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

March 23-27, 2006
La Jolla, California U.S.A.

TABLE OF CONTENTS

Plenary Report – 44 pp.

Annex 1: **Agenda** – 1 p.

Annex 2: **List of Participants** – 5 pp.

Annex 3: **List of Documents** – 2 pp.

Annex 4: **Report of the Marlin and Swordfish Working Groups Joint-Meeting**
(August 29 – September 2, 2005, Shimizu, Japan) – 37 pp.

Annex 5: **Report of the Marlin Working Group Meeting**
(November 15-21, 2005, Honolulu, HI, U.S.A.) – 23 pp.

Annex 6: **Report of the Albacore Working Group Meeting**
(November 28 – December 2, 2005, La Jolla, CA, U.S.A.) – 30 pp.

Annex 7: **Report of the Bluefin Tuna Working Group meeting**
(January 16-20, 2006, Shimizu, Japan) – 30 pp.

Annex 8: **Report of the Statistics Working Group meeting**
(January 23-24, 2006, Shimizu, Japan) – 15 pp.

Annex 9: **Report of the Bycatch Working Group Meeting**
(March 20-22, 2006, La Jolla, California, U.S.A.) – 22 pp.

Annex 10: **Report of the Marlin and Swordfish Working Group Joint Meeting**
(March 20-22, 2006, La Jolla, California, U.S.A.) – 34 pp.

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

Plenary Session, March 23-27, 2006
La Jolla, California U.S.A.

Background

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

The ISC provides scientific advice on the stocks and fisheries of tuna and tuna-like species in the North Pacific to the Member governments and regional fishery management organizations. For the recent year 2004, for which complete statistics have been tabulated by ISC Members and reported for their fisheries operating in the North Pacific, the total landed was 554,000 metric tons (mt) of the major species (albacore – *Thunnus alalunga*, bigeye tuna – *T. obesus*, Pacific bluefin tuna – *T. orientalis*, yellowfin tuna – *T. albacares*, skipjack tuna – *Katsuwonus pelamis*, swordfish – *Xiphias gladius*, striped marlin – *Tetrapterus audax*, and blue marlin- *Makaira nigricans*). In comparison, the reported catch for 2003 was 699,600 mt. The Sixth Meeting of the ISC Plenary was held March 23-27, 2006 in La Jolla, CA, U.S.A.

1. Opening

The Sixth Meeting convened at 9:00 a.m., March 23, 2006, as scheduled. The ISC Chairman, Gary Sakagawa, opened the meeting by welcoming all participants. Delegates were asked to briefly introduce themselves. All ISC Members were represented with the exception of China, FAO and PICES (Annex 2 – List of Participants).

Following the opening, William Fox, Head of Delegation for the U.S. and Director of the NOAA Fisheries Southwest Fisheries Science Center (SWFSC), welcomed the Members and Observers to the Sixth ISC Plenary Meeting in La Jolla. He particularly welcomed the new Observers from the Philippines and the Scientific Committee of the Western and

Central Pacific Fisheries Commission (WCPFC). He noted that the Sixth ISC Meeting in La Jolla is the first one to be held on the U.S. mainland. W. Fox briefly described the SWFSC, its history and research programs. Then, he recounted the history of the ISC, emphasizing its purpose when created. W. Fox praised the progress of the ISC and pointed to its important work for the future, especially as the pan-Pacific scientific committee for tuna and tuna-like fishes of the North Pacific Ocean and scientific advisor to the WCPFC's Northern Committee.

Anne Allen, staff member of the SWFSC, provided a brief orientation for the participants. She covered a few logistical details and introduced a team of support staff to assist participants with the wireless internet connection, file sharing, and clerical services. Finally, she announced the schedule of planned social events which included a dinner banquet held at the Scripps Birch Aquarium on Saturday evening. Participants were made aware of Plenary documents (Annex 3 – List of Documents) which were also available as electronic copies through two host computers.

2. Adoption of Agenda and Appointment of Rapporteurs

The provisional agenda (Annex 1) was reviewed, and the Chairman added an item under the topic of 'Stock Status and Conservation Advice' on biological reference points. In addition, Section 3 (Delegation Reports) was modified to accommodate a report to be given by the Philippine delegation. The provisional agenda was otherwise accepted as presented. The list of Plenary documents was then reviewed. In particular, the Chair pointed out the draft Operations Manual for the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC/06/PLENARY/02), which is being developed to contain the terms of reference of the Committee, and the various MOUs between the relevant Fisheries Commissions and Observers and the ISC. The Chair requested that the delegates review the draft document and provide comments to be included in the revision of the draft.

Rapporteurs from the delegations were appointed to assist with preparation of the Plenary Report, listed here followed by the sections for which they were responsible: S. Kohin and R. Hewitt (lead rapporteurs); A. Coan (8); R. Conser (9,10); P. Crone (5); G. DiNardo (6); K. Piner (6,7); R. Skillman (3); M. Stocker (11,12); K. Uosaki (3); and H. Yamada (8).

3. Delegation Reports on Research and Fishery Monitoring

3.1 Canada

Max Stocker presented a summary of catch, effort, and catch per unit of effort (CPUE) data for the Canadian North Pacific albacore fishery in 2005 (ISC/06/PLENARY/04). The Canadian fishery for albacore in the North Pacific is a troll fishery using tuna jigs. All Canadian vessels must carry logbooks while fishing for highly migratory species. Detailed analysis of a combination of sales slips, logbooks, phone-in and transshipment records are undertaken to report fisheries statistics for the Canadian albacore fishery.

In 2005, 201 Canadian vessels operated in the North Pacific and caught 4,963 mt of albacore in 8,530 vessel days of fishing for a CPUE of 0.58 mt/vessel-day. Estimates for 2005 are considered preliminary. Both catch and CPUE have followed an increasing trend over the period 1995-2004 and then dropped in 2005. As in previous years, most of the 2005 catch was taken within 200 miles of the North American coast. Access by Canadian albacore vessels to waters in the U.S. EEZ is governed by a U.S.-Canada albacore treaty.

In terms of research activities, a project to document the existing relational database for the Canadian Pacific albacore catch and effort data is underway. A technical report is being prepared that describes the design of the entire database (including trip log, sale slip and hail components) based on a Venn diagram concept, and includes the relationship diagram that documents the structure of the relationships between these components.

Discussion

In response to a question about the lower catch of albacore in 2005, M. Stocker responded that catches often fluctuate due to environmental and other causes. Lower catches in 2005 are within the range of variability, and the U.S. fleet also experienced lower catches in 2005 as well. Perhaps the cost of fuel was a factor.

3.2 Chinese-Taipei

Feng-Chen Chang reported on the fisheries of Chinese-Taipei targeting tuna in the North Pacific Ocean (ISC/06/Plenary/06). Distant water longline (DWLL) and offshore longline (OSLL) are the two major tuna fisheries in the North Pacific Ocean. The total number of DWLL vessels in the entire Pacific Ocean was 137 in 2004 but reduced to 133 in 2005. Albacore is the major catch of DWLL in the northern region. The catch has increased significantly since 1995, but the amount is still less than 10% of the albacore catch by all the fleets in the region. Catches in 2004 are estimated as 4,061 mt, a continuous decrease since 2000. The proportion of northern catch to the entire Pacific Ocean catch has declined from 44% in 2000 to 23% in 2004. The size of albacore caught by the DWLL for 2000-2003 ranged from 40 to 120 cm fork length (FL) with two modes: roughly 70-85 cm FL and 90-105 cm FL. Albacore caught by the OSLL represented a single mode within the range of the second mode (90-105 cm FL) of the DWLL fleet. North Pacific swordfish and bluefin tuna were mainly caught by the OSLL. The 2004 catch estimates were 3,167 mt and 1,714 mt, respectively, with preliminary 2005 estimations of 3,200 mt and 1,700 mt, respectively.

Discussion

While catches of blue marlin were reported, the ISC noted that catches of striped marlin were not and that catches by the drift gill net fishery were also not included. F.-C. Chang responded that the catches of striped marlin were small and were thus not included. The

Chair indicated that all HMS fisheries takes should be reported to the ISC, and the Chinese-Taipei delegation indicated that they would work toward doing so. It was pointed out that the STATWG had not developed a standard list of species to be included but that it might be a good idea to do so. While most of the effort by the longline fleet occurred in the central North Pacific, some occurs near the Philippines. F.-C. Chang indicated that the catch near the Philippines is mostly yellowfin tuna and bigeye tuna and that the smaller vessels in the fleet likely fish in that area because it is closer to the landing ports. It was noted that the catch rate of bigeye tuna by these smaller vessels off the Philippines might be low judging from the observation of distant-water longliners in which the catch rate of bigeye tuna is low in the western Pacific and lower than in the eastern Pacific Ocean.

3.3 Korea

Jeong-Rack Koh reported on the Korean fisheries operating in the North Pacific Ocean (ISC/06/PLENARY/12). Korean fisheries of the North Pacific Ocean are classified as offshore fisheries that catch Pacific bluefin tuna (PBF) by purse seine vessels and far sea fisheries. PBF as bycatch consists of fish of small size, less than one meter fork length, most of which are exported to the Japanese markets for sashimi. During 2000 to 2005, average catch of PBF from 33 purse seine vessels and 4 trawlers amounted to 900 mt, but the catch varied between 594 and 1,591mt. In 2005, the catch was lower than in 2004, mainly due to the decrease in purse seine catch. Fishing grounds for PBF were mainly scattered in the southern waters of Korea near the Cheju and Tsushima Islands, with occasional catches taken in the Yellow Sea. However, catch distribution shows an annual fluctuation depending upon fishing success for the target species and oceanographic conditions. Total longline tuna production in the Pacific during the last 10 years has been fluctuating between 37,000 to 60,000 mt, averaging 48,000 mt and catches in the North Pacific Ocean ranged from 11,000 to 27,000 mt, averaging 18,000 mt during that period. Major species in the North Pacific Ocean longline catches are bigeye and yellowfin tunas, which comprised 74% of the total catch in these areas. In 2005, bigeye and yellowfin tuna catches decreased by 18% and 20%, respectively, while albacore and billfish catches increased compared with those in the previous year. To avoid or reduce mortality of seabirds and sea turtles by tuna longline vessels, guidebooks and posters containing information and a release manual for these species were distributed in 2005 to fishing boats, including to Korean tuna longline vessels.

Discussion

J.-R. Koh responded to several questions. First, all sizes of Pacific bluefin tuna, including the very small fish noted, are exported to Japan for sashimi. Second, he is aware of problems in translating Korean names of marlins to English (e.g. the document reported catch of white marlin, *Tetrapturus albidus*, a species not found in the Pacific Ocean) and will be working to solve the problem. Third, the "Other" species category includes mostly sharks and miscellaneous marlins. It was noted that longline catches of yellowfin tuna were relatively stable while catches of bigeye tuna varied. The ISC

agreed that movement of the Korean fleet north and south of the equator as well as east and west could help explain the variations in bigeye tuna catch.

3.4 Japan

Koji Uosaki reported on the Japan fisheries (ISC/06/PLENARY/10). Japanese tuna fisheries consist of three major fisheries, i.e. longline, pure seine, pole-and-line, and other miscellaneous fisheries like troll, drift net, and set net fisheries. Total landings of tunas, swordfish and billfishes in the Pacific Ocean in 2003 were 527,000 mt. The three major fisheries have accounted for more than 96% of catch in recent years. Total catch of longline vessels smaller than 20 GRT continually increased from the 1980s, peaked in 1997, and then decreased. The total catch was 33,000 mt in 2003. The effort of this fishery was relatively stable in the 1980s, but increased after that. The total catch and effort of longline vessels larger than 20 GRT had been stable until 1990, but both show decreasing trends since. The total catch was 49,000 mt in 2004. Bigeye tuna has been the dominant species in the landings. Total catch of the purse seine fishery in the waters north of 20ºN was variable during the documented period, ranging from 20,000 mt to 100,000 mt and was 58,000 mt in 2004. Skipjack tuna dominates in the purse seine catch, followed by bluefin and yellowfin tunas. The effort of this fishery was highest, at about 3,500-4,000 sets, in the mid 1980s but has been about 2,500-3,000 sets in recent years. Total catch of the offshore and distant water pole-and-line in the waters north of 20ºN was variable ranging from 90,000 mt to 200,000 mt and was 139,000 mt in 2004. Skipjack tuna and albacore dominate the pole-and-line catch. The effort of this fishery had decreased during the 1980s due to a decrease in the number of vessels, and it has been relatively stable since the early 1990s.

Discussion

K. Uosaki explained that the catch data are extracted from published reports by the Ministry of Agriculture, Forestry and Fisheries, with 2003 being the latest available. He also commented that the sizes of longline-caught albacore for 2003 shown in his report are small compared to the 2004 size composition because at the time of compiling the size data, the NRIFSF's size database application was not operating properly and only part of the available data was compiled; nonetheless, he noted that the 2003 size composition is more typical for the longline fishery than the 2004 size composition. The 2004 composition is considered atypical as well because it included measurements by training vessels only, which operate far from Japan, and catch mainly large-sized fish. The composition does not include the smaller fish caught by longliners in the waters near Japan. Updated figures will be provided. Regarding whether the increasing trend in coastal longline effort and coincident declining trend in distant water longline effort beginning around 1990 are related, K. Uosaki believes they are not. No vessels or licenses were transferred from the distant water and offshore longline fleet to the coastal longline fishery. Vessels in the coastal fishery are multipurpose and often switch targeted species and fishing modes (gears), as well. It was also suggested that the market for fresh sashimi quality albacore in Japan could affect targeting by this fleet. The decline that began around 1990 in the offshore fleet occurred mostly in the mid-sized vessels.

Furthermore, effort of the large longline vessels has declined due to a program initiated in the late 1990s to reduce the size of the longline fleet.

3.5 Mexico

Luis Fleischer described the recent trends of the Mexican tuna fisheries for yellowfin, bluefin, and albacore tunas, and swordfish (ISC/06/PLENARY/11). For striped marlin, Mexico submitted a complete report on the recreational fishery for this species for the MARWG assessment meeting.

In Mexico, the National Institute of Fisheries (Instituto Nacional de la Pesca, INP) is responsible for conducting scientific work and fisheries research concerning the marine and aquaculture resources of Mexico. It also has the mandate to give management advice to the fisheries authorities. Since 1992, the INP's research efforts have included the work of the National Tuna-Dolphin Program (Programa Nacional de Aprovechaminto del Atún y Protección del Delfín, PNAAPD), which closely monitors the activity of Mexican purse seine and longline fleets. The data reported is based on the combined efforts from these different yet unified groups. Catch and performance of the Mexican purse seine fleet has been closely monitored with 100% coverage by scientific observers.

The Mexican tuna purse seine fishery has been the largest in the ETP since the mid 1980's. The fleet concentrates mainly on yellowfin tuna. Other tuna species which are also caught in much lower proportions are: skipjack, bigeye, and black skipjack (*Euthynnus lineatus*) tunas as well as, more recently in northerly zones of the Mexican EEZ, Pacific bluefin tuna and albacore.

All the fishing zones for bluefin tuna are located along the northwest side of the Baja California peninsula, inside the Mexican EEZ. The catch of young (age 2-3) bluefin tuna for ranching is performed by commercial purse seine vessels (the same vessels targeting yellowfin tuna). In 2004, 80% of the bluefin tuna catch was utilized for ranching (pen rearing), and the other 20% went for local Mexican consumption. This bluefin tuna rearing activity represents an important economic incentive for the Mexican tuna fishery. The fishing season usually runs for five months, from May to September, which is the time corresponding to when the trans-Pacific migration of this stock brings the fish closer to the Mexican Pacific coast. These catches represent only a very small proportion of the total tuna caught by the Mexican fleet with an average annual catch of 413 mt for the entire period. The targeting of bluefin tuna began in 1996 with a high catch for the period of 3,700 mt. Then, in 2004, a new record catch of 8,548 mt was reported for this species.

The albacore catch data submitted to the ISC this year have been updated from those submitted for previous meetings of the ISC and North Pacific Albacore Workshop. Albacore catches are low because the fishery is performed in Mexico only optionally, or incidentally, when looking for bluefin tuna for ranching. Consequently, no reliable effort data are available. The data presented here are considered to be the best available estimates of the Mexican historic catches of north Pacific albacore.

The swordfish fishery in Mexico developed in two different phases. The longline fishery started in 1964 and the gill net fishery began in 1986. Since 1990, Mexican law requires that all billfishes (including swordfish) be reserved for sport fishing operations. This regulation designated a strip of fifty miles from the Mexican coast as a reserved zone for sportfishing of these species. Swordfish is the only billfish species commercially captured outside the defined corridor. The integrated swordfish fleet consisted of 24 active fishing vessels in 1992, 22 in 1995, and currently 21. The fleet operates mainly in the autumn and winter. Currently the Mexican longline fleet is concentrated in two areas, south of Punta Eugenia along the Baja California peninsula to roughly 23^{o}N, and from the 30^{o}N parallel to the Mexico - U.S. EEZ border.

Discussion

L. Fleischer clarified that the capture weights of Pacific bluefin tuna used for rearing represent fish of roughly 80-100 cm FL. Reported striped marlin catches are exclusively from the recreational fishery, and sailfish *(Istiphorus platypterus)* catches are not reported this time.

3.6 United States

Roger Hewitt reported data on seven U.S. fisheries that operate in the North Pacific and catch tuna and tuna-like species (ISC/06/PLENARY/13): purse seine, longline, distant-water troll, pole-and-line, nearshore troll/handline, gill net and harpoon, with the first three landing the majority of fish. The 2004 purse seine fishery operated in the western-central Pacific (21 vessels) and the eastern tropical Pacific (3 vessels) between 20°N to 20°S; catches north of the equator have averaged 20,000 mt since 2000 and are composed primarily of skipjack tuna with lesser quantities of yellowfin and bigeye tunas. The 2004 longline fisheries operated out of Hawaii (105 vessels) and California (20 vessels); combined catches have averaged 8,000 mt since 2000 with the proportion of swordfish decreasing and bigeye tuna increasing. The 2004 distant-water troll fishery operated off the west coast of North America and west along the North Pacific transition zone to 160°E longitude; catches have averaged 12,000 mt since 2000 and are composed primarily of albacore. Categories I, II and III data were collected from the 3 major fisheries.

Southwest Fisheries Science Center and the Pacific Islands Fisheries Science Center collaborated with other government and academic laboratories on pelagic fisheries-related research. These studies can be grouped into three broad categories: stock assessment (e.g. albacore, striped marlin, bluefin tuna); biological and oceanographic research (e.g. archival tagging, habitat definition, age, growth, diet, movement, stock structure); and fishery management (e.g. quantification of fishing capacity and productivity, socio-economic analyses of conservation incentives and impacts of regulatory actions, workshops on ecosystem approaches to management and reduction of sea turtle bycatch).

Discussion

R. Hewitt confirmed that U.S. albacore catches, like Canadian catches, were down in 2005. The typical offshore fishing grounds did not materialize in either 2004 or 2005. Responding to a question about the albacore fishery in the South Pacific Ocean, the U.S. delegation said that raising fuel costs might lead to declines in effort in that fishery. It was noted that some purse seine effort is apparently occurring within the Mexican EEZ, but the nature of the catch was not known. However, it was stated that most purse seine effort in waters outside the Mexican EEZ is directed toward yellowfin tuna. In response to a question about the size of albacore caught near Hawaii, it was indicated that albacore size composition information from the Hawaii-based longline fishery appears in the Nineteenth North Pacific Albacore Workshop Report (ISC/06/PLENARY/INFO1).

3.7 IATTC

Rick Deriso briefly summarized the EPO tuna landing statistics for the recent years (ISC/06/PLENARY/09). These values are published annually in an IATTC Fishery Status Report and can be accessed online at http://www.iattc.org/FisheryStatusReportsENG.htm. In general, in 2004 catches were lower for the 3 major species (yellowfin, bigeye and skipjack tunas) than in the previous 3 years.

3.8 SPC

John Hampton described the tuna fisheries operating in the area covered by the Western and Central Pacific Fisheries Commission (WCPFC). These fisheries are now recording catches of major target species of almost 2 million mt annually. Catches are dominated by skipjack tuna (~1.2 million mt) and yellowfin tuna (400,000-500,000 mt), with smaller catches of bigeye and albacore tunas. The purse seine fishery has the largest catch, with longline and pole-and-line gears also important. Domestic fisheries in the Philippines and Indonesia catch large quantities of mainly juvenile tuna using a range of fishing methods.

The SPC Oceanic Fisheries Programme (OFP) has coordinated monitoring of the WCPO fishery for around 30 years and manages an extensive database incorporating operational level catch-and-effort (logbook) data, aggregated catch, effort and size data provided by fishing nations, and sampling data from in-port and at-sea observer programs. The OFP is currently acting as data manager for the WCPFC. Other OFP research activities include stock assessment of skipjack, yellowfin, bigeye and south Pacific albacore tunas (and provision of these assessments to the WCPFC), ecosystem research and various species-specific biological studies. A major research focus over the next few years will be a large scale tuna tagging project, the first phase of which should begin in Papua New Guinea in late 2006.

Discussion

In response to some statements made earlier in the meeting regarding the stock boundary of North Pacific stocks of interest to the SPC and the IATTC, a member of the IATTC scientific staff stated that in their experience the equator has not been found to be a boundary for fish stocks. It was also pointed out that the IATTC has not stratified discard catches by area for stock assessment purposes as may be needed by the ISC for assessments of stocks in the North Pacific.

3.9 Philippines

Noel Barut reported on the Philippine fisheries. The annual tuna production has been showing a steady upward trend from 238,128 mt in 1993 to 328,043 mt in 2001. In 2002, the production increased to 407,584 mt and reached 530,411 mt in 2005. The total production includes frigate/bullet tuna (*Auxis* spp.), yellowfin/bigeye tuna, eastern little tuna (kawakawa – *Euthynnus affinis*) and skipjack tuna caught by commercial and municipal fishing vessels. Commercial fishing vessels are vessels 3 GT and above while those that are less than 3 GT are classified as municipal fishing vessels.

Before 2005, yellowfin and bigeye tuna catches were aggregated in the statistical records due to the difficulty in identification to the species level. For 2005, however, statistics were recorded for the two species separately. The combined production of yellowfin/bigeye tuna was 38,083 mt in 1993 and increased to 129,553 mt in 2004. In 2005 the yellowfin tuna catch was 114,027 mt while the bigeye tuna catch was 21,686 mt.

The average billfish production was 11,890 mt for 2000 to 2004, comprised mainly of marlin (blue marlin and black marlin – *M. indica*) - 1,983 mt, swordfish – 4,592 mt, and sailfish – 5,315 mt. Billfish are normally landed dressed (headless, finless, tailless, and gutted).

The Western and Central Pacific Fisheries Commission is currently funding a two-year tuna monitoring project in the Philippines, which will end in December 2006. The project is basically aimed at collecting and processing catch and effort data, as well as biological data. Future research activity includes the survey of bluefin tuna fish eggs and larvae in the Pacific waters to the northeast of the Philippines. The survey will verify reports that the area is the spawning ground for bluefin tuna. The Philippines would welcome any assistance ISC could provide, especially in the identification of bluefin tuna larvae and other analysis that could be done.

Discussion

N. Barut indicated that handline gear fished at night and during the day around anchored FADs is the primary gear taking swordfish. Regarding the marlin catches in the Philippine report, they were compiled only from domestic vessel records. Almost all billfish are landed dressed (headed, tailed, finned, and gutted). Sailfish are harvested by

the Philippine fisheries throughout the year, mostly in the summer, and size varies by season. They do collect data from the Chinese-Taipei longline vessels based in Davao, but these data are not included in Philippine fishery statistics. The Chinese-Taipei delegation indicated that they started collecting data from many operations such as this throughout the Indo-Pacific. They noted that the rate of submission varies between base operatives, and they are attempting to improve the situation.

4. Report of Chairman

The ISC Chairman provided a brief report on performance of the ISC since the Fifth Plenary Meeting and on challenges ahead for the near-term. He remarked that the Committee is making significant progress in transforming itself from a loosely organized entity with a limited work plan to a more tightly organized team with a business-oriented work plan. Currently, the organizational structure consists of six Working Groups reporting to the ISC Plenary. The primary objective of the species Working Groups (Pacific Bluefin Tuna – PBFWG, Albacore – ALBWG, Marlin – MARWG, and Swordfish – SWOWG) is to assess the condition of their relevant stocks and to conduct research that reduces the uncertainties in the assessments, including uncertainties in forward projections of stock condition. For the Statistics Working Group (STATWG), the primary objective is to manage the ISC database and website in order for the Working Groups and Plenary to perform their assignments and responsibilities efficiently. For the more recently organized Bycatch Working Group (BYCATWG), its principal responsibility is assembling data on, and where possible, assessing the status of populations of animals considered to be bycatch species caught by fisheries targeting tuna and tuna-like species in the North Pacific Ocean. During the past year, seven intercessional meetings were held with each Working Group meeting at least once, and Working Group Reports are provided for review at this Sixth Plenary Meeting.

Progress has also been made with respect to administrative matters, including advancing an MOU between the ISC and the WCPFC to its final stage, soliciting a draft MOU from the IATTC that outlines the relationship between that organization and the ISC, drafting an Operations Manual (ISC/06/PLENARY/02), and organizing the Sixth Plenary Meeting, among other achievements.

Looking ahead for the next year or two, the challenges will be in establishing performance measures on two levels: resource conservation and Member contribution. Resource conservation should be measured in terms of biological reference points or benchmarks that are consistent with international requirements for application of the precautionary approach. Member contribution should be assessed with respect to meeting the terms of the ISC Membership pledge: submitting fishery data; upgrading sampling coverage; and following through with research responsibilities. To this end, Members are expected to be consistent in fulfilling data submission obligations, cooperate by financially supporting recommended stock assessment research and Working Group participation, and by assigning only professionally qualified persons to Working Groups.

The Chairman ended by thanking the Working Groups, ISC Members, and Observers and said he looks forward to working with them in the coming year in advancing the work of the ISC.

5. Reports of Working Groups

5.1 Albacore Working Group

Max Stocker, Chair of the Albacore Working Group, presented an overview of the ISC Albacore Working Group (ALBWG) Meeting held at the Southwest Fisheries Science Center in La Jolla, CA from November 28 - December 2, 2005 (Annex 6). The primary focus of the Meeting was to outline preparations for conducting the 2006 north Pacific albacore assessment. The Meeting also considered appropriate reference points for north Pacific albacore; choice of modeling platforms for the 2006 assessment; research studies needed to improve knowledge of albacore biology; the process to update fisheries data; and to update albacore catches to 2004. A total of 20 participants from Canada, Chinese-Taipei, Japan, U.S.A., and IATTC attended the Meeting. Although Mexico was unable to attend, they provided an update of their catch statistics. A total of 14 working documents were tabled.

Albacore are a valuable species with a long history of exploitation in the eastern and western North Pacific Ocean. The total catch of north Pacific albacore for all nations combined peaked at a record high of 124,800 mt in 1976, then declined to a low of 37,300 mt in 1991. In the early 1990s, catches increased again, peaking in 1999 at 124,900 mt, and averaging 91,600 mt between 2000 and 2004 (see Table 1). The catch in 2004 was 86,100 mt, which is 6% below the 2000-2004 average. During the past five years, fisheries based in Japan accounted for 66.6% of the total harvest, followed by fisheries in the United States (15.9%), Chinese-Taipei (8.2%) and Canada (6.3%). Other countries targeting the north Pacific stock contributed 2.8% to the catch and included Korea, Mexico, Tonga, Belize, Cook Islands, and Ecuador. While various fishing gears have been employed over the years to harvest albacore in the North Pacific Ocean, the main gears used during the last five years were longline (37.5%), pole-and-line (36.8%), and troll (20.2 %). Other gears used since the mid-1990s include purse seine, gill net, and recreational fishing gears, which combined accounted for roughly 5.5% of the total catch of albacore from the North Pacific Ocean over the last five years.

As in past Meetings/Workshops, participants emphasized the need to continue research efforts that address biological issues surrounding north Pacific albacore. The ALBWG reviewed various research studies that generally addressed the biology of albacore, including: migration (archival tagging projects); reproduction (fecundity/maturity-related research); and growth (weight-length relationship). It was suggested that collecting sex ratio at length/age information is of utmost importance in a maturity study, given the importance of this information for stock assessment. In this context, a biology-related Task Group was appointed to further evaluate the merits/drawbacks of a Pacific Ocean-wide sampling design for collecting data in the field necessary to update parameters of interest, such as maturity, and age/growth.

Annual submission of fishery data (Category I, II, and III) by Data Correspondents to the ALBWG Data Manager for inclusion in the database is a requirement of ALBWG Members. Correspondents must pay special attention to submitting up-to-date fishery data on a timely basis and well in advance of planned ALBWG Meetings.

In response to presentations concerning alternative assessment models, the ALBWG felt it was time to commit fully to conducting an assessment using a forward-simulation model for the 2006 assessment. In addition, conducting a VPA assessment was considered necessary in order to have continuity with previous consensus-based assessments, before an alternative model is selected for future assessments. The ALBWG agreed that assessments for the 2006 Meeting will be conducted using the Stock Synthesis 2 (SS2) and VPA-2BOX platforms. A Task Group was appointed to conduct the analyses, including the data preparation work, making decisions about the model parameterizations, conducting preliminary assessments and projections, and providing sufficient model diagnostics for review at the 2006 assessment Meeting. Finally, the Working Group planned 2 meetings to complete the planned assessment for 2006: the assessment-related Task Group will meet July 13-17, 2006 in Nanaimo, BC, Canada to review biological information needed for the assessments, data preparatory work, and model exploration; the full ALBWG will meet at the end of 2006 (November 28-December 5) in Shimizu, Japan to review and finalize the formal stock assessments.

Discussion

- The ISC agreed that the ALBWG should further review data, particularly catch information, that are available from the period prior to the mid 1970s. The current stock assessment is based on a time period beginning in 1975.
- The ISC agreed that additional catch-effort and size (length) data available from both the Japan and U.S.A. fisheries from the early 1950s should also receive critical review for inclusion in a time-expanded model scenario.

5.2 Pacific Bluefin Tuna Working Group

Harumi Yamada, Chair of the Bluefin Tuna Working Group, reported on the Fourth Meeting of the Pacific Bluefin Tuna Working Group (PBFWG) held in Shimizu, Japan from January 16–20, 2006 (Annex 7). Scientists from Chinese-Taipei, Japan, U.S.A., and the IATTC participated in the meeting, with a primary objective to update the stock assessment last conducted in 2004. Annual catch has fluctuated between 8,000 to 35,000 mt from 1952 to 2005. In recent years, after declining to 8,000 mt in 1990, the catch increased to 29,000 mt in 2000. Since 2001, the annual catches were relatively stable, ranging from 16,000 to 22,000 mt. Catch time series also included minor catches (less than 100 mt) from fisheries associated with non-Member nations. It is assumed that bluefin tuna in the Pacific Ocean represent a single stock. A tuned VPA was conducted for purposes of estimating important management-related stock parameters, such as biomass and spawning stock biomass (1952-2005). In general, results were similar to those produced in the assessment conducted in 2004. A test run of the fully-integrated,

length-based/age-structured model (SS2) was also conducted to evaluate its potential use in future assessments. The results from SS2 showed some differences from the VPA runs, particularly in the early period of the modeled time series. It was noted that there was a high degree of uncertainty in the catch-at-age data and CPUEs in the early period, as well as uncertainty regarding this species' growth parameters. Biomass projections were carried out based on the VPA results. The projections indicated that, provided fishing mortality remains at recent levels, a strong year class in 2001 would maintain spawning stock biomass above recent levels until 2010.

Discussion

- The ISC noted that the current consensus of the scientific community is that PBF should be considered as a single stock in the Pacific Ocean. Population models should thus reflect this assumption and include fishery-dependent data currently collected by various management bodies throughout the Pacific Ocean. In this context, the ISC agreed that the PBFWG should consult with other organizations to ensure that their data have been summarized appropriately.
- Catch data for Pacific bluefin tuna are not part of the current WCPFC data exchange requirement, but the ISC noted that bluefin tuna data should be added to the requirement. This will be proposed to the WCPFC Scientific Committee this year so that PBF data throughout the WCPO would be available for future assessments.
- The ISC suggested that further details of the results from the various model comparisons presented be included in the PBFWG Report, or an amendment to the Report.
- The ISC noted that there is a need to decide how the PBFWG should proceed in 2006-07 with respect to the scheduling of intercessional meeting(s) and the next formal assessment.

5.3 Marlin and Swordfish Working Groups

Gerard DiNardo, Chair of the Marlin Working Group, presented the reports of the First Joint Intercessional Meeting of the Marlin and Swordfish Working Groups convened in Shimizu, Japan from August 29 to September 2, 2005 (Annex 4) and the Striped Marlin Stock Assessment Workshop convened in Honolulu, Hawaii from November 15 to 21, 2005 (Annex 5). The goals of the joint intercessional meeting were to bring together scientists conducting research common to both Pacific marlins and swordfish, review information concerning marlin resources in the North Pacific, and develop a work plan to support completion of a striped marlin stock assessment. The goals of the striped marlin stock assessment workshop were to bring together scientists to review and compile submitted data and assess the status of striped marlin in the North Pacific. At the Intercessional Meeting, discussion topics included 1) fisheries statistics (north Pacific albacore tuna database, country reports, and Category I, II, and III data), 2) biological data, 3) abundance indices, 4) stock assessment models and data requirements, including a proposal for the establishment of a formal peer-review process for ISC stock assessments, and 5) future meetings, workshops, and symposia. A proposal was also presented for convening the first world symposium on swordfish, as well as a

presentation on an assessment schedule (order of assessments) for the Marlin and Swordfish Working Groups; north Pacific striped marlin, north Pacific swordfish, and Pacific blue marlin. Guidance was sought from the ISC Membership on the development of a formal peer-review process of ISC stock assessments.

Discussion topics at the striped marlin stock assessment workshop included 1) the review of Category I, II, and III data, 2) review of area stratification and abundance indices (GLM and statistical habitat models), and 3) assessment models and model structure. It was decided that three models would be applied to the data, two integrated modeling platforms (MULTIFAN-CL and SS2) and a biomass dynamics model (Bayesian production model). Model runs could not be completed at the Workshop due to a suite of data related issues. Guidance was sought from ISC Membership on 4 issues that impeded the completion of the stock assessments by the MARWG. They include the development of 1) efficient protocols for submitting, verifying, and maintaining Category I, II, and III data, 2) procedures for the collection and verification of detailed data by Working Group Chairs to support stock assessments, 3) a mechanism that "persuades" countries to submit data should be implemented (data requests are generally ignored by many countries), and 4) efficient arrangements for sharing data between Organizations/Institutions housing data from the North Pacific. It should be noted that the issues outlined above were discussed and potential solutions for many of them recommended at the January 2006 meeting of the ISC Statistical Working Group.

Robert Humphreys, Chair of the Swordfish Working Group, reported on the Joint Marlin and Swordfish Working Group (MARWG & SWOWG) Meeting held on March 20-22, 2006 (Annex 10). The principal goals were to: 1) review the quality and limitations of existing data; 2) review provisional results of striped marlin stock assessment models; and 3) develop a work plan to support completion of future swordfish and striped marlin stock assessments.

For striped marlin, participants reviewed the results of three biomass dynamic models which included a Bayesian production model, a Logistic and Fox production model using ASPIC software, and an age-structured production model. Initial results from all three models suggest a decline in striped marlin stock biomass, although results remain provisional due to a suite of unresolved data issues. Future work on striped marlin will need to improve the standardization of Japanese longline CPUE during the 1952-1962 time series and during the mid-1970s. Additional sensitivity analyses should be conducted for all three models and the size discrepancy between the longline and purse seine fleets needs to be investigated. More advanced stock assessment models will also need to be utilized. The Marlin Working Group sought guidance from the ISC Plenary regarding data requests to ISC Member countries that go unheeded.

The Swordfish Working Group focused on three main issues: 1) developing a timetable for a 2008 completion of the next north Pacific swordfish stock assessment; 2) the identification of potential data sources from ISC Member countries and Organizations; and 3) a proposal to take the lead in organizing a "1st World Swordfish Meeting" to be held in the Western Pacific in Fall 2008. The Swordfish Working Group Chair sought

the ISC's guidance and advice regarding this proposed World Swordfish Meeting and asked for assistance in getting catch data information on the Spanish longline fleet working in the Pacific.

Discussion

- The ISC echoed the presenters' feelings concerning the critical need for better support from the Member nations in terms of data requests and overall participation in these species' Working Groups.
- The ISC supported (conditionally) the proposal to begin efforts at holding a "World Swordfish Meeting" sometime in the near future (likely 2008). In this context, R. Humphreys was appointed as the coordinator for this endeavor and further, to keep the ISC Plenary abreast of any progress or additional support that would be needed to meet this goal. Finally, it was emphasized that initial invitations/input should include management bodies and researchers that are associated with other swordfish fisheries in other oceans (particularly, ICCAT/Atlantic Ocean); however, if these efforts become overly problematic (e.g., due to scheduling difficulties), a Pacific Ocean-only effort should be pursued.
- The Working Group should explore the nature of the catch and release data for marlin from the Mexico and U.S. sport fisheries.

5.4 Statistics Working Group

Naozumi Miyabe, Interim Chair of the Statistics Working Group (STATWG), reported on the Fifth Meeting of the Statistics Working Group held in Shimizu, Japan on January 23-24, 2006 (Annex 8). Chinese-Taipei, IATTC, Japan, and U.S.A. participated in the meeting but other Members were unfortunately missing. Of the 8 designated data correspondents, only three (IATTC, Japan and U.S.A.) attended. There were three working documents presented at the meeting. Considerable review and discussion were given to: 1) the data requirements for stock assessment and how to manage them; 2) data submission by participants; 3) developments in the ISC database system; 4) data reporting protocol; 5) the ISC website; and 6) problems and requests from the species Working Groups. The STATWG generally agreed that there need to be two data sets: those submitted by the National Correspondents and those used by the species Working Groups for stock assessment. The latter may include data that are in finer detail and that encompass a larger area than in the official data. Making backups and maintaining security of these data are thought to be important responsibilities of the ISC database administrator. Regrettably, most countries did not report data by the designated deadline, July 1, 2005. To improve the situation, several suggestions were raised. The ISC database system was further developed, including enabling the use of comma separated (CSV) files and allowing the individual country to directly submit its data. With respect to data, a reporting protocol, codes, and acceptable data formats still need to be improved. Whenever the previously submitted data are modified or corrected, the data correspondent should provide a written report that states the reasons and procedures used. The ISC website should have various roles such as posting meeting announcements, meeting reports, meeting documents and other material. From the species Working

Groups, a number of issues were raised such as efficient protocols for data submission, verification and maintenance of official data, as well as other data requirements for stock assessment. At the end of the meeting, various recommendations were made and assignments were given to individuals and/or groups to assure action.

Discussion

- The ISC noted that each Member nation should appoint Data Correspondents that are knowledgeable with their respective database(s) to ensure Working Group requests are supported in an accurate and efficient manner.
- The ISC strongly emphasized that the centralized ISC database(s) receive the highest priority, given this information is the foundation of all scientific research efforts. In the interim, a temporary system will be in place that follows protocols established by the ALBWG. That is, the 'ftp' site and protocols for data submission documented for albacore-related data (Category I, II, and III data) will be used for the ISC Working Groups until the permanent system is functional. Finally, exchange of data with other management bodies is a critical part of ongoing (as well as future) MOUs. Thus, data exchange protocols should necessarily consider rules established by these other institutions.

5.5 Bycatch Working Group

Chris Boggs, Chair of the Bycatch Working Group (BYCATWG), described the First Meeting of the Group (Annex 9). The BYCATWG heard reports on bycatch monitoring and research from the U.S.A., Japan, Korea, Mexico, IATTC and the Philippines. The group heard and discussed reports on shark, sea turtle, and seabird bycatch and stock status, as a foundation for developing a set of general work plan objectives. The Working Group will develop specific activities and collaborations to address the general objectives at its next meeting. The BYCATWG general objectives are:

1. Bycatch Estimation: Members are encouraged to initiate or continue the estimation of bycatch (turtles, seabirds, sharks, and other bycatch species) in all major fisheries for pelagic species in the North Pacific based on logbook data, observer data, or any other available information.
2. Priority Data for Bycatch Assessment: Members are encouraged to provide any available bycatch information in three categories of descending urgency. These are: 1) estimates of removals; 2) catch and effort data and other logbook-type data; and 3) biological data (size, age, gender, etc.).
3. Observer Programs: Provide scientific and technical guidance towards the development and standardization of observer programs and the training of observers in all relevant fisheries in collaboration with other commissions.
4. Identify Fishery Information Necessary to Monitor Bycatch: Such details might include additional species of interest (e.g. mahimahi – *Coryphaena hippurus*), the recording of discards in logbooks, and observations regarding the condition of bait (e.g., frozen or thawed) and discards (e.g., alive or dead), etc.

5. Assess 'Data Sparse' Species: Develop stock assessment models for bycatch-related species that have limited sample information.
6. Inter-fishery Comparisons of CPUE: Comparisons between different operational characteristics within fishing styles (i.e. monofilament versus multifilament longline gears, etc.) can help for many assessment and estimation models where data are incomplete for one style or the other. Calibration research is encouraged.
7. Collaboration with Other Commissions: Encourage ongoing cooperation to assess bycatch in other areas by fisheries capturing tuna and tuna-like species (e.g. tropical areas). The BYCATWG will rely on those efforts to provide bycatch information on species that contribute to total bycatch of populations also impacting temperate fisheries of more direct concern to the ISC.
8. Gear Research: Continue development and testing of alternative fishing gear to reduce bycatch.
9. Bycatch Handling and Release: Encourage outreach and local adaptation of bycatch handling and release guidelines to improve survival of released bycatch.
10. Support a Bycatch Relevant Reference List: Links to additional informational references will be provided by the BYCATWG for listing on the ISC web site.
11. Marine Mammals: Invite further input and discussion on the possible seriousness of impacts to marine mammals at the next Working Group meeting, particularly regarding improved technologies for estimating the population size and regarding any promising new ideas for mitigation technology. The BYCATWG will include an expert on this topic for the next meeting. Based on information presented at its initial meeting, the BYCATWG does not recommend broadening its focus to marine mammal interactions at this time.

Discussion

- The ISC suggested that the BYCATWG 'firm up' its research assignments for the upcoming years, particularly, identifying studies and related work necessary to meet the overall goals defined above.
- The ISC noted that as the BYCATWG proceeds with scheduling work tasks, they should be cognizant of similar efforts by the other regional fishery management organizations.
- It was noted that the IATTC provided a promising draft plan for the comprehensive assessment of key shark species for comment by the ISC.

6. Stock Status and Conservation Advice

6.1 Albacore

M. Stocker presented a summary of work on determination of stock condition of north Pacific albacore. A stock assessment was not conducted at the ALBWG meeting in 2005. The most current stock status information can be found in the Report from the Nineteenth North Pacific Albacore Workshop (ISC/06/PLENARY/INFO1). The next north Pacific albacore assessment will be conducted in November/December 2006. The stock status

conclusions and recommendations for north Pacific albacore from the "Report of the Plenary Session of the Fifth Meeting of the ISC" are as follows:

> *"Stock assessment results indicated that the current level of spawning stock biomass (i.e., SSB_{2004} = 165,000 mt) is largely reflective of a very strong 1999 year-class that eventually became a major contributor in 2004 as part of 'mature' (spawning) biomass. However, the assessment also indicated that more recent recruitment declined to levels more typical of the extended historical time series. These lower recruitments result in reduced levels of forecasted SSB, particularly, when assuming high F scenarios within the overall uncertainty analysis. Lower recruitment coupled with a current fishing mortality rate (F_{2003}) that is high relative to commonly used reference points, may be a cause for concern regarding the future stock status of North Pacific albacore. Thus, the ISC noted the critical need to closely monitor the population over the coming years, and recommends that the Albacore Working Group carry out another stock assessment in 2006.*
>
> *Based on the preliminary SSB simulation analysis, the ISC advises as follows.*
>
> *Future SSB can be maintained at or above the minimum 'observed' SSB (43,000 mt in 1977) with F's slightly higher than the current F range. However, the lowest 'observed' SSB estimates all occurred in late 1970's and may be the least reliable estimates of SSB. A more robust SSB threshold could be based on the lower 10th or 25th percentile of 'observed' SSB. If so done, current F should maintain SSB at or above the 10th percentile threshold but a modest reduction from current F may be needed to maintain SSB at or above the 25th percentile threshold."*

M. Stocker also described the efforts of the WG to address biological reference points for north Pacific albacore. Currently, alternative proxies for particular biological reference points of interest (e.g., MSY-related) are computed for the albacore stock. The proxies, however, span a wide range and thus, further research is needed to better define appropriate biological reference points for this fish population, including both MSY- and overfishing-related target levels. Such research should include determining robustness of the proxies through simulation studies, and using both equilibrium and non-equilibrium (stochastic) assumptions. Analysis of appropriate reference points for species with similar life histories to albacore could provide a basis for selecting the appropriate proxies for albacore.

The Working Group produced a list of candidate target and limit reference points that were taken from previous albacore workshop reports, the last ISC ALBWG meeting, and other management bodies (e.g., ICCAT and IATTC). For example, MSY-related reference points have been used for tunas and billfishes in ICCAT and IATTC. No specific recommendations regarding reference points are made at this time. The Working Group will need to consult with the Commissions (IATTC and WCPFC) before narrowing down the list of reference points.

Following the presentations on reference points, the discussion of the Working Group focused on creating a framework for the development of appropriate reference points for north Pacific albacore. The proposed framework could, for example, follow the framework devised by Northwest Atlantic Fisheries Organization. The framework would describe the role of the scientific Working Group by itemizing scientific products the Working Group would need to produce. The framework would also describe the role of the fisheries commissions in establishing biological reference points.

Discussion

The ISC reviewed the stock status and conservation advice of the ALBWG and noted that the current guidance is based on an assessment conducted in 2004. It was further noted that the 2005 catch of north Pacific albacore has declined in some sectors of the fishery, notably the U.S. and Canada troll fisheries. However, these sectors constitute approximately 10% of the total catch, and the ISC has no information suggesting that these declines reflect an overall decline in stock abundance.

The ISC agreed that current stock status and conservation advice for north Pacific albacore should follow those outlined in the "Report of the Plenary Session of the Fifth Meeting of the ISC". It was noted that recent north Pacific albacore fishery management actions adopted by the IATTC and WCPFC are consistent with the recommendations of this report but that more information is required to determine if they are sufficient.

The ISC Membership commended the work of the ALBWG to address biological reference points. The ISC Membership agrees with the ALBWG that discussions with the fisheries commissions are necessary to further refine the choice of appropriate biological reference points. Participants discussed the merits of using minimum stock biomass as an appropriate reference point and agreed this metric should be included as a potential candidate. It was noted that a desirable attribute of an appropriate reference point is maintenance of the population at levels that will maintain MSY. Also, appropriate choice of reference points and implementation in a management context should embrace the notion of limits and threshold values associated with reference points, and that a defined threshold should not necessarily be the limit.

6.2 Pacific Bluefin Tuna

H. Yamada reported on the status of Pacific bluefin tuna in the North Pacific based on the assessment conducted in January 2006. The stock assessment still involves large uncertainties, including lack of precise information on numbers at length, on catches, on reliable abundance indices in earlier time periods, and on age and growth of larger fish. Therefore, the stock condition from the 1950s to the 1980s is uncertain. Nevertheless, results from the multiple models provided some common conclusions: (1) biomass has local peaks in the late 1970s and late 1990s, with a decline after the second peak; (2) recruitment in recent decades has varied considerably, and the 2001 year class appears to be strong; and (3) there is no evidence of recruitment failure in recent years.

Outlook for the stock in the short-term depends upon the contribution to the total biomass of the 2001 year class, which may be poorly estimated. Despite this, if fishing mortality remains at the current level, the strong 2001 year class may maintain spawning biomass above the current level through 2009. However, if the fishing mortality increases by 20%, the spawning biomass can drop below the current biomass, even with the strong 2001 year cohort. Therefore the PBFWG recommended not increasing fishing mortality above the current level. There remain other uncertainties such as age-and-growth that can affect the outlook of the stock. Careful and continuous monitoring of the fisheries and directed research are necessary to obtain more precise assessments of the outlook of the stock and appropriate reference points.

Discussion

The ISC Plenary discussed the current stock assessment provided by the PBFWG and noted that the large uncertainties associated with the assessment restrict the ability to provide sound stock status and conservation advice. Preliminary assessment results from different model formulations indicate that the current assessment may provide an optimistic interpretation of stock status. There was also agreement that some biological parameters used in the current assessment, as well as early data on catch and effort should be re-evaluated given their influence on assessment results.

Noting the uncertainty in the assessments, the ISC Plenary agreed with the WG recommendation that bluefin tuna fishing mortality not be increased above recent levels as a precautionary measure.

The ISC Plenary recommends the PBFWG address both the data uncertainties and suggestions of the participants before proceeding with the next Pacific bluefin tuna assessment, scheduled for completion prior to the next ISC Plenary meeting in 2007. To support the proposed assessment, the PBFWG should construct a comprehensive catch and effort database, develop standardized abundance series and identify appropriate assessment platforms. To facilitate construction of the catch database all ISC Member countries will need to submit PBF data to the STATWG. The ISC Chairman instructed Member countries to do so.

6.3 Swordfish

R. Humphreys reiterated the results of the last swordfish assessment conducted in December 2003. These results were previously reviewed at the ISC meeting in February 2004 and currently represent the most recent assessment. The stock status conclusions and recommendations for north Pacific swordfish from the "Report of the Plenary Session of the Fifth Meeting of the ISC" are as follows:

> *"Results of preliminary modeling of a north Pacific swordfish stock in areas north of 10°N indicate that in recent years the biomass level has been stable and*

well above 50% of the unexploited levels of stock biomass, implying that swordfish are not over-exploited at current levels of fishing effort. The current interpretation is that the stock is neither overfished ($B_{current}/B_{MSY}=1.7$) nor is overfishing occurring ($F_{current}/F_{MSY}=0.3$)."

Discussion

The ISC reviewed the stock status conclusions of the Fourth ISC Plenary and noted that the guidance was based on a preliminary assessment conducted in 2003. That assessment did not include catch statistics from some major fishing fleets (other than Hawaii and Japan) and did not incorporate some important biological processes (particularly sex-specific vital rates). These concerns will be addressed in the next assessment. Data preparations for the next assessment have begun. In addition, the ISC suggested, as it did in 2004, that efforts of the SWOWG be focused on reducing the level of uncertainty in future assessments (e.g. by using additional stock assessment models, incorporating additional size composition data, and expanding swordfish tagging efforts, etc.). The ISC Plenary recommends that the next assessment cover the entire range of north Pacific swordfish, and take into consideration the latest information on swordfish stock structure. To ensure sufficient biological data for future assessments, the ISC also recommends that current and planned observer programs collect requisite biological data.

6.4 Striped Marlin

G. DiNardo presented results of preliminary stock assessments for striped marlin in the North Pacific (Annex 10). Three biomass dynamics models were applied to catch and effort data spanning 1952 to 2003. The models included a Bayesian surplus production model, a Logistic and Fox model using the ASPIC software, and an age-structured biomass dynamics model. While the population exhibits some level of spatial structure, a single stock was assumed in the current assessment. It was further assumed that of the eight reported fisheries catching striped marlin in the North Pacific, the abundance index associated with the Japanese distant water longline fishery from 1962-2003 is the most reliable representation of striped marlin abundance.

The results of all assessment models indicated that stock biomass has been reduced. For models that provide estimates of current biomass relative to starting biomass, the results indicated the population has declined to 10-45% of initial biomass. In contrast, "splitting" the abundance series in the mid 1970s, and assuming this represents a change in targeting, indicated a more optimistic view (current biomass above biomass at MSY). While the results of the current assessments are provisional due to a suite of unresolved issues, the MARWG recommends that fishing mortality not exceed current levels.

The unresolved issues include the assumption that catchability in the distant water Japanese longline fishery has remained constant. Additional details are provided in Annex 10. The next assessment will include updated catch and effort data and is scheduled to be completed prior to the next ISC Plenary Meeting in 2007.

Discussion

The ISC discussed the importance of potential changes in catchability (due to targeting) in the Japanese distant water longline CPUE series. A single north Pacific stock was assumed, however the ISC noted that true stock structure is uncertain. The ISC encouraged the MARWG to contact researchers at the SPC who are currently working on a stock assessment of a southwestern Pacific striped marlin stock. The ISC also suggested that a high priority be given by the MARWG to the following unresolved issues in its preparation for the next stock assessment:

- Investigate potential changes in catchability of the Japanese distant water longline CPUE series.
- Obtain complete catch and effort data from Chinese-Taipei and Korea instead of using derived data.
- Further work to identify appropriate stock structure for assessment purposes.
- The Working Group should explore the nature of the catch and release data for marlin from the Mexico and U.S. sport fisheries.

Noting the uncertainty in the assessments, the ISC agreed with the WG recommendation that striped marlin fishing mortality not be increased above recent levels as a precautionary measure.

6.5 Bycatch

G. DiNardo, on behalf of the BYCATWG Chair, presented the stock status and conservation advice of the Working Group based on their first meeting. The Bycatch Working Group reviewed reports on stock status of north Pacific blue sharks (*Prionace glauca*), sea turtles, and seabirds. The report on blue sharks was reassuring, indicating an increase in biomass following the cessation of drift gill net fishing more than a decade ago. However, it was noted that the assessment is preliminary and depends on a number of assumptions to obtain blue shark catch from logbook data. Work will continue on this assessment, including resolution of some effort data problems and comparison with another model approach. The Group also reviewed a request to support the German Ministry for the Environment, Nature Conservation and Nuclear Safety for CITES listing of porbeagle shark (*Lamna nasus*) and spiny dogfish (*Squalus acanthias*). The former is not found in the North Pacific, and the latter is almost never encountered in pelagic fisheries, so the WG recommendation is to respond that the issue is outside the ISC terms of reference. Leatherback sea turtles (*Dermochelys coriacea*) are one of the species of greatest concern based on their stock status. The great majority of leatherback turtle bycatch in north Pacific fisheries is from the western Pacific nesting population which is not in as grave a situation as the eastern Pacific nesters that migrate primarily into the South Pacific. However, nestling production from the western Pacific nesters has remained low for so long that population failure remains a possibility. North Pacific loggerhead turtles (*Caretta caretta*) have shown signs of increase but are still at risk of population failure. Among the seabirds, the status of the endangered short-tailed

albatross (*Phoebaotria albatrus*) is of greatest concern. Nesting pairs have been increasing steadily and the establishment of colonies beyond Torishima Island also provides hope of improvement in their status.

Discussion

The ISC discussed the letter from the German Ministry for the Environment, Nature Conservation and Nuclear Safety regarding support for CITES listing of spiny dogfish and porbeagle sharks. **It was noted that the porbeagle does not occur in the North Pacific Ocean and spiny dogfish are not encountered in the pelagic tuna fisheries. The ISC agreed with the conclusion of the BYCATWG that the request was outside of the terms of reference of the ISC.** The ISC Chairman agreed to draft a reply which would describe this decision.

6.6 Biological Reference Points

Ray Conser provided some background information on biological reference points. Two types of reference points are commonly used for fisheries management.

(1) **Overfishing** reference points that compare the current fishing mortality rate (F_t) to an agreed F reference point (F_{ref}). Overfishing on the stock occurs whenever $F_t > F_{ref}$.

(2) **Overfished** reference points that compare some measure of stock biomass (B_t) to an agreed B reference point (B_{ref}). Spawning stock biomass (SSB) is often used as an important measure of stock biomass. The stock is considered to be overfished whenever $SSB_t < SSB_{ref}$.

Maximum sustainable yield (MSY) reference points (e.g. F_{MSY} and SSB_{MSY}) are common reference points for fisheries management and in particular, have been formalized in the charters of international commissions (e.g. ICCAT and IATTC) and in domestic fisheries management legislation (e.g. U.S.A.). MSY reference points are also fundamental parameters (or derived parameters) for surplus production models, which have a long history of use in the management of tunas and tuna-like species worldwide. However, when age-structured models are used for stock assessment, MSY proxies are often used rather than MSY *per se*. The most commonly used proxies are those based on equilibrium SSB per recruit analyses, e.g. $F_{30\%}$ and $F_{40\%}$. MSY proxies and management decisions based on them tend to be more robust to estimation error in stock assessment models. In part, this is because such proxies neither require *a priori* specification of the stock-recruitment relationship nor the estimation of stock-recruit parameters, which are typically the most difficult population parameters to estimate reliably.

Determination of the most appropriate biological reference points for tunas and tuna-like species will probably require simulation studies designed to compare the use of proxy vs. MSY-based reference points. If proxies are determined to be preferable, then the best proxy to use for management must be determined. Input and feedback from fishery managers will be a critical part of the process for establishing reliable reference points.

Discussion

The ISC noted that the ALBWG is currently the only group working on BRPs, and that similar work will be necessary from the other species working groups. The conventions of the WCPFC and IATTC have management objectives relating to MSY. However, in some situations MSY-based estimates are not available and proxies are needed. Control rules governing procedures if stocks fall below the reference levels will also need to be developed.

The ISC acknowledged that dialogue with management bodies will need to take place to complete the adoption of appropriate BRPs. It was suggested that a similar presentation be given by the ISC to the Scientific Committee of the WCPFC.

7. Review of stock status of secondary stocks

7.1 Bigeye Tuna – Eastern Pacific Ocean

R. Deriso described the eastern Pacific bigeye tuna fisheries and the 2005 assessment conducted by the IATTC for this species.

There have been substantial changes in the bigeye tuna fishery in recent years. Initially, the majority of the bigeye tuna catch was taken by longline vessels. With the expansion of the fishery on fish-aggregating devices (FADs) since 1993, the purse-seine fishery has taken an increasing proportion of the bigeye tuna catch. The FAD fishery captures smaller bigeye tunas, and has therefore reduced the yield per recruit and the average maximum sustainable yield (AMSY).

An age-structured catch-at-length analysis, A-SCALA, was used to assess bigeye tuna in the eastern Pacific Ocean (EPO). For further information on the most recent assessment, see IATTC Stock Assessment Report 6 (ISC/06/PLENARY/08), available on the IATTC website: http:www.iattc.org.

The assessment was conducted as if there were a single stock in the EPO. Its results are consistent with results of other analyses of bigeye tuna on a Pacific-wide basis. In addition, analyses have shown that the results are insensitive to the spatial structure of the analysis.

On average, the fishing mortality of bigeye tuna less than about four and a half years old has increased substantially since 1993, and that of older fish has increased slightly.

There are several important features in the estimated time series of bigeye tuna recruitment. First, the estimates of the recruitment before 1993 are uncertain, as the floating-object fisheries, which catch small bigeye tuna, were not operating. Second, there was a period of above-average recruitment during 1994-1998, followed by a period of below-average recruitment during 1999-2000. The recruitments were above average in 2001 and 2002. Third, the estimate of the most recent recruitment is uncertain,

because recently-recruited bigeye tuna are represented in only a few length-frequency samples. The extended period of relatively high recruitments during 1994-1998 coincided with the expansion of the fisheries that catch bigeye tuna in association with floating objects.

Fishing has reduced the total biomass of bigeye tuna present in the EPO, and it is predicted that it will be near its lowest level by the end of 2005. There has been an accelerated decline in biomass since the peak in 2000. Analysis of the levels of fishing mortality associated with each fishery indicates that, since the expansion of the purse-seine fishing on floating objects during the early to mid-1990s, the purse-seine fishery has had a much greater impact on the stock than has the longline fishery.

At the beginning of 2005, the spawning biomass of bigeye tuna in the EPO had declined from a recent high level. At that time the spawning biomass ratio (the ratio of current spawning biomass to biomass of spawners in the absence of fishing mortality; SBR) was estimated to be about 0.13, about 41% less than the level corresponding to the average maximum sustainable yield (SBR_{AMSY}).

All analyses considered suggest that at the start of 2005 the spawning biomass was below the level corresponding to the AMSY. The AMSY and the fishing mortality (F) multiplier are sensitive to how the assessment model is parameterized, the data that are included in the assessment, and the periods assumed to represent average fishing mortality, but under all scenarios considered, the current fishing mortality is well above the level corresponding to the AMSY.

The estimates of recruitment and biomass were only moderately sensitive to the steepness of the stock-recruitment relationship. The current status and future projections are considerably more pessimistic, in terms of stock status, if a stock-recruitment relationship ($h = 0.75$) exists.

The effects of IATTC Resolution C-04-09, which imposed a 6 week closure on the purse seine fisheries for bigeye, yellowfin and skipjack tunas and a limit on longline catch of bigeye tuna for the years 2004-2006, are estimated to be insufficient to allow the stock to rebuild. If the effort is reduced to levels corresponding to the AMSY, the stock will rebuild to SBR_{AMSY} within the 5-year projection period.

7.2 Yellowfin Tuna - Eastern Pacific Ocean

R. Deriso also provided a presentation on the eastern Pacific yellowfin tuna fisheries and the 2005 stock assessment conducted by the IATTC for this species.

An age-structured, catch-at-length analysis (A-SCALA) was used to assess yellowfin tuna in the eastern Pacific Ocean (EPO). For further information on the most recent assessment, see IATTC Stock Assessment Report 6 (ISC/06/PLENARY/08), available on the IATTC web site: http:www.iattc.org.

The assessment is based on the assumption that there is a single stock of yellowfin tuna in the EPO. Yellowfin tuna are distributed across the Pacific Ocean, but the bulk of the catch is made in the eastern and western parts of that ocean. The movements of tagged yellowfin tuna are generally over hundreds, rather than thousands, of kilometers, and exchange between the eastern and western Pacific Ocean appears to be limited. The stock assessment requires substantial amounts of information, including data on retained catches, discards, fishing effort, and the size compositions of the catches from the various fisheries.

Significant levels of fishing mortality have been observed in the yellowfin tuna fishery in the EPO. These levels are greatest for middle-aged yellowfin tuna. Both recruitment and exploitation have had substantial impacts on the yellowfin tuna biomass trajectory. Most of the yellowfin tuna catch is taken in schools associated with dolphins, and accordingly this method has the greatest impact on the yellowfin tuna population, although it has almost the least impact per unit of weight captured of all fishing methods. It appears that the yellowfin tuna population has experienced two different productivity regimes (1975-1983 and 1984-2004), with greater recruitment during the second regime. The two recruitment regimes correspond to two regimes in biomass, the high-recruitment regime corresponding to greater biomasses. The spawning biomass ratio (the ratio of the current spawning biomass to that for the unfished stock; SBR) of yellowfin tuna in the EPO was below the level corresponding to the average maximum sustainable yields (AMSYs) during the low-recruitment regime, but close to that level during the high-recruitment regime. The two different productivity regimes may support two different levels of AMSY and associated SBRs, and the AMSY reported here is an average for the 1975-2004 period. The current SBR is below the SBR level corresponding to the AMSY. However, there is substantial uncertainty in the most recent estimate of SBR, and there is a moderate probability that the current SBR is above the level corresponding to the AMSY. The effort levels are estimated to be greater than those corresponding to the AMSY (based on the recent (2002-2003) distribution of effort among the different fisheries). Because of the flat yield curve, however, the recent effort levels are estimated to be capable of producing, under average conditions, catch that is only slightly less than the AMSY. The analysis indicates that strong cohorts entered the fishery during 1998-2000, and that these cohorts increased the biomass during 1999-2000. However, these cohorts have now moved through the population, so the biomass decreased during 2002-2004.

The conservation measures imposed in 2004 under IATTC Resolution C-04-09, described above, are predicted to result in slightly greater biomasses and SBRs than would otherwise have been the case. However, it is likely that the stock is below the AMSY level.

A sensitivity analysis was carried out to estimate the effect of a stock-recruitment relationship. The results from the analysis with a stock-recruitment relationship, suggest that the effort level is greater than that corresponding to the AMSY; however, the yield at this effort level is still only 6% less than the AMSY. The biomass is estimated to have been less than the biomass that would produce the AMSY for most of the modeling

period, except for most of the 2000-2002 period.

Discussion

The ISC Plenary discussed technical aspects of the assessments and how the IATTC coped with the differential impacts of various fisheries. Most notable was the recent development of the fishery on Fish Aggregating Devices and its comparatively high catches of smaller fishes.

7.3 Yellowfin Tuna and Bigeye Tuna – Western Pacific Ocean

J. Hampton described stock assessments of Western Pacific Ocean (WPO) bigeye and yellowfin tunas which were presented at the 2005 Meeting of the Scientific Committee of the WCPFC. The 2005 assessments of yellowfin and bigeye tunas indicated that WPO stocks had recent (2001-2003 average) levels of fishing mortality that are classified as overfishing in relation to F_{MSY}-based reference points. For both stocks, recent recruitment is estimated to be above average, with the result that stock biomass has remained near to or above the biomass at MSY. The stocks are therefore not classified as being in an overfished state. However, stocks are predicted to decline to an overfished state under average recruitment conditions at the current levels of fishing mortality.

The WCPFC Scientific Committee (SC) considered these assessments. The key recommendation of the SC was that fishing mortality levels for both stocks should be reduced from their 2001-2003 average levels.

The WCPFC met in December 2005 and considered the advice of the SC. The decisions made with respect to yellowfin and bigeye tunas were that: (1) for the purse seine fishery, effort will be limited to 2004 or 2001-2004 average levels; and (2) for the longline fishery, catches of bigeye tuna by countries catching more than 2,000 mt of bigeye tuna in 2004 will be limited to 2001-2004 average levels, or 2004 levels (in the case of China and U.S.A.) and countries catching less than 2,000 mt in 2004 will be limited to 2,000 mt. The purse seine measure will potentially allow a 15% increase in fishing effort over 2001-2003 average levels. The longline measure will potentially allow increases in bigeye tuna longline catch of 6-46% from the 2001-2003 average level, depending on the uptake of the 2,000 mt provision by Member states. In the absence of further measures to limit fishing mortality on these stocks, there remains a significant gap between the scientific advice and the current management response of the WCPFC.

Discussion

The ISC Plenary discussed the effects of the area stratification on assessment results. It was noted that some area stratification divided areas of high catches. J. Hampton indicated that these issues have been investigated and the results indicated that changes in area stratification boundaries did not greatly affect the stock assessments results. Furthermore, it was noted that the area boundaries are often driven by the mandates of regional fishery management organizations.

8. Review of Statistics and Database Issues

8.1 Timely reporting of statistics

The upcoming submission of Category I, II and III data is required of ISC Members by July 1, 2006. The Statistics Working Group (STATWG) Chairman will send out two reminders before the submission date. The first will be sent on June 1, 2006, and the second, 1 week prior to the July 1, 2006 deadline. These reminders will be sent to the national Data Correspondents and the national Delegation Leaders. One week after the deadline, if data have not been received, a final reminder will be sent.

Mexico and Chinese-Taipei requested changes to the STATWG data correspondent list. The changes were adopted by the group. The new STATWG data correspondent list is as follows (changes in italics):

Member	Data Correspondent
Canada	Max Stocker
Chinese-Taipei	Shui-Kai Chang *(primary)*
	Feng-Chen Chang (secondary)
Japan	Harumi Yamada
Korea	Dae-Yeon Moon
Mexico	Michel Dreyfus *(PBF)*
	Luis Fleischer (all other species)
People's Republic of China	Not designated
U.S.A.	Al Coan
IATTC	Michael Hinton
SPC	Timothy Lawson

8.2 Reporting procedures

Category I (catches and vessels), Category II (summarized catch and effort) and Category III (size composition) data will be submitted to the STATWG Chairman as outlined in the ISC data submission requirements. In 2006, submission of metadata will also be required. The specification of what will be included in these metadata will be developed by the STATWG and sent to the data correspondents along with the first data submission reminder on June 1, 2006. The Group was also reminded that data submitted must conform to the new data submission formats. These formats will also be sent with the June 1 reminder.

8.3 Database up-keep and support

An update on the progress made in defining a position and resources for a database manager was presented by the STATWG Chairman. Funding has been approved by the Fisheries Agency of Japan. Funding should be in place in April 2006. The funds will be used to hire a database management assistant who will aid in the development of the ISC

system in 2006. The ISC data system will not be fully functional for the July 1, 2006 data submission. An ftp site (swfscftp.ucsd.edu) will be used in the interim.

The STATWG has the lead in the development of an ISC data system development plan. This plan will be used to track progress made on the ISC data system development.

Concern was expressed that the STATWG needs to meet at least one time before the next Plenary session. After discussion, the Group decided that in order to get the maximum participation by the Data Correspondents, the next STATWG meeting should be held in conjunction with the next Plenary session. Also, the STATWG should continue system development (development of standards) and other matters (progress reviews, metadata requirements, etc.) through e-mail correspondence.

8.4 Other statistics and database matters

The STATWG was again reminded of the need to coordinate with regional fishery management organizations such as the IATTC and WCPFC. The STATWG may be able to save some time by looking at data management policies of these organizations.

It was noted that an ad hoc working group of the WCPFC will be meeting in August 2006 to discuss issues relating to data security, confidentiality, and dissemination, and that the ISC may need to review the outcome of these discussions as it may impact on the nature of any data exchange between the WCPFC and ISC.

The IATTC is discussing data release policies and the timing and results of these discussions may delay the IATTC submission to the ISC.

The ISC reviewed the catch tables (ISC/06/PLENARY/14). The tables are the most current catch tables from the ALBWG, PBFWG, MARWG and SWOWG and will be incorporated in this and future ISC Plenary Reports (Tables 1-4). Discussion centered on whether the catch tables should be for the entire stock or just for the North Pacific. The group decided that the tables should reflect the area considered by the species Working Groups (i.e. north Pacific albacore tables are for the North Pacific only). The table captions in Annex 10 for swordfish and striped marlins did not reflect the area of the Pacific covered by the catch. The captions for this Report were modified accordingly.

9. Relationship between ISC and Regional Organizations

9.1 Status of MOU between ISC and WCPFC

The Chair acknowledged the participation at this meeting of Shelton Harley, Acting Chair of the WCPFC Scientific Committee. S. Harley commented that his participation is due – in part – to the existing draft ISC-WCPFC MOU that suggests exchange of ISC and WCPFC scientists at their respective meetings. He commented further that in its early years, the WCPFC will likely focus its energies on assessments of the four main tuna stocks of interest to it (bigeye, yellowfin, skipjack, and south Pacific albacore) and

the Commission will rely on cooperation between Member countries, and organizations such as the ISC (particularly in relation to northern stocks), for assessments of other HMS species. In addition, it would be beneficial for the ISC to review WCPFC stock assessments and vice-versa and in this regard he welcomed presentations on the north Pacific albacore, Pacific bluefin tuna, and striped marlin assessments, and research on biological reference points at this year's WCPFC Scientific Committee meeting. Ecosystem issues are also important to the WCPFC, and the initial meeting of the ISC Bycatch WG was encouraging from the WCPFC perspective. He closed his remarks with a request for ISC scientists to participate in the upcoming WCPFC Scientific Committee meeting in August 2006.

The draft ISC-WCPFC MOU (ISC/06/Plenary/07) was adopted, in principle, at the WCPFC meeting in December 2005. However, the MOU has not been officially signed by the parties because Annex 2 of the MOU (*Standard Recurring Advice Required from ISC by the WCPFC-Northern Committee*) had not been completed. Annex 2 is important since it makes clear to all parties what the ISC will provide on a continuing basis with its available resources. All supplemental tasks requested by the Northern Committee will require review and discussion on funding and other matters between the ISC and WCPFC. It was suggested that the template used for the SPC-WCPFC MOU may be appropriate for the ISC-WCPFC dealings with supplemental tasks. The SPC-WCPFC MOU establishes continuing, recurring annual tasks but also requires an annual service agreement annex that sets up any additional tasks and the funding required to carry them out. The Plenary agreed to follow this approach as well for the ISC-WCPFC MOU Annex 2.

The ISC Chair drafted a list of key items for possible inclusion in Annex 2 for consideration by the ISC Plenary. After considerable discussion, it was agreed to structure Annex 2 along the following lines.

> *For the tuna and tuna-like species that occur primarily in the North Pacific, the ISC will report annually to the NC and WCPFC:*
>
> 1. *Performance of the monitored fisheries*
> 2. *Progress in stock assessment research and future needs*
> 3. *Status of stocks*
> 4. *Advice on conservation measures*
>   a. *Management measures needed*
>   b. *Evaluation of the effectiveness of existing measures*
>
> *Any additional ISC tasks needed to support WCPFC will be delineated in annual service agreements established at the onset of each year.*

The Chair agreed to re-draft Annex 2 along these lines. Finally, it was noted that there will not be a separate MOU between ISC and the WCPFC-Northern Committee. However, the Northern Committee will probably review the ISC-WCPFC MOU before it is finalized.

9.2 Status of MOU between ISC and IATTC

Robin Allen (IATTC), in consultation with the ISC Chair, drafted an ISC-IATTC MOU for Plenary consideration (ISC/06/Plenary/01).

After discussing the draft MOU at some length, it was noted that the draft covers all things current associated with ISC Members, as defined in the ISC Guidelines (ISC/06/Plenary/02). IATTC (as well as SPC, FAO, and PICES) is currently designated as an "Observer Participant." If that category were eliminated and replaced with "Non-voting Member," then all provisions of the draft MOU will be covered by provisions already associated with "Members" in the Guidelines; hence, the ISC-IATTC MOU will not be necessary. IATTC agreed in principle to this suggested change in designation, i.e. from "Observer Participant" to "Non-voting Member," but asked for time to further consider the matter. Analogously, SPC, FAO, and PICES would also become "Non-voting Members." The Plenary agreed to have the Chair draft changes to the ISC Guidelines and associated documents, and to circulate the amended documents to all parties for consideration. If agreed, the amendments would be approved at the Seventh ISC Plenary meeting.

9.3 2006 Support for the Northern Committee

The Chair reported that a brief first meeting of the Northern Committee occurred in December 2005 as an adjunct to the WCPFC meeting. The Northern Committee met to organize itself, dealt with north Pacific albacore matters, and agreed to meet in September 2006 in Tokyo, Japan. The Chair and other ISC scientists are planning to attend.

10. Review of Schedule of Meetings

10.1 ISC Working Group planned meetings and WCPFC and IATTC meetings

The Chair provided an updated version of ISC/06/Plenary/05 (*Dates for Pacific HMS Meetings of Interest to ISC*) that provided the basis for much of the discussion.

It was agreed that with the establishment of regularly-scheduled annual meetings of the WCPFC's Scientific Committee (August) and Northern Committee (September), a change in the ISC Plenary timing was needed. July would be better suited for the annual meeting of the ISC Plenary. July timing would allow review of the results from ISC WG's and sufficient time to complete the Plenary Report prior to the subsequent WCPFC meetings each year.

There are numerous and an ever growing number of international HMS meetings. It is becoming quite difficult for national scientists to cover these meetings, especially for those working in the Atlantic and Indian Oceans as well as the Pacific. Many of the ISC WG meetings during the past two years have focused on data and other start-up issues. It may be possible to reduce the frequency of ISC WG meetings after these issues have

been put to rest. Scheduling joint WG meetings (covering two species) may help to reduce travel-related overhead.

A related concern is that 5-day WG meetings (Monday through Friday) are often not long enough for meetings in which stock assessments are carried out. Frequently, the first few days of these meetings are needed to review papers and to resolve data-related issues; and the last day is needed for writing and clearing the report. Insufficient time is left to make additional model runs and to provide peer review of results. An eight- or nine-day period is better suited for meetings in which assessments are being carried out. If joint WG meetings are scheduled (as suggested above), instead of structuring them back-to-back, it may be better to use alternative arrangements. As with the frequency of WG meetings issue addressed above, it is likely that the length of the WG meetings can also be reduced after a given assessment has been done a few times, and an assessment update (rather than full, new assessment) becomes the goal of a WG meeting.

The ISC Plenary requested that the ISC Chair, in consultation with the WG Chairs and perhaps the Northern Committee, develop a long-term plan (perhaps with a 3-year time horizon) that establishes what the ISC wishes to accomplish over the period. Once established, these objectives could be used as the basis for planning the frequency of WG meetings; the duration of the meetings; which species to combine for joint meetings; etc. While the Chair agreed to take on this task, he emphasized the importance of the WG meetings to the success of ISC; and the need for all Members to commit the participation of their best scientists to the process. Otherwise, no amount of planning or WG structural changes will suffice to make the ISC successful.

Finally, it was agreed that ISC/06/Plenary/05 should be further updated to show the pertinent meetings of ICCAT and the IOTC (especially those in which ISC scientists will be involved).

10.2 Time and place for the 2007 ISC Plenary Meeting

Korea graciously offered to host the next meeting of the ISC Plenary. The tentative dates are 26-30 July, 2007. The ISC Plenary accepted Korea's invitation and expressed its appreciation for this milestone event. It will be the first ISC Plenary meeting held outside of the traditional locations, i.e. Japan and the U.S.A.

11. Administrative matters

11.1 ISC Secretariat

Participants noted that the ISC is working reasonably well under the current arrangement that does not involve a permanent Secretariat. However, in the future establishing a Secretariat may become necessary. Particularly, if requests for scientific work from the Northern Committee of the WCPFC come on line, establishing a permanent Secretariat will likely be necessary.

11.2 Website issues

Participants noted that the website is an important communication tool for developing the ISC database. The U.S. delegation offered assistance to Japanese colleagues for updating the ISC Website. In return, the Japanese delegation expressed gratitude for any assistance that may be provided by the U.S., in particular from Al Coan, Southwest Fisheries Science Center. Participants noted that ISC working papers should be made available on the website. Salient scientific information that is used in developing management actions needs to be made available to the public. This would make the scientific process of the ISC more transparent. It was also noted that the ISC website does not yet make any reference to the Albacore Working Group. The Webmaster is urged to make the necessary changes to the Website for including the Albacore Working Group.

11.3 Assignments for Chair

The chair proposes to continue with quarterly communications to the ISC leadership and to consult with the Steering Committee. An Action Item Plan will be completed including recommendations from the current meeting to be circulated to the ISC participants for review and to the Members for approval and use during the year.

11.4 Funding

The Northern Committee of the WCPFC has developed a minimum budget for the Committee funded by its Members. The funds cover mainly administrative matters. No research funding is currently identified in the budget. The ISC discussed a proposal that a Finance Committee be established in the future. The Finance Committee would assist the Chair in budget matters that may arise with requests for work by the Northern Committee that are beyond those agreed to in the MOU with the WCPFC.

12. Other

The MARWG proposal for establishing a stock assessment peer review process in the ISC was discussed. Participants felt that the Working Group process, as it is practiced by the ALBWG, for example, essentially fulfills the requirement of peer review of stock assessments. Other examples of stock assessment review processes such as are practiced in the ICCAT were described. In the ICCAT arena, scientists in addition to those doing the assessment are invited to review and comment on the detailed assessments. Participants suggested that the WGs should look into peer review procedures, as appropriate. The operations manual provides some guidance on this matter.

13. Adoption of Report

A draft *Report of the Sixth Meeting of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean* was reviewed by all participants.

Agreement was reached on all items covered in the agenda. The Chair committed to sending a revised Report by the end of the week to all participants for review.

14. Close of Meeting

On behalf of all participants, Luis Fleischer thanked the Chairman, Gary Sakagawa, for conducting a smoothly run and productive ISC Plenary Meeting, and expressed his gratitude to the hosts for providing the Mexico delegation the opportunity to participate. William Fox, on behalf of the U.S. delegation, also thanked the Chair and all participants for a productive meeting. As Director of the Southwest Fisheries Science Center, W. Fox also said he was happy to extend the Center's hospitality to the ISC Plenary. Finally, G. Sakagawa thanked all participants and said he looks forward to seeing everyone next year in Korea. He ended by thanking the SWFSC staff, and especially Anne Allen, for assistance with organizing the meeting.

The meeting was adjourned at 3:30 p.m., March 27, 2006.

Table 1. North Pacific albacore catches (in metric tons) by fishing gear, 1952-2005[1]. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ).

YEAR	CANADA		JAPAN						KOREA		MEXICO
	TROLL	PURSE SEINE	GILL NET	LONG LINE	POLE & LINE	PURSE SEINE	TROLL	UNSP. GEAR	GILL NET	LONG LINE	UNSP. GEAR
1952	71			26,687	41,787	154		237			
1953	5			27,777	32,921	38		132			
1954				20,958	28,069	23		38			
1955				16,277	24,236	8		136			
1956	17			14,341	42,810			57			
1957	8			21,053	49,500	83		151			
1958	74			18,432	22,175	8		124			
1959	212			15,802	14,252			67			
1960	5	136		17,369	25,156			76			
1961	4			17,437	18,639	7		268			0
1962	1			15,764	8,729	53		191			0
1963	5			13,464	26,420	59		218			0
1964	3			15,458	23,858	128		319			0
1965	15			13,701	41,491	11		121			0
1966	44			25,050	22,830	111		585			0
1967	161			28,869	30,481	89		520			
1968	1,028			23,961	16,597	267		1,109			
1969	1,365			18,006	31,912	521		935			0
1970	390			16,283	24,263	317		456			0
1971	1,746			11,524	52,957	902		308			0
1972	3,921		1	13,043	60,569	277		623			100
1973	1,400		39	16,795	68,767	1,353		495			0
1974	1,331		224	13,409	73,564	161		879			1
1975	111		166	10,318	52,152	159		228		2,463	1
1976	278		1,070	15,825	85,336	1,109		272		859	36
1977	53		688	15,696	31,934	669		355		792	0
1978	23		4,029	13,023	59,877	1,115		2,078		228	1
1979	521		2,856	14,215	44,662	125		1,126	0	259	1
1980	212		2,986	14,689	46,742	329		1,179	6	597	31
1981	200		10,348	17,922	27,426	252		663	16	459	8
1982	104		12,511	16,767	29,614	561		440	113	387	7
1983	225		6,852	15,097	21,098	350		118	233	454	33
1984	50		8,988	15,060	26,013	3,380		511	516	136	113
1985	56		11,204	14,351	20,714	1,533		305	576	291	49
1986	30		7,813	12,928	16,096	1,542		626	726	241	3
1987	104		6,698	14,702	19,082	1,205		155	817	549	7
1988	155		9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140		7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302		6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139		3,401	17,046	7,103	2,652		392	852	3	2
1992	363		2,721	19,049	13,888	4,104		1,527	271	(15)	10
1993	494		287	29,966	12,797	2,889		867		(32)	11
1994	1,998		263	29,600	26,389	2,026		799		(45)	6
1995	1,720		282	29,075	20,981	1,177	856	81		440	5
1996	3,591		116	32,493	20,272	581	815	117		158	21
1997	2,433		359	38,950	32,238	1,068	1,585	123		404	53
1998	4,188		206	35,813	22,926	1,554	1,190	88		(218)	8
1999	2,641		289	33,365	50,369	6,872	891	127		99	23
2000	4,465		67	30,046	21,549	2,408	645	171		15	79
2001	4,985		117	28,819	29,430	974	416	96		64	22
2002	5,022		332	23,640	48,454	3,303	787	135		(113)	(28)
2003	6,735		126	20915	36121	627	922	106	(0)	(144)	(29)
2004	(7,842)		(126)	(15,593)	(32,316)	(6,046)	(922)	(106)	(0)	(68)	(106)
2005	(4,963)		(126)	(16,000)	(17,000)	(6,046)	(922)	(106)		(520)	(0)

[1] Data are from the 1st ISC Albacore Working Group, November 28 - December 2, 2005 except as noted.

Table 1. Continued - North Pacific Albacore

YEAR	CHINESE TAIPEI		U.S.							OTHERS		GRAND TOTAL
	GILL NET	LONG LINE[2]	POLE & LINE	GILL NET	LONG LINE	PURSE SEINE	SPORT	TROLL	UNSP. GEAR	LONG LINE[3]	TROLL	
1952					46		1,373	23,843				94,198
1953					23		171	15,740				76,807
1954					13		147	12,246				61,494
1955					9		577	13,264				54,507
1956					6		482	18,751				76,464
1957					4		304	21,165				92,268
1958					7		48	14,855				55,723
1959					5		0	20,990	0			51,328
1960					4		557	20,100	0			63,403
1961			2,837		5		1,355	12,055	1			52,608
1962			1,085		7		1,681	19,752	1			47,264
1963			2,432		7		1,161	25,140	0			68,906
1964			3,411		4		824	18,388	0			62,393
1965			417		3		731	16,542	0			73,032
1966			1,600		8		588	15,333	1			66,150
1967		330	4,113		12		707	17,814	0			83,096
1968		216	4,906		11		951	20,434	0			69,480
1969		65	2,996		14		358	18,827	0			74,999
1970		34	4,416		9		822	21,032	0			68,022
1971		20	2,071		11		1,175	20,526	0			91,240
1972		187	3,750		8		637	23,600	0			106,717
1973		--	2,236		14		84	15,653	0			106,836
1974		486	4,777		9		94	20,178	0			115,113
1975		1,240	3,243		33		640	18,932	10			89,696
1976		686	2,700		23		713	15,905	4			124,816
1977		572	1,497		37		537	9,969	0			62,799
1978		6	950		54		810	16,613	15			98,822
1979		81	303		--		74	6,781	0			71,004
1980	--	249	382		--		168	7,556	0			75,126
1981	--	143	748		25		195	12,637	0			71,042
1982	--	38	425		105		257	6,609	21			67,960
1983	--	8	607		6		87	9,359	0			54,527
1984	--	--	1,030		2	3,728	1,427	9,304	0			70,258
1985	--	--	1,498	2	0		1,176	6,415	0			58,170
1986	--	--	432	3			196	4,708	0			45,344
1987	2,514	--	158	5	150		74	2,766	0			48,986
1988	7,389	--	598	15	308		64	4,212	10			45,554
1989	8,350	40	54	4	249		160	1,860	23			44,140
1990	16,701	4	115	29	177	71	24	2,603	4			53,683
1991	3,398	12	0	17	313	0	6	1,845	71			37,253
1992	7,866	--	0	0	337	0	2	4,572	72			(54,796)
1993		5		0	440		25	6,254	0			(54,067)
1994		83	0	38	546		106	10,978	213		158	(73,248)
1995		4,280	80	52	883		102	8,045	1		137	68,197
1996		7,596	24	83	1,187	11	88	16,938	0	1,735	505	86,506
1997		9,119	73	60	1,652	2	1,018	14,252	1	2,824	404	106,533
1998		8,617	79	80	1,120	33	1,208	14,410	2	5,871	286	(97,967)
1999		8,186	60	149	1,540	48	3,621	10,060	1	6,307	261	124,917
2000		8,842	69	55	940	4	1,798	9,645	3	3,654	490	85,692
2001		8,684	139	94	1,295	51	1,635	11,210	0	1,471	127	89,644
2002		7,965	378	30	525	3	2,357	10,387		700	(127)	(104,292)
2003		(7,166)	59	15	524	44	2,214	14,102	(2)	(2,400)	(127)	(92,381)
2004		(4,988)	(125)	(9)	(360)	(1)	(1,506)	(13,432)	(0)	(2,400)	(127)	(86,107)

[2] Catches for 2000-2004 contain estimates of offshore longline catches from vessels landing at

[3] Other longline catches from vessels flying flags of convenience being called back to Taiwan. The catches may be duplicated in Taiwan longline catches (November 2005).

Table 2. Catches and landings (metric tons) of Pacific bluefin tuna by fishing gear for the North Pacific Ocean, 1952-2005. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ).

Year	Western Pacific States													WPO Total
	Japan								Japan total	Korea *1		Chinese Taipei		
	Purse Seine	Longline	Troll	Pole and Line	Set Net	Drift Net	Handline	Others		Purse seine	Trawl	Longline	Purse Seine	
1952	3,690	2,581	439	4,852	2,145	286	37	34	14,064					14,064
1953	4,189	1,998	1,465	3,049	2,335	9	50	74	13,169					13,169
1954	4,043	1,588	1,656	3,041	5,579	48	188	31	16,173					16,173
1955	10,561	2,099	1,507	2,839	3,256	15	146	103	20,526					20,526
1956	15,810	1,242	1,765	4,058	4,170	24	572	107	27,748					27,748
1957	15,971	1,490	2,395	1,795	2,822	14	161	33	24,680					24,680
1958	7,860	1,429	1,509	2,337	1,187	7	148	35	14,512					14,512
1959	9,108	3,667	1,011	586	1,575	1	102	51	16,100					16,100
1960	9,268	5,784	1,846	600	2,032	67	218	78	19,893					19,893
1961	8,120	6,175	3,116	662	2,710	19	511	68	21,380					21,380
1962	9,501	2,238	978	747	2,545	6	233	50	16,298					16,298
1963	8,677	2,104	2,403	1,256	2,797	18	203	59	17,517					17,517
1964	7,950	2,379	2,739	1,037	1,475	9	256	100	15,945					15,945
1965	10,173	2,062	1,429	831	2,121	52	173	130	16,972			54		17,026
1966	8,790	3,388	1,502	613	1,261	42	54	18	15,667			0		15,667
1967	5,750	2,099	3,115	1,210	2,603	39	113	130	15,060			53		15,113
1968	8,341	2,278	1,407	983	3,058	6	196	1	16,271			33		16,304
1969	2,876	1,366	1,836	721	2,187	32	149	3	9,170			23		9,193
1970	2,644	1,123	1,181	723	1,779	62	151	2	7,666			0		7,666
1971	3,559	757	2,189	938	1,555	35	188	3	9,223			1		9,224
1972	3,827	724	2,385	944	1,107	39	112	3	9,140			14		9,154
1973	2,001	1,158	3,519	526	2,351	309	249	19	10,132			33		10,165
1974	3,679	1,220	2,994	1,192	6,019	335	316	28	15,784			47		15,831
1975	4,308	1,558	941	1,401	2,433	676	104	1	11,422			61		11,483
1976	1,964	520	920	1,082	2,996	1,085	136	5	8,709			17		8,726
1977	3,960	712	2,230	2,256	2,257	884	142	5	12,446			131		12,577
1978	8,878	1,049	4,757	1,154	2,546	2,030	113	40	20,567			66		20,633
1979	12,266	1,223	2,659	1,250	4,558	1,541	265	394	24,157			58		24,215
1980	10,414	1,170	1,494	1,392	2,521	1,479	142	310	18,922			114		19,036
1981	23,219	796	1,758	754	2,129	2,130	139	272	31,197			179		31,376
1982	16,180	880	872	1,777	1,667	1,577	37	9	22,998	31		207		23,236
1983	14,105	707	2,020	356	972	807	32	53	19,051	13		175		19,239
1984	4,016	360	1,905	587	2,234	532	108	17	9,761	4		477		10,242
1985	4,239	496	1,920	1,817	2,562	728	232	32	12,026	1		210		12,237
1986	7,466	249	1,562	1,086	2,914	316	143	9	13,745	344		70		14,159
1987	7,771	346	1,030	1,565	2,198	258	50	0	13,218	89		365		13,672
1988	2,931	241	1,190	907	843	371	32	0	6,515	32		108	197	6,852
1989	5,624	440	1,025	754	748	173	30	1	8,795	71		205	259	9,330
1990	2,960	396	1,291	536	716	256	57	38	6,251	132		189	149	6,721
1991	8,217	285	2,168	286	1,485	236	68	36	12,782	265		342	-	13,389
1992	6,147	573	908	166	1,208	888	97	1	9,988	288		464	73	10,813
1993	5,675	857	534	129	848	159	102	2	8,305	40		471	4	8,820
1994	6,919	1,138	3,427	206	1,158	126	74	101	13,149	50		559	-	13,758
1995	15,978	769	4,631	307	1,859	110	77	38	23,770	821		335	2	24,928
1996	6,641	978	3,296	256	1,149	67	203	6	12,597	102		956	-	13,655
1997	11,123	1,383	2,676	71	803	109	264	6	16,436	1,054		1,814	-	19,304
1998	4,371	1,260	2,701	120	874	91	139	8	9,564	188		1,910	-	11,662
1999	13,440	1,155	3,236	124	1,097	59	78	13	19,202	256		3,089	-	22,547
2000	14,021	1,005	4,503	256	1,125	51	198	23	21,181	794	0	2,780	2	24,757
2001	6,727	1,004	3,266	332	1,366	100	334	23	13,152	995	10	1,839	104	16,100
2002	8,009	889	2,448	187	1,011	212	361	17	13,133	674	1	1,523	4	15,335
2003	5,680	1,230	801	59	439	43	465	202	8,920	1,591	0	1,863	21	12,395
2004	6,340	1,311	922	237	520	81	863	147	10,421	636	0	1,714		12,771
2005	(5,178)	(1,825)	(1,574)	(683)	(1,119)	(135)	(171)	(335)	(11,020)	(950)	-	(1,366)	-	(13,336)

***1: Catch statistics of Korea derived from Japanese Import statistics for 1982-1999, and from the Statistical Document Program for 2005 (minimum estimates for assessment).**

Table 2. Continued - Pacific Bluefin Tuna

Year	Eastern Pacific states												EPO Total	Grand Total
	United States							US total	Mexico					
	Pole and Line	Purse Seine	Longline	Troll	Gillnet	Other	Sport		Purse Seine	Pole and Line	Longline	Unidentified		
1952		2,076					2	2,078					2,078	16,142
1953		4,433					48	4,481					4,481	17,650
1954		9,537					11	9,548					9,548	25,721
1955		6,173					93	6,266					6,266	26,792
1956		5,727					388	6,115					6,115	33,863
1957		9,215					73	9,288					9,288	33,968
1958		13,934					10	13,944					13,944	28,456
1959		6,914					15	6,929					6,929	23,029
1960		5,422					1	5,423	0	0			5,423	25,316
1961		8,136					26	8,162	130	0			8,292	29,672
1962		11,268					28	11,296	294				11,590	27,888
1963		12,271					8	12,279	412				12,691	30,208
1964		9,218					8	9,226	131				9,357	25,302
1965		6,887					1	6,888	289				7,177	24,203
1966		15,897					23	15,920	435	0			16,355	32,022
1967		5,889					36	5,925	371				6,296	21,409
1968		5,976					1	5,977	195				6,172	22,476
1969		6,926					17	6,943	260				7,203	16,396
1970		3,966					21	3,987	92	0			4,079	11,745
1971		8,360					8	8,368	555	0			8,923	18,147
1972		13,348					17	13,365	1,646	0			15,011	24,165
1973		10,746					61	10,807	1,084	0			11,891	22,056
1974		5,617					65	5,682	344	0			6,026	21,857
1975		9,583					38	9,621	2,145	0			11,766	23,249
1976		10,646					23	10,669	1,968	0			12,637	21,363
1977		5,473					21	5,494	2,186				7,680	20,257
1978		5,396					5	5,401	545				5,946	26,579
1979		6,118					12	6,130	213	0			6,343	30,558
1980		2,938					8	2,946	582	0			3,528	22,563
1981	0	867	0	10	4	1	6	888	218	0			1,106	32,482
1982	1	2,639	0	0	1	2	7	2,650	506	0			3,156	26,392
1983	6	629	0	0	3	125	21	784	214	0			998	20,237
1984	4	673	1	0	4	25	31	738	166	0			904	11,146
1985	3	3,320	0	0	6	146	55	3,530	676	0			4,206	16,443
1986	1	4,851	0	0	15	323	7	5,197	189	0			5,386	19,545
1987	0	861	0	0	2	112	21	996	119	0			1,115	14,787
1988	4	923	0	0	4	73	4	1,008	447	0	1		1,456	8,308
1989	8	1,046	0	0	3	54	70	1,181	57	0			1,238	10,568
1990	61	1,380	0	0	10	94	40	1,585	50	0			1,635	8,356
1991	0	410	2	0	4	5	57	478	9	0			487	13,876
1992	1	1,928	38	0	8	81	93	2,149	0	0			2,149	12,962
1993	5	580	42	0	31	25	114	797	0	0			797	9,617
1994	1	906	30	0	28	101	24	1,090	63	0		2	1,155	14,913
1995	1	689	29	0	19	0	166	904	10	0			914	25,842
1996	0	4,523	25	2	43	0	30	4,623	3,700	0			8,323	21,978
1997	1	2,240	26	1	57	0	90	2,415	367	0			2,782	22,086
1998	4	1,771	54	172	40	1	213	2,255	1	0			2,256	13,918
1999	2	184	54	8	19	2	397	666	2,369	5	30		3,070	25,617
2000	12	693	19	1	29	0	220	974	3,025	61	42		4,102	28,859
2001	1	149	6	6	34	0	226	422	863	0			1,285	17,385
2002	2	50	2	1	7	0	348	410	1,708	1	5		2,124	17,459
2003	2	22	1	0	14	0	229	268	3,211	0	46		3,525	15,920
2004	0	0	1	0	10	0	34	45	8,880	0	11		8,936	21,707
2005	-	(165)	-	-	-	-	(56)	(221)	-	-	-	-	(4,545)	(17,881)

Table 3. Catches and landings (metric tons) of striped marlin by fishery for the North Pacific Ocean, 1952-2005. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

	Japan							Chinese Taipei[1,2]				Costa Rica[1]	Korea			Mexico			United States					Grand Total
Year	Distant-water and Offshore Longline	Coastal Longline	Other Longline	Small Mesh Gillnet	Large Mesh Gillnet	Other	Total	Distant-water Longline	High-seas Drift Gillnet	Other	Total	Sport	Longline	High-seas Drift Gillnet	Total	Longline	Sport[1]	Total	Longline	Troll	Handline	Sport[1]	Total	
1952	2,901		722	0	0	1,564	5,187				0		-		0			0				23	23	5,210
1953	2,138		47	0	0	954	3,139				0		-		0			0				5	5	3,144
1954	3,068		52	0	0	1,088	4,208				0		-		0			0				16	16	4,224
1955	3,082		28	0	0	1,038	4,149				0		-		0			0				5	5	4,154
1956	3,729		59	0	0	1,996	5,785				0		-		0			0				34	34	5,819
1957	3,189		119	0	0	2,459	5,766				0		-		0			0				42	42	5,808
1958	4,106		277	0	3	2,914	7,301				0		-		0			0				59	59	7,360
1959	4,152		156	0	2	3,191	7,501				0		-		0			0				65	65	7,566
1960	3,862		101	0	4	1,937	5,905				0		-		0			0				30	30	5,935
1961	4,420		169	0	2	1,797	6,388				0		-		0			0				24	24	6,412
1962	5,739		110	0	8	1,912	7,770				0		-		0			0				5	5	7,775
1963	6,135		62	0	17	1,910	8,124				0		-		0			0				68	68	8,193
1964	14,304		42	0	2	2,344	16,691				0		-		0			0				58	58	16,749
1965	11,602		19	0	1	2,796	14,418			608	608		-		0			0				23	23	15,049
1966	8,419		112	0	2	1,573	10,106			677	677		-		0			0				36	36	10,819
1967	11,698		127	0	3	1,551	13,379	2		643	646		-		0			0				49	49	14,073
1968	15,913		230	0	3	1,040	17,186	1		591	592		-		0			0				51	51	17,829
1969	8,544	600	3	0	3	2,630	11,780	2		814	816		-		0			0				30	30	12,626
1970	12,996	690	181	0	3	1,029	14,899	0		722	722		-		0			0				18	18	15,639

[1] Estimated from catch in number of fish

[2] Data from assessment table

Table 3. Continued - North Pacific Striped Marlin

	Japan							Chinese Taipei[1,2]				Costa Rica[1]	Korea			Mexico			United States					Grand Total
Year	Distant-water and Offshore Longline	Coastal Longline	Other Longline	Small Mesh Gillnet	Large mesh gillnet	Other	Total	Distant-water Longline	High-seas Drift Gillnet	Other	Total	Sport	Longline	High-seas Drift Gillnet	Total	Longline	Sport[1]	Total	Longline	Troll	Handline	Sport[1]	Total	
1971	10,965	667	259	0	10	2,016	13,917	0		701	701		-		0			0				17	17	14,635
1972	7,006	837	145	0	243	990	9,221	9		480	489		-		0			0				21	21	9,731
1973	6,299	632	118	0	3,265	630	10,944	1		821	822		-		0			0				9	9	11,774
1974	6,625	327	49	0	3,112	775	10,888	24		835	859		-		0			0				55	55	11,802
1975	5,193	286	38	0	6,534	685	12,736	64		571	635		-		0			0				27	27	13,398
1976	4,996	244	34	0	3,561	571	9,406	32		497	530		-		0			0				31	31	9,967
1977	2,722	256	15	0	4,424	547	7,964	17		1,030	1,046		-		0			0				41	41	9,052
1978	2,464	243	27	0	5,593	418	8,745	0		0	0		-		0			0				37	37	8,782
1979	4,898	366	21	0	2,532	526	8,343	26		464	490		-		0			0				36	36	8,870
1980	5,871	607	5	0	3,467	537	10,488	61		1,442	1,503		-		0			0				33	33	12,024
1981	3,957	259	12	0	3,866	538	8,632	17		669	687		-		0			0				60	60	9,379
1982	5,211	270	13	0	2,351	655	8,500	7		660	667		-		0			0				41	41	9,208
1983	3,575	320	10	22	1,845	792	6,564	0		0	0		-		0			0				39	39	6,604
1984	3,335	386	9	76	2,257	719	6,782	0		0	0		-		0			0				36	36	6,818
1985	3,698	711	24	40	2,323	732	7,528	0		972	972		-		0			0				42	42	8,541

[1] Estimated from catch in number of fish

[2] Data from assessment table

Table 3. Continued - North Pacific Striped Marlin

	Japan							Chinese Taipei[1,2]				Costa Rica[1]	Korea			Mexico			United States					Grand Total
Year	Distant-water and Offshore Longline	Coastal Longline	Other Longline	Small Mesh Gillnet	Large Mesh Gillnet	Other	Total	Distant-water Longline	High-seas Drift Gillnet	Other	Total	Sport	Longline	High-seas Drift Gillnet	Total	Longline	Sport[1]	Total	Longline	Troll	Handline	Sport[1]	Total	
1986	5,178	901	33	48	3,536	571	10,267	0		601	601		-		0	-		0				19	19	10,888
1987	5,439	1,187	6	32	1,856	513	9,033	31		1,035	1,066		-		0	-		0	272	30	1	28	331	10,429
1988	5,768	752	7	54	2,157	668	9,406	7		1,167	1,174		-		0	-		0	504	54	1	30	589	11,169
1989	4,582	1,081	13	102	1,562	537	7,877	8		1,337	1,345		-		0	-		0	612	24	0	52	688	9,910
1990	2,298	1,125	3	19	1,926	545	5,916	2		1,284	1,287		-		0	-	181	181	538	27	0	23	588	7,971
1991	2,677	1,197	3	27	1,302	506	5,712	36		1,149	1,185	106	-		0	-	75	75	663	40	0	12	715	7,793
1992	2,757	1,247	10	35	1,169	302	5,520	1		646	647	281	-		0	-	142	142	459	38	1	25	523	7,114
1993	3,286	1,723	1	0	828	443	6,281	5		365	370	438	-		0	-	159	159	471	68	1	11	551	7,798
1994	5,522	1,284	1	0	1,443	383	8,633	1		318	319	521	-		0	-	179	179	326	34	0	17	377	10,029
1995	5,596	1,840	3	0	970	278	8,686	27		151	178	153	-		0	-	190	190	543	52	0	14	609	9,817
1996	4,248	1,836	4	0	703	152	6,943	26		169	195	122	348		348	-	237	237	418	54	1	20	493	8,337
1997	4,697	1,400	3	0	813	163	7,076	59		361	420	138	828		828	-	193	193	352	38	1	21	412	9,068
1998	4,377	1,975	2	0	1,092	304	7,750	90		263	354	144	519		519	-	345	345	378	26	0	23	427	9,538
1999	2,600	1,551	4	0	1,126	183	5,464	66		0	66	166	352		352	-	266	266	364	28	1	12	405	6,719
2000	1,766	1,109	8	0	1,062	297	4,242	153		236	389	97	436		436	-	312	312	200	14	1	10	225	5,702
2001	2,077	1,326	11	0	1,077	237	4,728	121		160	281	151	206		206	-	237	237	351	42	2		395	5,998
2002	1,730	957	5	0	1,264	291	4,247	251		321	572	76	153		153	-	305	305	226	29	0		255	5,608
2003	1,907	870	3	0	1,064	203	4,047	-		172	172	79	172		172	-	322	322	538	28	0		566	5,358
2004	(1,555)	-			-	-	(1,555)	-		(134)	(134)	(19)	(75)		(75)	-	-	0	(384)	(56)	(2)		(442)	(2,225)
2005	-	-			-	-	(0)	-		-	(0)	-	(115)		(115)	-	-	(0)	(377)	-	-		(377)	(492)

[1] Estimated from catch in number of fish

[2] Data from assessment table

Table 4. Catches and landings (metric tons) of swordfish by fishery for the North Pacific Ocean, 1952-2005. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

	Japan								Chinese Taipei[4]			Korea	Mexico	United States[5]						
														Hawaii	California					
Year	Distant-water and Offshore Longline[2]	Coastal Longline	Driftnet	Harpoon	Other Bait Fishing	Trap Net	Other[3]	Total	Distant-water Longline	Offshore Longline	Total	Longline	All Gears	Longline	Longline	Gill Net	Harpoon	Unknown	Total	Grand Total
1952	9,138	941	0	2,558	-	-	79	12,716	-	-	-	-	-	-	-	-	-	-	-	12,716
1953	11,180	439	0	1,399	-	-	124	13,142	-	-	-	-	-	-	-	-	-	-	-	13,142
1954	12,957	394	0	810	-	-	124	14,285	-	-	-	-	-	-	-	-	-	-	-	14,285
1955	13,784	326	0	818	-	-	176	15,104	-	-	-	-	-	-	-	-	-	-	-	15,104
1956	15,407	308	0	772	-	-	86	16,573	-	-	-	-	-	-	-	-	-	-	-	16,573
1957	14,956	334	0	855	-	-	71	16,216	-	-	-	-	-	-	-	-	-	-	-	16,216
1958	19,336	341	0	1,063	-	-	96	20,836	-	-	-	-	-	-	-	-	-	-	-	20,836
1959	18,034	365	0	890	-	-	69	19,358	-	-	-	-	-	-	-	-	-	-	-	19,358
1960	21,091	351	1	1,191	-	-	93	22,727	-	-	-	-	-	-	-	-	-	-	-	22,727
1961	20,721	350	1	1,333	-	-	40	22,445	-	-	-	-	-	-	-	-	-	-	-	22,445
1962	10,559	377	0	1,369	-	-	55	12,360	-	-	-	-	-	-	-	-	-	-	-	12,360
1963	10,162	398	0	743	-	-	74	11,377	-	-	-	-	-	-	-	-	-	-	-	11,377
1964	5,974	391	4	1,006	-	-	82	7,457	-	-	-	-	-	-	-	-	-	-	-	7,457
1965	7,786	419	0	1,908	-	-	222	10,335	-	-	-	-	-	-	-	-	-	-	-	10,335
1966	8,970	413	0	1,725	-	-	59	11,167	-	-	-	-	-	-	-	-	-	-	-	11,167
1967	10,196	484	0	891	-	-	52	11,623	-	261	261	-	-	-	-	-	-	-	-	11,884
1968	8,295	536	0	1,539	-	-	1,167	11,537	-	281	281	-	-	-	-	-	-	-	-	11,818
1969	7,792	296	0	1,557	-	-	1,246	10,891	0	292	292	-	-	-	-	-	-	-	-	11,183
1970	5,659	427	0	1,748	-	-	1,049	8,883	-	182	182	-	-	5	-	-	612	10	627	9,692

[1] Catch data are currently unavailable for Republic of Korea, Philippines, and some other other countries catching swordfish in the North Pacific.

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

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

For 1971-2002 "Other" excludes estimated catches by other bait fishing methods and trap nets.

[4] Offshore longline category includes some catches from harpoon and other fisheries but does not include catches unloaded in foreign ports. Estimates of catches for 2002 are preliminary.

[5] Estimated round weight of retained catch. Does not include discards.

Table 4. Continued - North Pacific Swordfish

	Japan								Chinese Taipei[4]			Korea	Mexico	United States[5]						
														Hawaii	California					
Year	Distant-water and Offshore Longline[2]	Coastal Longline	Driftnet	Harpoon	Other Bait Fishing	Trap Net	Other[3]	Total	Distant-water Longline	Offshore Longline	Total	Longline	All Gears	Longline	Longline	Gill Net	Harpoon	Unknown	Total	Grand Total
1971	5,095	332	1	473	12	37	54	6,004	-	257	257	-	-	1	-	-	99	3	103	6,364
1972	4,453	520	55	282	8	1	25	5,344	-	352	352	-	2	0	-	-	171	4	175	5,873
1973	4,421	404	720	121	2	23	37	5,728	-	460	460	-	4	0	-	-	399	4	403	6,595
1974	4,388	508	1,304	190	11	16	164	6,581	1	460	461	-	6	0	-	-	406	22	428	7,476
1975	5,603	602	2,672	205	33	18	45	9,178	29	470	499	-	-	0	-	-	557	13	570	10,247
1976	6,087	691	3,488	313	165	14	76	10,834	23	487	510	-	-	0	-	-	42	13	55	11,399
1977	7,180	834	2,344	201	62	7	57	10,685	36	527	563	-	-	17	-	-	318	19	354	11,602
1978	7,273	984	2,475	130	96	22	62	11,042	-	436	436	-	-	9	-	-	1,699	13	1,721	13,199
1979	7,769	973	983	161	38	15	76	10,015	7	608	615	-	7	7	-	-	329	57	393	11,030
1980	6,005	824	1,746	398	22	15	33	9,043	10	679	689	-	380	5	-	160	566	62	793	10,905
1981	7,039	675	1,848	129	40	9	73	9,813	2	567	569	-	1,575	3	1	461	267	20	752	12,709
1982	6,064	839	1,257	195	51	7	43	8,456	1	758	759	-	1,365	5	2	911	156	43	1,117	11,697
1983	7,692	955	962	166	27	9	120	9,931	0	789	789	-	120	5	1	1,321	58	378	1,763	12,603
1984	7,177	1,141	971	117	91	13	125	9,635	-	954	954	-	47	3	14	2,101	96	678	2,892	13,528
1985	9,335	980	1,026	191	59	10	136	11,737	-	742	742	-	18	2	46	2,368	211	792	3,419	15,916

Table 4. Continued - North Pacific Swordfish

	Japan								Chinese Taipei[4]			Korea	Mexico	United States[5]						
														Hawaii	California					
Year	Distant-water and Offshore Longline[2]	Coastal Longline	Driftnet	Harpoon	Other Bait Fishing	Trap Net	Other[3]	Total	Distant-water Longline	Offshore Longline	Total	Longline	All Gears	Longline	Longline	Gill Net	Harpoon	Unknown	Total	Grand Total
1986	8,721	960	1,170	123	32	9	186	11,201	-	652	652	-	422	2	4	1,594	236	696	2,532	14,807
1987	9,495	819	910	87	29	11	198	11,549	3	1,515	1,518	-	550	24	4	1,287	211	300	1,826	15,443
1988	8,574	665	1,048	173	12	8	206	10,686	-	1,041	1,041	-	613	24	19	1,092	180	344	1,659	13,999
1989	6,690	742	1,397	362	15	10	215	9,431	50	1,491	1,541	-	690	218	29	1,050	54	224	1,575	13,237
1990	5,833	687	1,026	128	11	4	53	7,742	143	1,309	1,452	-	2,650	2,436	18	1,028	50	137	3,669	15,513
1991	4,809	799	424	153	18	5	84	6,292	40	1,390	1,430	-	861	4,508	39	836	16	137	5,536	14,119
1992	7,234	1,173	840	381	15	6	56	9,705	21	1,473	1,494	-	1,160	5,700	95	1,332	74	44	7,245	19,604
1993	8,298	1,394	292	309	41	4	3	10,341	54	1,174	1,228	-	812	5,909	165	1,400	169	36	7,679	20,060
1994	7,366	1,357	421	308	30	4	7	9,493	-	1,155	1,155	-	581	3,176	740	799	153	8	4,876	16,105
1995	6,422	1,386	561	423	33	7	2	8,834	50	1,135	1,185	-	437	2,713	279	755	96	31	3,874	14,330
1996	6,916	1,063	428	597	44	4	5	9,057	9	1,130	1,139	12	439	2,502	347	752	81	10	3,692	14,339
1997	7,002	1,400	365	346	57	5	6	9,181	15	2,190	2,205	246	2,365	2,881	664	707	84	3	4,339	18,336
1998	6,233	1,975	470	476	66	2	6	9,228	20	1,900	1,920	123	3,603	3,263	422	924	48	13	4,670	19,544
1999	5,557	1,551	724	416	46	5	3	8,302	70	2,234	2,304	104	1,136	3,100	1,333	606	81	2	5,122	16,968
2000	6,180	1,109	808	497	45	5	13	8,657	325	2,470	2,795	161	2,216	2,949	1,908	646	90	9	5,602	19,431
2001	6,932	1,326	732	230	28	15	11	9,274	1,039	2,727	3,766	349	780	220	1,763	375	52	5	2,415	16,584
2002	6,227	-	1,164	201	24	11	15	7,642	1,633	2,511	4,144	350	465	204	1,320	302	90	3	1,919	14,520
2003	5,339	-	1,198	149	23	4	10	6,723	1,084	3,196	4,280	311	671	147	1,812	216	107	0	2,282	14,267
2004	(6,510)	-	-	-	-	-	-	(6,510)	(1,301)	(3,167)	(4,468)	(350)	-	(213)	(898)	(169)	(62)	(37)	(1,379)	(12,707)
2005	-	-	-	-	-	-	-	(0)	-	-	(0)	(407)	-	(1,360)	-	(148)	(50)	(0)	(1,558)	(1,965)