REPORT OF THE 2014 INTERCESSIONAL MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

PLENARY SESSION

12 March 2014
Webinar

LIST OF ANNEXES

ACRONYMS AND ABBERVIATIONS

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

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

ISC Working Groups

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

Other Abbreviations and Acronyms Used in the Report

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

1.0 INTRODUCTION AND OPENING OF THE MEETING

1.1 Introduction

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) was established in 1995 through an intergovernmental agreement between Japan and the United States of America (USA). Since its establishment and first meeting in 1996, the ISC has undergone a number of changes to its membership, charter and name (from the Interim Scientific Committee to the International Scientific Committee) and has adopted a number of guidelines for its operations. The two main goals of the ISC are (1) to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes that inhabit the North Pacific Ocean during a part or all of their life cycle; and (2) to establish the scientific groundwork for the conservation and rational utilization of these species in this region. The ISC is made up of voting Members from coastal states and fishing entities in the North Pacific as well as coastal states and fishing entities with vessels fishing for highly migratory species in the region, and non-voting Members from relevant intergovernmental fishery and marine science organizations, recognized by all voting Members.

At the thirteenth Plenary session of the ISC (ISC13) held in July 2013, ISC members agreed to hold an intercessional Plenary meeting in order to resolve outstanding issues. These issues include adopting the updated stock status and conservation advice for the Pacific bluefin tuna stock.

1.2 Opening of the meeting

The intercessional meeting of the ISC was convened via webinar at 3pm (HST) on 12 March 2014 by the ISC Chairman, G. DiNardo. A roll call confirmed the presence of delegates from Canada, Chinese Taipei, Japan, Korea, Mexico, and USA. Representatives from PEW, WWF, and the Monterey Bay Aquarium attended as observers (*Annex 1*).

2.0 ADOPTION OF THE AGENDA

The proposed agenda of the session was considered and adopted with no changes (*Annex 2*). S. Shoffler and L. Thomas were assigned lead rapporteur duties. A list of meeting documents is contained in *Annex 3*.

3.0 UPDATED STOCK STATUS AND CONSERVATION ADVICE FOR THE PACIFIC BLUEFIN TUNA STOCK

Y. Takeuchi summarized results of the stock assessment update conducted by the ISC Pacific Bluefin Tuna Working Group (PBFWG) (*Annex 4*) from 17-22 February 2014 at SWFSC NOAA in La Jolla, California. The objectives of this meeting were to 1) To conduct future projections using a better F-level scenario, which is more consistent with the current management measures used by WCPFC and IATTC; and to determine details of projection scenarios, including F-levels and future recruitment, 2. Provide more accurate estimates of the immediate risk of declining spawning stock biomass (SSB) below the historically lowest observed SSB;

and 3. Evaluate stock status and address actual fishing mortalities under management (Fs in 2011 and 2012), recognizing that uncertainties still remain.

Population dynamics were estimated using a fully integrated age-structured model (Stock Synthesis (SS) v3.23b) fitted to catch, size composition and catch-per-unit of effort (CPUE) data from July 1952 to June 2013 (fishing years 1952-2012). A total of 14 fisheries were defined for use in the stock assessment model based on country/gear type stratification. Quarterly observations of catch and size compositions, when available, were used as inputs to the model to describe the removal processes.

The PBFWG recognized the uncertainties in the standardized CPUE series, the procedures used to weight the data inputs (including catch, CPUE, and size composition) relative to each other in the model, and the methods used to estimate selectivity patterns. The influence of these uncertainties on the stock dynamics was assessed by constructing four different model runs, each with different updated CPUE and length composition data (*Annex 4*/Table 1). While no single model run provided a good fit to all reliable data, there was general agreement on the depleted state of the stock among all scenarios, although estimates of current SSB varied. Long-term fluctuations in SSB occurred throughout the assessment period (1952-2012) and in the most recent period SSB was found to have been declining for over a decade. The recruitment level in 2012 was estimated to be relatively low (the 8th lowest in 61 years), and the average recruitment level for the last five years may have been below the historical average level (*Annex 4*/Figures 4 and 5).

Based on the results, draft conservation advice made by the WG was presented.

The PBFWG offered the following conservation advice:

- If the low recruitment of recent years continues, the risk of SSB falling below its historically lowest level observed would increase. This risk can be reduced with implementation of more conservative management measures (*Annex 4*/Figure 11).

- Based on the results of future projections requested by NC9, unless the historical average level (1952-2011) of recruitment is realized, an increase of SSB cannot be expected under the current WCPFC and IATTC conservation and management measures, even under full implementation (Scenario 1). If the specifications of the harvest control rules used in the projections were modified to include a definition of juveniles that is more consistent with the maturity ogive used in the stock assessment, projection results could be different.

- The current (2012) PBF biomass level is near historically low levels and experiencing high exploitation rates above all biological reference points except for Floss. Based on

projection results, the recently adopted WCPFC CMM and IATTC resolution for 2014, if continued, are not expected to increase SSB if recent low recruitment continues.

Discussion

The ISC Chair thanked the PBFWG for its hard work and noted that it produced a report in very short order.

The Plenary inquired if the Pacific bluefin tuna have entered a low recruitment phase and if this phase is likely to continue. The PBFWG noted that recruitment in recent years was low but there is no clear conclusion on future recruitment. The group discussed that age at maturity may be defined by 50% mature or 100% mature and that a clear definition of age at maturity needs to be stated. The WG implemented the age at maturity that was requested by the NC in responding to NC9's request.

While the update stock assessment model was unable to adequately represent much of the updated data though certain results are clear. Poor fit to the two adult indices of abundance and their associated size composition in the last two years indicate results are highly uncertain. Improvements to the model are advisable before re-assessing, and the current results, with regard to the recent trends in SSB, should be interpreted with caution.

Stock Status and Conservation Advice

Stock Status

Using the update stock assessment, the 2012 SSB of 26,324 t is slightly higher than that estimated for 2010 (25,476 t).

Across sensitivity runs in the update stock assessment, estimates of recruitment were considered to be robust. The recruitment level in 2012 was estimated to be relatively low (the 8th lowest in 61 years), and the average recruitment level for the last five years may have been below the historical average level (**Figure 1** bottom panel). Estimated age-specific fishing mortalities on the stock in the period 2009-2011 relative to 2002-2004 (the base period for the current WCPFC Conservation and Management Measure 2010-04) show 19%, 4%, 12%, 31%, 60%, 51% and 21% increases for ages 0-6, respectively, and a 35% decrease for age 7+.

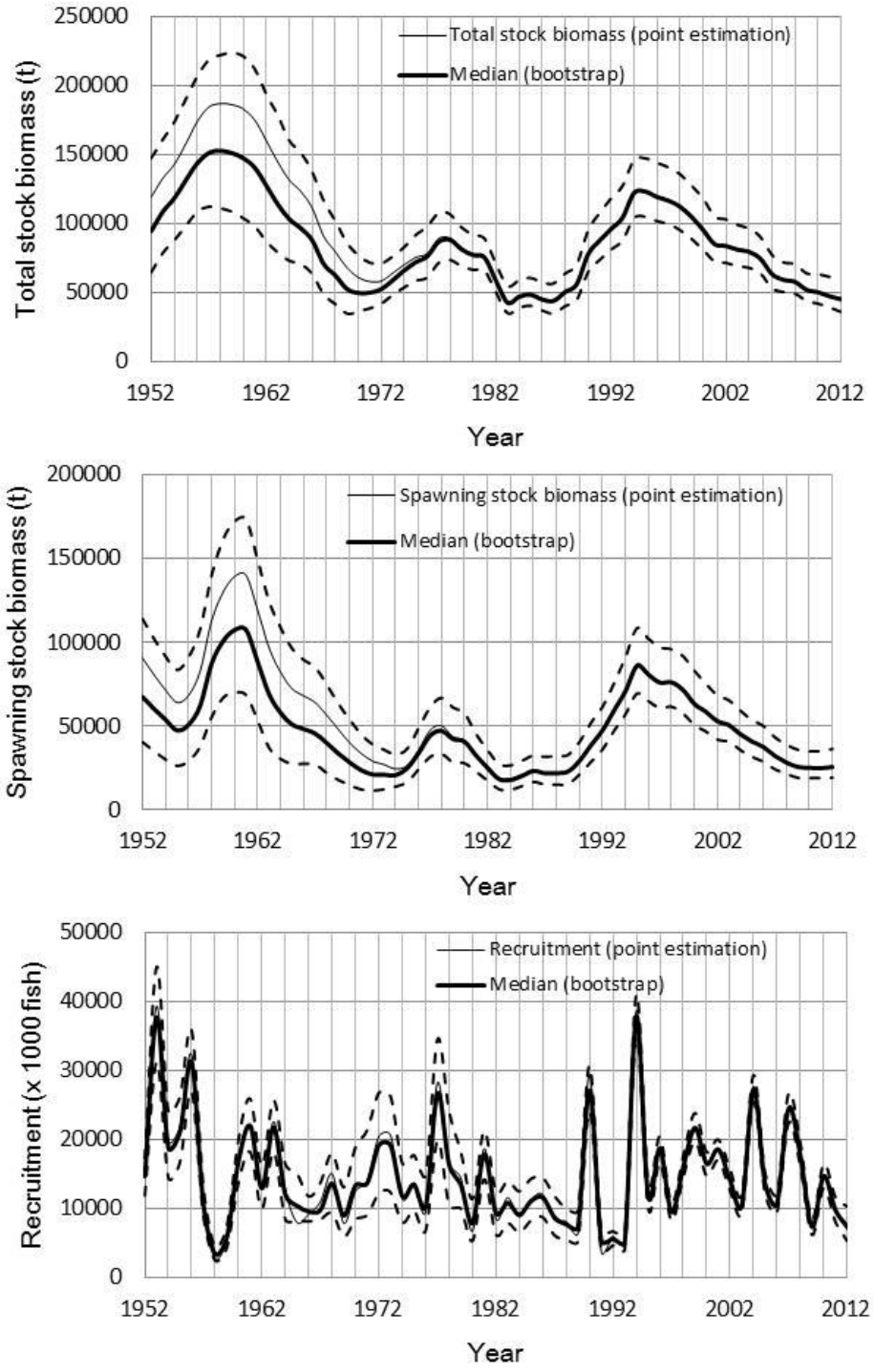

Figure 1. Total stock biomass (upper panel), spawning stock biomass (middle panel) and recruitment (lower panel) of PBF from the base case run (Run1). Thick line indicates median, thin line indicates point estimate, and dashed lines indicate the 90% confidence interval.

Although no target or limit reference points have been established for the PBF stock under the auspices of the WCPFC and IATTC, the current *F* (average 2009-2011) exceeds all target and limit biological reference points (BRPs) except for F_{loss}, and the ratio of SSB in 2012 relative to unfished SSB (depletion ratio) is less than 6%. In summary, based on reference point ratios, overfishing is occurring and the stock is overfished (**Table 1**).

	F_{max}	$F_{0.1}$	F_{med}	F_{loss}	$F_{10\%}$	$F_{20\%}$	$F_{30\%}$	$F_{40\%}$	Depletion Ratio	Estimated SSB(t) (yr=2012)
$F_{2002\text{-}2004}$										
Run1	**1.70**	**2.44**	**1.09**	**0.84**	**1.16**	**1.68**	**2.26**	**2.98**	**0.042**	**26,324**
Run2	1.73	2.47	1.09	0.85	1.16	1.68	2.26	2.99	0.054	33,736
Run3	1.78	2.55	1.16	1.03	1.24	1.79	2.40	3.17	0.031	19,369
Run4	1.77	2.52	1.13	0.89	1.21	1.75	2.36	3.11	0.043	26,952
$F_{2007\text{-}2009}$										
Run1	**2.09**	**2.96**	**1.40**	**1.08**	**1.48**	**2.14**	**2.87**	**3.79**	**0.042**	**26,324**
Run2	1.93	2.74	1.25	0.99	1.34	1.94	2.60	3.43	0.054	33,736
Run3	2.34	3.31	1.54	1.38	1.65	2.38	3.20	4.23	0.031	19,369
Run4	2.11	2.98	1.36	1.07	1.46	2.11	2.84	3.74	0.043	26,952
$F_{2009\text{-}2011}$										
Run1	**1.79**	**2.54**	**1.25**	**0.97**	**1.32**	**1.90**	**2.55**	**3.36**	**0.042**	**26,324**
Run2	1.61	2.30	1.11	0.88	1.19	1.71	2.29	3.02	0.054	33,736
Run3	2.02	2.86	1.37	1.23	1.46	2.11	2.83	3.73	0.031	19,369
Run4	1.77	2.52	1.20	0.95	1.29	1.85	2.49	3.27	0.043	26,952

Table 1: Ratio of the estimated fishing mortalities $F_{2002\text{-}2004}$, $F_{2007\text{-}2009}$ and $F_{2009\text{-}2011}$ relative to computed F-based biological reference points for Pacific bluefin tuna (PBF), depletion ratio (ratio of SSB in 2012 relative to unfished SSB), and estimated SSB (t) in year 2012 for four model configurations (runs). Run 1 is the base case assessment model for the PBF update stock assessment. Values in the first eight columns above 1.0 indicate overfishing.

For illustrative purposes, two examples of Kobe plots (plot A based on SSB_{MED} and $F_{ME}D$, plot B based on $SSB_{20\%}$ and $SPR_{20\%}$, **Figure 2**) were prepared and presented. Because no reference points for PBF have yet been agreed to, these versions of the Kobe plot represent alternative interpretations of status in an effort to prompt further discussion.

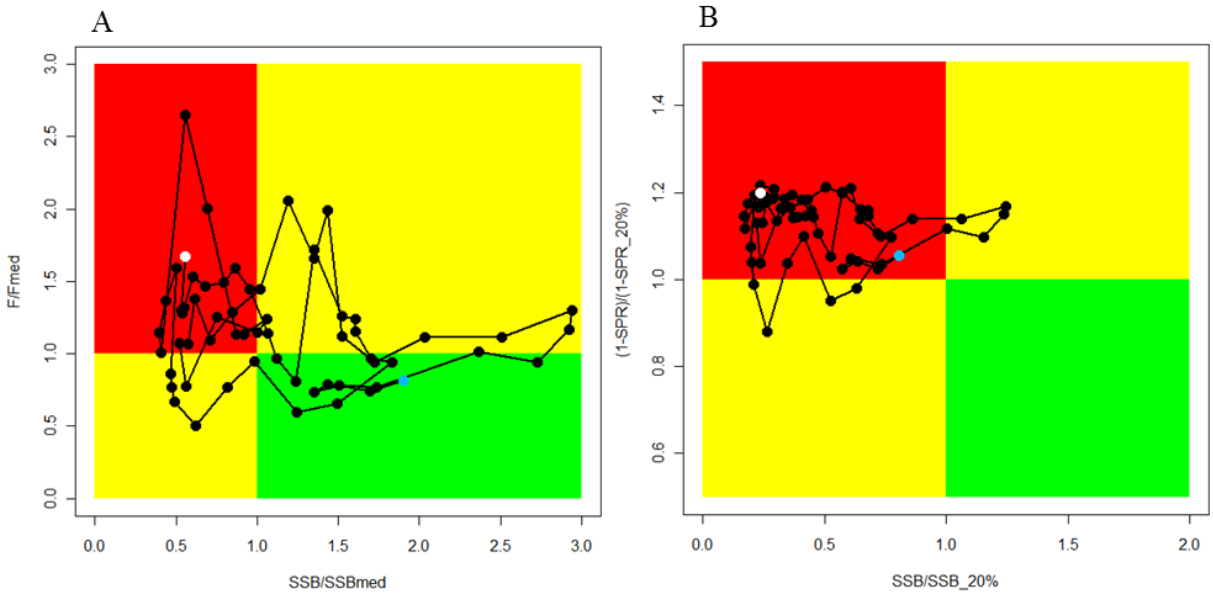

Figure 2: Alternative Kobe plots for Pacific bluefin tuna (Thunnus orientalis). A. SSBMED and FMED; B. SSB20% and SPR20%. Citation of these Kobe plots should include clarifying comments in the text. The blue and white points on the plot show the start (1952) and end (2012) year of the period modeled in the stock assessment, respectively.

Historically, the western Pacific Ocean (WPO) coastal fishery group has had the greatest impact on the PBF stock, but since about the early 1990s the WPO purse seine fleet has increased its impact, and the effect of this fleet is currently greater than any of the other fishery groups. The impact of the eastern Pacific Ocean fishery was large before the mid-1980s, but decreased after the 1990s until the mid 2000s. The WPO longline fleet has had a limited effect on the stock throughout the analysis period. The impact of a fishery on a stock depends on both the number and size of the fish caught by each fleet; i.e., catching a high number of smaller juvenile fish can have a greater impact on future spawning stock biomass than catching the same weight of larger mature fish.

Conservation Advice

The current (2012) PBF biomass level is near historically low levels and experiencing high exploitation rates above all biological reference points except for F_{LOSS}. Based on projection results, the recently adopted WCPFC CMM (2013-09) and IATTC resolution for 2014 (C-13-02), if continued in to the future, are not expected to increase SSB if recent low recruitment continues.

In relation to the projections requested by NC9, no scenario except for Scenario 6, the strictest one, demonstrates an increase of SSB when assuming the current low recruitment continues. Given the result of Scenario 6, further substantial reduction of fishing mortality and juvenile

catch over the whole range of juvenile ages should be considered to reduce the risk of SSB falling below its historically lowest level.

If the low recruitment of recent years continues the risk of SSB falling below its historically lowest level observed would increase. This risk can be reduced with implementation of more conservative management measures.

Based on the results of future projections requested by NC9, unless the historical average level (1952-2011) of recruitment is realized, an increase of SSB cannot be expected under the current WCPFC and IATTC conservation and management measures[1], even under full implementation (Scenario 1)[2].

If the specifications of the harvest control rules used in the projections were modified to include a definition of juveniles that is consistent with the maturity ogive[3] used in the stock assessment, projection results could be different, for example, rebuilding may be faster. While no projection with a consistent definition of juvenile in any harvest scenario was conducted, any proposed reductions in juvenile catch should consider all non-mature individuals.

Given the low SSB and uncertainty in future recruitment, monitoring of recruitment should be strengthened to allow the recruitment trend to be understood in a timely manner.

Future work

Plenary agreed that in 2016 a more robust model will be used to conduct the bluefin tuna stock assessment.

4.0 ISC14

4.1 Venue

Chinese-Taipei has agreed to host ISC14 Plenary in Taipei. The meeting venue will be announced soon.

[1] WCPFC: Reduce all catches of juveniles (age 0 to 3-(less than 30 kg)) by at least 15% below the 2002-2004 annual average levels, and maintain the total fishing effort below the 2002-2004 annual average levels. IATTC: Catch limit of 5000 t with an additional 500 t for commercial fisheries for countries with catch history. (1. In the IATTC Convention Area, the commercial catches of bluefin tuna by all the CPCs during 2014 shall not exceed 5,000 metric tons. 2. Notwithstanding paragraph 1, any CPC with a historical record of eastern Pacific bluefin catches may take a commercial catch of up to 500 metric tons of eastern Pacific bluefin tuna annually. (C-13-02), see https://www.iattc.org/PDFFiles2/Resolutions/C-13-02-Pacific-bluefin-tuna.pdf)

[2] Although these measures assume F be kept below $F_{2002\text{-}2004}$, $F_{2009\text{-}2011}$ was higher than $F_{2002\text{-}2004.}$

[3] 20% in age 3 50 % in age 4 100% in age 5 and older

5.0 Other matters

5.1 PICES – ISC relationship

ISC is currently working on strengthening their relationship with PICES. The ISC has accepted a proposal to attend the PICES annual meeting in October 2014 that will be held in Yeosu, Korea and details of this are currently being discussed. A work plan is currently being drafted to work with PICES on the impacts of climate change on highly migratory species and associated fisheries in the North Pacific Ocean. More information on this work plan will be provided soon.

5.2 Deadlines

The deadline for all stock assessments with the exception of the blue shark assessment will be on June 1, 2014. The deadline for the blue shark assessment will be July 9, 2014. All documents and National Reports for ISC 14 will be due on July 1, 2014.

5.3 WCPFC decisions of interest to ISC

The NC9, SC9, and WCPFC10 decisions of interest to ISC were briefly discussed and are presented in ISC/IM14/PLENARY/01.;

6.0 CLOSE OF MEETING

The meeting ended at 5:30 pm (HST) on 12 March 2014.

Annex 1

LIST OF PARTICIPANTS

2014 Intercessional Meeting of the

INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

12 March 2014
Webinar

Canada

John Holmes*
Pacific Biological Station
3190 Hammond Bay Road
Nanaimo, B.C., Canada V9T 6N7
John.Holmes@dfo-mpo.gc.ca

Chinese Taipei

Ted Tien-Hsiang Tsai*
Fisheries Agency of Taiwan
70-1, Sec. 1, Jinshan S. Road
Taipei, 100 Taiwan
ted@ms1.fa.gov.tw

Shui-Kai Chang
National Sun-Yat Sen University
70 Lienhai Rd.
Kaohsiung, 80424 Taiwan, R.O.C.
skchang@faculty.nsysu.edu.tw

Wen-Yu Chiu
Fisheries Agency of Taiwan
70-1, Sec. 1, Jinshan S. Road
Taipei, 100 Taiwan
wenyu@ms.1.fa.gov.tw

Hisiang-Yi Yu
Fisheries Agency of Taiwan
70-1, Sec. 1, Jinshan S. Road
Taipei, 100 Taiwan
hsiangyi@ms1.fa.gov.tw

Chien-Chung Hsu
National Taiwan University
No. 1, Sec. 4, Roosevelt Road
Taipei, 106 Taiwan
hsucc@ntu.edu.tw

Chi-Chao Liu
Fisheries Agency of Taiwan
70-1, Sec. 1, Jinshan S. Road
Taipei, 100 Taiwan
chichao@ms1.fa.gov.tw

Ren-Fen Wu
Overseas Fisheries Development Council
19, Lane 113, Roosevelt Road, Sec. 4
Taipei, 106 Taiwan
fan@ofdc.org.tw

Yi-Xiu Yeh
Fisheries Agency of Taiwan
70-1, Sec. 1, Jinshan S. Road
Taipei, 100 Taiwan
yixiu@ms1.fa.gov.tw

*Delegation leaders

Chen Yu
Fisheries Agency of Taiwan
70-1, Sec. 1, Jinshan S. Road
Taipei, 100 Taiwan
chenyu@ms1.fa.gov.tw

Japan

Hideki Nakano*
National Research Inst. of Far Seas Fisheries
5-7-1 Orido, Shimizu
Shizuoka, 424-8633 Japan
hnakano@affrc.go.jp

Yukio Takeuchi
National Research Inst. of Far Seas Fisheries
5-7-1 Orido, Shimizu
Shizuoka, 424-8633 Japan
yukiot@fra.affrc.go.jp

Mexico

Michel Dreyfus*
Centro Regional de Inv Pesquera
Km. 97.5, Carretera Tij-Ensenada
Ensenada, Mexico
dreyfus@cicese.mx

Republic of Korea

Sang Chul Yoon
National Fisheries Research and
Development Inst.
216 Gijanghaean-ro, Gijang-up, Gijang-gun
Busan, 619-705 Korea
yoonsc@korea.kr

USA

Cisco Werner*
NOAA NMFS SWFSC
3333 N. Torrey Pines Court
La Jolla, CA 92037 USA
Cisco.Werner@noaa.gov

*Delegation leaders

Tom Graham
NOAA NMFS PIRO
1601 Kapiolani Blvd., Suite 1110
Honolulu, HI 96814 USA
Tom.Graham@noaa.gov

Mark Helvey
NOAA NMFS Southwest Regional Office
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802-4213
Mark.Helvey@noaa.gov

Kevin Piner
NOAA NMFS SWFSC
3333 N. Torrey Pines Court
La Jolla, CA 92037 USA
Kevin.Piner@noaa.gov

Steven Teo
NOAA NMFS SWFSC
3333 N. Torrey Pines Court
La Jolla, CA 92037 USA
Steve.Teo@noaa.gov

Observers

Charles Farwell
Monterey Bay Aquarium
886 Cannery Row
Monterey, CA 93940 USA
cfarwell@mbayaq.org

Jamie Gibbon
The Pew Charitable Trust
901 E. Street NW
Washington, DC 20004
jgibbon@pewtrusts.org

Shanna Miller
The Pew Charitable Trust
901 E. Street NW
Washington, DC 20004
smiller-consultant@pewtrusts.org

Aiko Yamauchi
WWF Japan
Shiba 3-1-14 Minato-ku
Tokyo, Japan
ayamauchi@wwf.or.jp

Office of the Chair

Gerard DiNardo
NOAA NMFS PIFSC
2570 Dole Street
Honolulu, HI 96822 USA
Gerard.DiNardo@noaa.gov

Sarah Shoffler
NOAA NMFS SWFSC
3333 N. Torrey Pines Court
La Jolla, CA 92037 USA
Sarah.Shoffler@noaa.gov

Chi-Lu Sun
National Taiwan University
No. 1, Sec. 4, Roosevelt Road
Taipei, 106 Taiwan
chilu@ntu.edu.tw

Lennon Thomas
Western Pacific Regional Fishery Management Council
1164 Bishop Street
Honolulu, HI 96813 USA
Lennon.Thomas@noaa.gov

AGENDA FOR PLENARY SESSION

2014 Intercessional Meeting of the

INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

12 March 2014
Webinar

1. Introduction and Opening of the Meeting

2. Adoption of the Agenda

3. Pacific Bluefin Tuna
    a. Updated Stock Status and Conservation Advice

4. ISC14
    a. Venue
    b. PICES – ISC relationship
    c. Deadlines
    d. WCPFC decisions of interest to ISC

5. Close of Meeting

Annex 3

LIST OF MEETING DOCUMENTS

2014 Intercessional Meeting of the

INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

5 March 2014
Webinar

ISC/IM14/PLENARY/01 NC9, SC9 and WCPFC10 decisions of interest to ISC

Annexes

Annex 1 List of meeting participants

Annex 2 ISC meeting agenda

Annex 3 List of meeting documents

Annex 4 2014 Pacific Bluefin Tuna stock assessment report