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REFERENCE DOCUMENT FOR REVIEW OF CMM 2015-01 (Bigeye, Yellowfin, and Skipjack Tuna)

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Paper prepared by the Secretariat

A. Introduction

1. The purpose of this paper is to provide a quick reference guide to the recommendations of the Scientific Committee (SC) and the Technical Compliance Committee (TCC) of relevance to the discussions in support of the review of CMM 2015-01. It lists the recommendations drawn from the summary reports of SC10 and SC12; and TCC12. The Summary Reports of those meetings are part of the meeting documentation and readily available for access and they provide the context and discussion in support of the recommendations.

B. Scientific Committee Recommendations

2. The relevant recommendations of the Scientific Committee, with appropriate referencing, are listed below:

Bigeye Tuna

Stock status and management advice

a) SC12 noted that no stock assessment was conducted for WCPO bigeye tuna in 2016. Therefore, the stock status description and management advice from SC10 are still current. SC12 also noted that (*SC12 - Paras 232-239*):
   a. The total bigeye catch in 2015 was 134,084 mt, which was a 16% decrease over 2014 and a 13% decrease over the average for 2010-14.
   b. Purse seine bigeye catch in 2015 was 26% lower than that in 2014 and effort was 21% lower. Longline catch in 2015 was 13% lower than that in 2014, and tropical longline effort (20N-10S) was 4% lower.
   c. The results of the updated short-term projections using actual catch and effort levels in 2013-2015 and which assumed that recent above-average recruitments continued, indicated that the median spawning biomass depletion (SB/SBF=0) of bigeye has been relatively stable since the 2012 assessment.

d. The importance of retrospective analyses as a diagnostic tool for WCPFC stock assessments. Further, retrospective forecasting of the 2014 WCPO bigeye tuna stock assessment found that the 2014 bigeye tuna stock assessment model is not subject to substantial retrospective bias.
e. Short-term projections conducted using the results of the 2014 bigeye tuna reference case assessment model provide consistent and relatively accurate indications of stock status in the short term.
f. The projected median spawning biomass depletion of bigeye in 2016 was SB2015/SBF=0 = 0.17. It was also noted that short-term stochastic projections using only the reference case model are likely to underestimate uncertainty in projected stock status.

b) SC10 recommended that fishing mortality on WCPO bigeye tuna be reduced. A 36% reduction in fishing mortality from the average levels for 2008–2011 would be expected to return the fishing mortality rate to F_{MSY}. This reduction of at least 36% should also allow the stock to rebuild above the LRP over a period of time. This recommended level of reduction in fishing mortality could also be stated as a minimum 33% reduction from the 2004 level of fishing mortality, or a minimum 26% reduction from the average 2001–2004 level of fishing mortality. (*SC10 - para 194*).

CMM 2015-01 – Purse seine catches of bigeye tuna

c) SC12 reviewed a management option to limit bigeye catches on purse seine vessels with higher percentage of bigeye tuna catch to assist the recovery of the bigeye tuna stock in the WCPO (SC12-MI-WP-09: *Examining a management measure of key purse seine vessels for recovering bigeye tuna stock in the WCPO*) though noted that further work on this option was required to clarify and validate specific outcomes. SC12 was also informed about additional options considered by some CCMs (e.g., the introduction of FAD charges to manage FAD usage in PNA waters) to achieve this same objective. SC12 recommends that WCPFC13 note that there are various options to limit bigeye catches on purse seine vessels when considering additional management measures for rebuilding the bigeye tuna stock within the WCPO. (*SC12 - Para 643*).

Yellowfin tuna

Stock status and management advice

d) SC12 noted that no stock assessment was conducted for WCPO yellowfin tuna in 2016. Therefore, the stock status description and management advice from SC10 are still current. SC12 also noted that (*SC12 – Paras 246-250*):
a. The total yellowfin catch in 2015 was 605,963 mt, a 2% increase over 2014 and a 7% increase over the average for 2010-14.
b. Purse seine yellowfin catch in 2015 was 15% lower than that in 2014 and effort was 21% lower. Longline catch in 2015 was 2% lower than that in 2014, and tropical longline effort (20N-10S) was 4% lower. Catches of other gears increased by 47% from 2014 to 2015.
c. The results of the updated short-term projections using actual catch and effort levels in 2013-2015 indicated that the projected median spawning biomass depletion ($SB/SB_{F=0}$) of yellowfin showed an increasing trend since 2012. SC12 also noted that the projected median spawning biomass depletion of yellowfin in 2016 was $SB_{2015}/SB_{F=0} = 0.49$.

e) SC recommended that the catch of WCPO yellowfin tuna should not be increased from 2012 levels, which exceeded MSY, and measures should be implemented to maintain current spawning biomass levels until the Commission can agree on an appropriate TRP (*SC10 - para 198*).

CMM 2015-01 – Yellowfin tuna catch limits

f) SC12 discussed the request from WCPFC12 to provide comments and/or recommendations to the Commission on how to further develop catch limit options for yellowfin tuna as specified in paragraphs 28, 29 and 43 of CMM-2015-01. SC12 reiterated its advice from SC11 that yellowfin tuna stock status in the WCPO is relatively insensitive to whether purse seine effort is comprised of mainly associated sets or unassociated sets. SC12 also noted that the latest catch estimates for 2015 suggest that catch of yellowfin in the longline and purse seine fisheries appears relatively stable and as such several CCMs do not consider yellowfin catch limits in the longline and purse seine fisheries to be immediately necessary. Nevertheless, some concern was expressed with the increase in yellowfin catch reported in the "other" fisheries category, particularly in the Indonesian and Philippines handline fisheries, though it was noted that these catches are presently provisional and increases may be attributed to changes in data collection in recent years. SC12 therefore recommended WCPFC13 consider the need for continued improvements for data collection in these fisheries and the need for CCMs to provide information to the Commission on the management tools they have available to them to bring these catches under control. (*SC 12 - Para 622*).

Skipjack tuna

Stock status and management advice

g) The SC12 was unable to reach consensus on the description of stock status based on the 2016 stock assessment. So majority and alternative views were provided for the stock status whereas SC12 provided agreed management advice. (*SC12 - Paras 304-305*).

Note
The Science Services Provider conducted additional sensitivity model runs to supplement the 2016 stock assessment. This paper is posted on the SC12 website (SA-WP-04a) on 28 November 2016, which can be considered at WCPFC13:
http://www.wcpfc.int/system/files/SC12-SA-WP-04a%20%5BAdditional%20analysis%20to%20support%20SKJ%20assessment%5D.pdf

Majority view of stock status and trends (*SC12 - Paras 306-311*)

a. A majority of SC12 CCMs selected the reference case model as the base case to represent the stock status of skipjack tuna (column "Ref Case" in Table SKJ2). To characterize uncertainty, those CCMs chose the structural uncertainty grid. Summaries of important model quantities for these models are shown in Table SKJ2.

Table SKJ2: Estimates of management quantities for the selected stock assessment models. For the purpose of this assessment, "recent" is the average over the period 2011–2014 and "latest" is 2015. The column "Ref Case" shows summaries for the reference case and the remaining columns are the quantiles of the structural uncertainty grid, e.g. 5% and 50% are the 5% quantile and the median (50% quantile), respectively. Option 1 in the text recommends basing management advice on the reference case model and considering the uncertainty represented by the 5% and 95% quantile columns. Option 2 recommends basing management advice on the range of model runs in the structural uncertainty grid, as represented by the 5% and 95% quantile columns.

Quantity	Ref Case	50%	5%	25%	75%	95%
C_{latest}	1,679,528	1,679,444	1,678,646	1,679,170	1,679,497	1,679,592
MSY	1,891,600	1,875,600	1,618,060	1,785,400	1,976,700	2,199,880
$Y_{F_{recent}}$	1,594,800	1,607,000	1,486,660	1,533,200	1,755,200	1,808,860
f_{mult}	2.23	2.07	1.57	1.85	2.29	2.62
F_{MSY}	0.24	0.24	0.21	0.22	0.26	0.28

F_{recent}/F_{MSY}	0.45	0.48	0.38	0.44	0.54	0.64
SB_{MSY}	1,626,000	1,628,000	1,258,700	1,425,750	1,852,750	2,166,100
SB_0	6,764,000	6,359,500	5,214,050	5,853,750	7,095,250	8,340,450
$SB_{F=0}$	7,221,135	6,876,526	5,778,079	6,408,578	7,425,353	8,555,240
SB_{latest}/SB_0	0.62	0.55	0.43	0.49	0.59	0.71
$SB_{latest}/SB_{F=0}$	0.58	0.51	0.39	0.47	0.57	0.67
SB_{latest}/SB_{MSY}	2.56	2.15	1.6	1.81	2.43	3.08
$SB_{recent}/SB_{F=0}$	0.52	0.49	0.4	0.46	0.52	0.57

b. Dynamics of most model quantities are relatively consistent with the results of the 2014 stock assessment, although there has been a period of several subsequent years with high recruitments and increased spawning biomass.
c. Fishing mortality of all age-classes is estimated to have increased significantly since the beginning of industrial tuna fishing, but fishing mortality still remains below the level that would result in the MSY (F_{recent}/F_{MSY} = 0.45 for the reference case), and is estimated to have decreased moderately in the last several years. Across the reference case and the structural uncertainty grid F_{recent}/F_{MSY} varied between 0.38 (5% quantile) to 0.64 (95% quantile). This indicates that overfishing is not occurring for the WCPO skipjack tuna stock.
d. The estimated MSY of 1,891,600 mt is moderately higher than the 2014 estimate due to the adoption of an annual, rather than quarterly, stock-recruitment relationship. Recent catches are lower than, but approaching, this MSY value.
e. The latest (2015) estimate of spawning biomass is well above both the level that will support MSY (SBlatest/SBMSY = 2.56, for the reference case model) and the adopted LRP of 0.2 SBF=0 (SBlatest/SBF=0 = 0.58, for the reference case model), and SBlatest/SBF=0 was relatively close to the adopted interim target reference point (0.5 SBF=0) for all models explored in the assessment (structural uncertainty grid: median = 0.51, 5% and 95% quantiles = 0.39 and 0.67).

Alternative view of stock status and trends (*SC12 - Paras 312-313*)

f. China, Japan and Chinese Taipei considered it is not possible to select a base-case model from various sensitivity models in the 2016 assessment, given the advice from the Scientific Service Provider that a suite of the sensitivity models were plausible. Therefore, these members considered that it would be more appropriate to provide advice to WCPFC13 on skipjack stock status based on the range of uncertainty expressed by the alternative model runs in the sensitivity analysis rather than based on the single base case model (represented by the 5% and 95% quantiles of the structural sensitivity grid presented in Table SKJ2).
g. The estimated MSY of the WCPO skipjack stock ranges from 1,618,060 mt (5% quantile) to 2,199,880 mt (95% quantile) across the alternative skipjack stock assessment models represented in the sensitivity grid. These CCMs also noted that some alternative models indicate that the 2015 biomass is below the adopted TRP of 0.5SBF=0.

Management advice and implications (*SC12 - Paras 314-319*)

h. SC12 noted that the skipjack assessment continues to show that the stock is currently moderately exploited and fishing mortality level is sustainable. The recent catches are fluctuating around and some models also indicate that the stock is currently under the TRP.
i. SC12 noted that fishing is having a significant impact on stock size and can be expected to affect catch rates. The stock distribution is also influenced by changes in oceanographic conditions associated with El Niño and La Niña events, which impact on catch rates and stock size. Additional purse-seine effort will yield only modest gains in long-term skipjack tuna catches and may result in a corresponding increase in fishing mortality for bigeye and yellowfin tunas. The management of total effort in the WCPO should recognize this.

j. SC12 noted that skipjack spawning biomass is now around the adopted TRP and SC12 recommends that the Commission take action to keep the spawning biomass near the TRP and also advocates for the adoption of harvest control rules based on the information provided.

k. In order to maintain the quality of stock assessments for this important stock, SC12 recommends 1) continued work on developing an index of abundance based on purse seine data; 2) regular large scale tagging cruises and complementary tagging work continue to be undertaken in a way that provides the best possible data for stock assessment purposes.

l. SC12 also notes that the current method of calculating the TRP is based on the most recent 10 years of recruitment information. However, the information on spawning potential, SB_{2015}, which is used to evaluate current stock status relative to the TRP can change very rapidly for skipjack which mature at age 1 and this rapid maturation may provide an optimistic status evaluation when recruitment is estimated have an increasing trend but is estimated with substantial uncertainty, as is currently observed in the case of skipjack which does not have a fishery-independent index of recruitment strength.

m. There is ongoing concern by at least one CCM that high catches in the equatorial region may be causing a range contraction of WCPO skipjack tuna, thus reducing skipjack tuna availability to fisheries conducted at higher latitudes than the Pacific equatorial region. SC12 reiterates the advice of SC11 whereby there is no demonstrated statistical evidence for SKJ range contraction. As a result, SC12 recommends that ongoing research on range contraction of skipjack tuna be continued in the framework of Project 67.

CMM 2015-01 – Other issues

Exemption from the high seas FAD closure

a) SC12 discussed the request from WCPFC12 to provide comments and/or recommendations to the Commission on proposals from CCMs that wish to claim exemption from the 2017 high seas FAD closure on the basis of footnote 5 of CMM 2015-01. SC12 was informed that the EU would be requesting such an exemption on the basis of the 2015 bigeye catch in the purse-seine fishery according to SC12-MI-IP-06. However SC12 has not been able to review this proposal due to the lack of guidance on how this review should be done. SC12 also noted that the present CMM is unclear as to how this exemption is to be applied as it does not specify a time period over which the drop in bigeye bycatch to no more than the 55% level of 2010-12 average needs to be sustained. SC12 recommends that TCC12 and WCPFC13 clarify how this assessment should be done. (*SC12 - Para 644*).

Effort creep

b) SC12 reviewed candidate indicators of effort creep in the WCPO purse seine fishery (SC12-MI-WP-08) noting that SPC had undertaken the work for the PNA to inform consideration of adjusting the Vessel Day Scheme TAE for effort creep. SC12 strongly supported this work, noting that this work was also directly relevant to the development of a harvest control rule for skipjack. SC12 also identified effort creep as an important issue related to all fleets operating in the WCPO and recommends that WCPF13 that note of these comments and prioritise continued research on this important issue. (*SC12 - Para 645*).

C. Technical and Compliance Committee Recommendations

3. The relevant recommendations of the TCC12, with appropriate referencing, are listed below:

a) TCC12 taking note of WCPFC-SC12-2016-MI-IP-06 rev_2 "Bigeye tuna catch by gear and flag, 2010-2015" confirmed that the EU purse-seine fleet has reached and exceeded in 2015 the 55% reduction target from 2010-2012 levels of bigeye tuna catch. TCC12 recommended that the provisions of footnote 5 of CMM 2015-01 para 18 applies for the EU purse-seine fleet in 2017. (*TCC – para 369*).
b) 370. TCC12 recommended that the provisions of footnote 5 of CMM 2015-01 para. 18 also applies for the purse seine fleets of Ecuador, El Salvador, Marshall Islands, New Zealand, Solomon Islands, Tuvalu and Vanuatu in 2017. (*TCC – para 370*).
c) 371. TCC12 strongly encouraged that any fleet fishing under the provisions of this footnote will ensure that the catch of bigeye tuna in 2017 will not exceed the level of 55% reduction from 2010-2012 levels. (*TCC – para 371*).