



**NORTHERN COMMITTEE
FOURTH REGULAR SESSION**

**Tokyo, Japan
11-13 September 2008**

**[Preliminary] EXECUTIVE SUMMARY
Fourth Regular Session of the Scientific Committee
Port Moresby, 11-22 August 2008**

WCPFC-2008-NC4/IP02

OPENING OF THE MEETING

1. The Chair, D.Y. Moon (Korea) opened the Fourth Regular Session of the Scientific Committee, which took place at Port Moresby, Papua New Guinea (PNG) from 11-22 August 2008.
2. The matters considered by the Scientific Committee (SC) and its six Specialist Working Groups (Biology [BI], Ecosystem and Bycatch [EB], Fishing Technology [FT], Methods [ME], Statistics [ST], and Stock Assessment [SA] SWG) included:
 - i. a review of the fisheries in the western and central Pacific Ocean (WCPO) and the eastern Pacific Ocean (EPO);
 - ii. a review of the status of stocks of bigeye tuna, skipjack and southern albacore tuna stocks in the Convention Area, swordfish stocks in the southwest and south-central Pacific with a focus on requests for advice and recommendations arising from the Fourth Regular Session of the Commission at Guam, USA in December 2007;
 - iii. a summary of the most recent information and assessments for tuna and billfish stocks in the North Pacific;
 - iv. by-catch mitigation issues associated with seabirds, sea turtles, sharks, juvenile bigeye and yellowfin tunas, and ecological risk assessment;
 - v. issues associated with the data available to the Commission and initiatives to address data gaps, the status of the Indonesia and Philippines Data Collection Project, and the Pacific Tuna Tagging Project;
 - vi. cooperation with other organizations;
 - vii. the special requirements of small island developing States and territories;
 - viii. a review of interim arrangements for science structure and function;
 - ix. the process for developing the programme of work for the SC and the 2009-2011 work programme for the SC; and
 - x. administrative matters associated with the functioning of the SC.

OVERVIEW OF THE WESTERN AND CENTRAL PACIFIC OCEAN FISHERIES

3. The provisional total Convention Area tuna catch for 2007 was estimated at 2,396,815 mt, clearly the highest annual catch recorded, and more than 120,000 mt higher than the previous record in 2006 (2,273,322 mt; Figure 1). During 2007, the purse seine fishery accounted for an estimated 1,739,859 mt (73% of the total catch, and a record for this fishery), with pole-and-line taking an estimated 214,935 mt (9%), the longline fishery an estimated 232,388 mt (10%), and the remainder (8%) taken by troll gear and a variety of artisanal gears, mostly in eastern Indonesia and the Philippines. The Convention Area tuna catch (2,396,815 mt) for 2007 represented 84% of the total Pacific Ocean catch of 2,800,740 mt, and 55% of the global tuna catch (the provisional estimate for 2007 is just under 4.4 million mt).

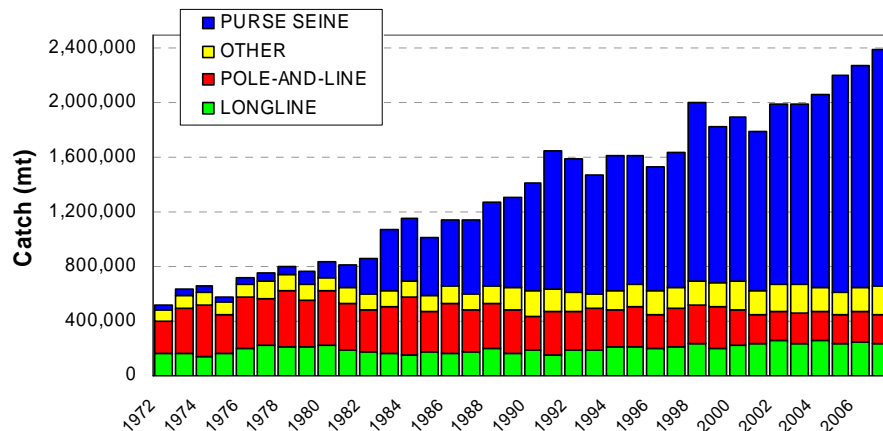


Figure 1. Catch (mt) of albacore, bigeye, skipjack and yellowfin tunas in the Convention Area, by longline, pole-and-line, purse seine and other gear types.

4. The 2007 Convention Area catch of skipjack (1,726,702 mt – 72% of the total catch) was the highest ever, continuing the trend of consecutive record catches since 2002 (Figure 2). The Convention Area yellowfin tuna catch for 2007 (431,814 mt – 18%) was lower than in 2006 (442,288 mt), but higher than the average catch level for the period since 2000 (~424,000 mt). The Convention Area bigeye tuna catch for 2007 (143,059 mt – 6%) was the second highest on record (after the catch in 2004–156,768 mt), mainly due to a relatively high estimated bigeye tuna catch from the purse seine fishery, although observer data for 2007, used to estimate the purse-seine bigeye tuna catch, are very preliminary. The 2007 Convention Area albacore catch (95,240 mt [4%]) was the lowest for over ten years, primarily due to the continuing trend of low catches in the North Pacific in recent years.

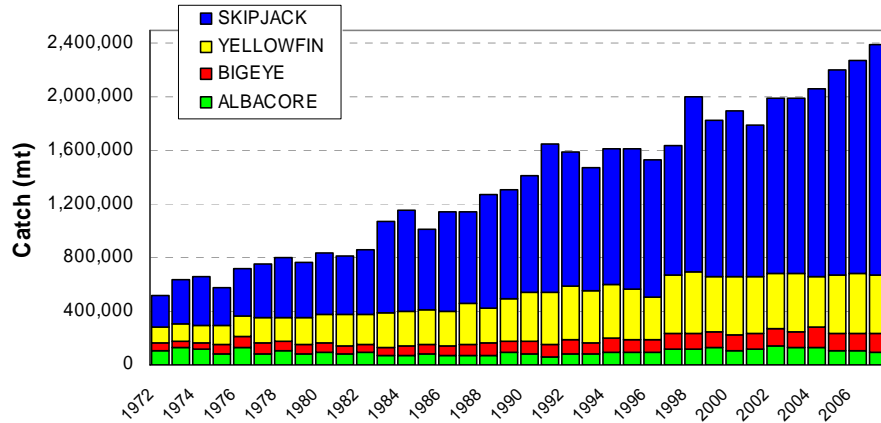


Figure 2. Catch (mt) of albacore, bigeye, skipjack and yellowfin tunas in the Convention Area by species for all gear types combined.

STATUS OF THE STOCKS AND MANAGEMENT ADVICE AND IMPLICATIONS

WCPO bigeye tuna

Status and trends

5. The assessment results from the base-case model closely approximate the results from the 2006 assessment (Table 1), with inclusion of the additional fisheries and changes in the fishery configurations. These changes represent refinements to the model rather than substantive changes to model structure and resulted in only minor changes to the biomass trajectories. The key conclusions of the models presented are similar to the comparative model runs from the 2006 base-case assessment – depletion levels estimated in the base-case (0.26) were slightly lower than the 2006 (LOWSAMP) assessment (0.29), $F_{current}/\tilde{F}_{MSY}$ was more pessimistic (1.44 (Figures 3 and 4) compared to 1.32 for 2006) and $B_{current}/\tilde{B}_{MSY}$ was higher (1.37 (Figures 3 and 5) compared to 1.27) while $SB_{current}/\tilde{SB}_{MSY}$ was comparable (1.19 compared to 1.20). These metrics indicate that recent fishing mortality has continued to increase unless fishing patterns and MSY have changed, although biomass levels have continued to be sustained by higher recruitment. However, the MSY-based reference points are not directly comparable as there has been a shift in the age-specific fishing mortality in recent years due to the recent decline in the longline catch.

6. The estimate of $F_{current}/\tilde{F}_{MSY}$ indicates that overfishing of bigeye tuna is occurring in the WCPO with a very high probability (100% for the scenario shown in Figure 4. While the stock is not yet in an overfished state with respect to total biomass ($B_{current}/\tilde{B}_{MSY} > 1$), the situation is less optimistic with respect to adult biomass and a number of plausible model options indicate that adult biomass has been below the \tilde{SB}_{MSY} level for a considerable period ($SB_{current}/\tilde{SB}_{MSY} < 1$). For the base-case, there is also a 42.8% probability that the $SB_{2006}/\tilde{SB}_{MSY}$ is less than 1.0. Further, both the adult and total biomass are predicted to become over-fished at 2003–2006 levels of fishing mortality and long-term average levels of recruitment. This is consistent with a recent decline in biomass under increasing levels of fishing mortality resulting in an increase in the probability of the stock becoming overfished over time.

7. Recent catches are high relative to the estimated MSY both because of high recent fishing mortality and because the stock has benefited from above-average recruitment over the past 15 years.

Table 1. Estimates of reference points from the 2008 and 2006 bigeye tuna stock assessments. The ranges shown in the table provide the minimum and maximum values of each reference point across the range of sensitivity scenarios considered within each assessment. However, as the range of scenarios considered within each assessment are not consistent across years, the ranges shown for each reference point should not be compared across years nor be considered as confidence intervals.

Management Quantity	2008 Assessment	2006 Assessment
Most Recent Catch	143,059 mt (2007)	156,768 mt (2004)
MSY	Base case: 64,600 mt Range: 56,800 ~ 65,520 mt	Base case: 72,880 mt Range: 64,600 ~ 91,400 mt
$Y_{F_{current}}/MSY$	Base case: 0.94 Range: 0.50 ~ 0.97	Base case: 0.96 Range: 0.94 ~ 0.99
$B_{current}/B_{current, F=0}$	Base case: 0.26 Range: 0.20 ~ 0.28	Base case: 0.29 Range: 0.28 ~ 0.44
$F_{current}/F_{MSY}$	Base case: 1.44 Range: 1.33 ~ 2.09	Base case: 1.32 Range: 0.87 ~ 1.48
$B_{current}/B_{MSY}$	Base case: 1.37 Range: 1.02 ~ 1.37	Base case: 1.27 Range: 1.27 ~ 1.59
$SB_{current}/SB_{MSY}$	Base case: 1.19 Range: 0.76 ~ 1.20	Base case: 1.20 Range: 1.10 ~ 1.74

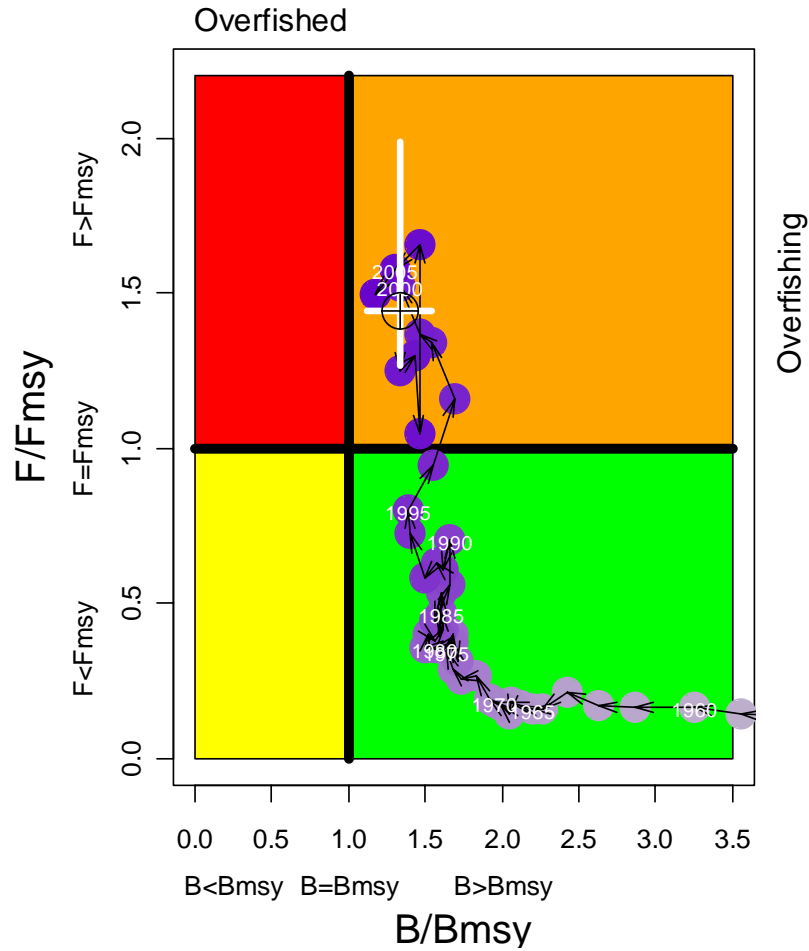


Figure 3. Temporal trend in annual stock status for bigeye tuna, relative to B_{MSY} (x-axis) and F_{MSY} (y-axis) reference points, for the model period (1952–2006) from the base-case model (run 4). The colour of the points is graduated from mauve (1952) to dark purple (2006) and the points are labelled at 5-year intervals. The white lines represent the confidence interval associated with F/F_{MSY} and B/B_{MSY} . The last year of the model (2007) is excluded as it is highly uncertain.

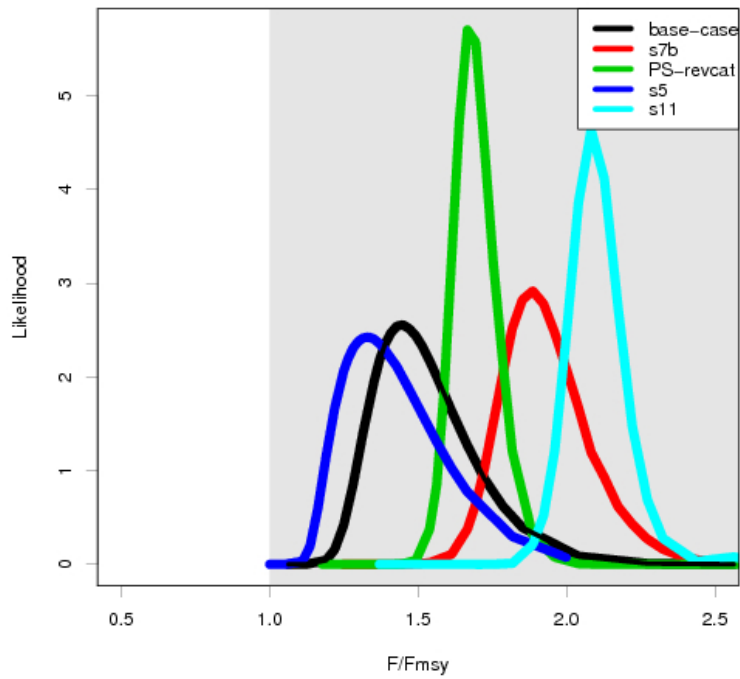


Figure 4. Probability distributions of $F_{current} / \tilde{F}_{MSY}$ for bigeye tuna based on the likelihood profile method for the base-case model and main sensitivity analyses.

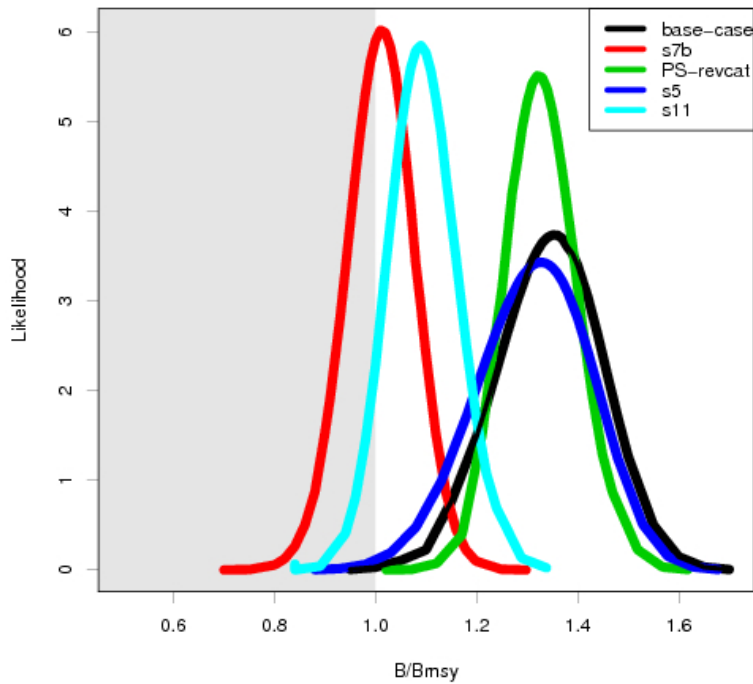


Figure 5. Probability distributions of $B_{current} / \tilde{B}_{MSY}$ for bigeye tuna based on the likelihood profile method for the base-case model and main sensitivity analyses.

8. Three projection runs were considered to illustrate stock status in relation to biomass quantities: 1) status quo of continuing the $F_{current}$ (2003–2006); 2) reducing $F_{current}$ from the status quo by 30% at start of projection (2008); and 3) reducing $F_{current}$ from the status quo by 10% per year over 3 years. Figure 6 illustrates three projections of $F_{current}/\tilde{F}_{MSY}$.

9. All projection runs from 2008 to 2018 indicate that the stock will be overfished after 2013 with regard to both total biomass ($B_{current}/\tilde{B}_{MSY} < 1.0$, Figure 7) and spawning biomass ($SB_{current}/\tilde{SB}_{MSY} < 1.0$, Figure 8), though there is increasing uncertainty in projections through time. As expected, the stock is projected to be overfished sooner if $F_{current}$ (2003–2006) is maintained. Estimates of $F_{current}/\tilde{F}_{MSY}$ (Attachment L, Table BET2), $B_{current}/\tilde{B}_{MSY}$ (Attachment L, Table BET3) and $SB_{current}/\tilde{SB}_{MSY}$ (Attachment L, Table BET4) were computed for three fishery groupings (longline, purse-seine associated, and Indonesian/Philippines) with decreases or increases in fishing effort (60%, 70%, 80%, 90%, 100%, 110% and 120%). Most multiples of reductions in fishing effort still result in overfishing (Attachment L, Table BET2) and a bigeye tuna stock that is overfished with regard to both biomass and spawning biomass (Attachment L, Tables BET3 and BET4).

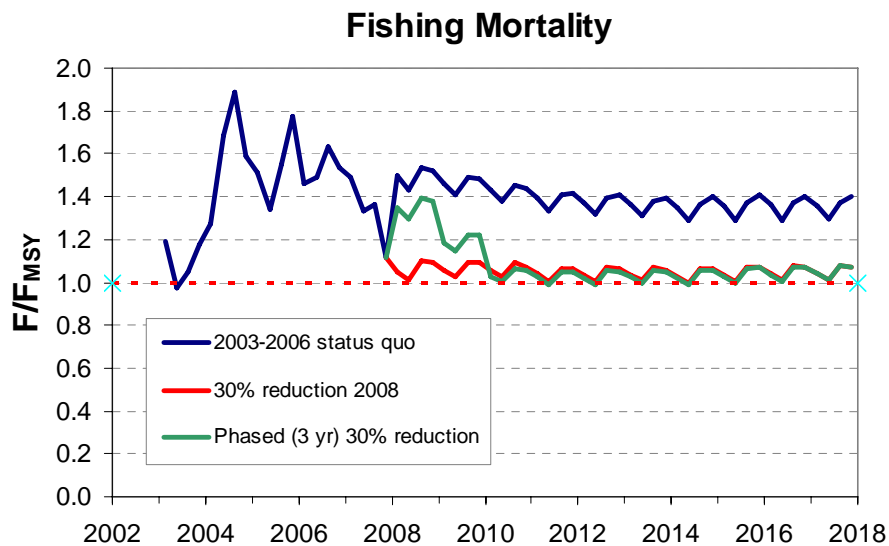


Figure 6. Estimated (2003–2006) and projected $F_{current}/\tilde{F}_{MSY}$ for bigeye tuna based on maintaining the status quo of continuing the average (2003–2006) $F_{current}$, reducing $F_{current}$ by 30% at the start of projection (2008) and reducing $F_{current}$ from the status quo by 10% per year over 3 years.

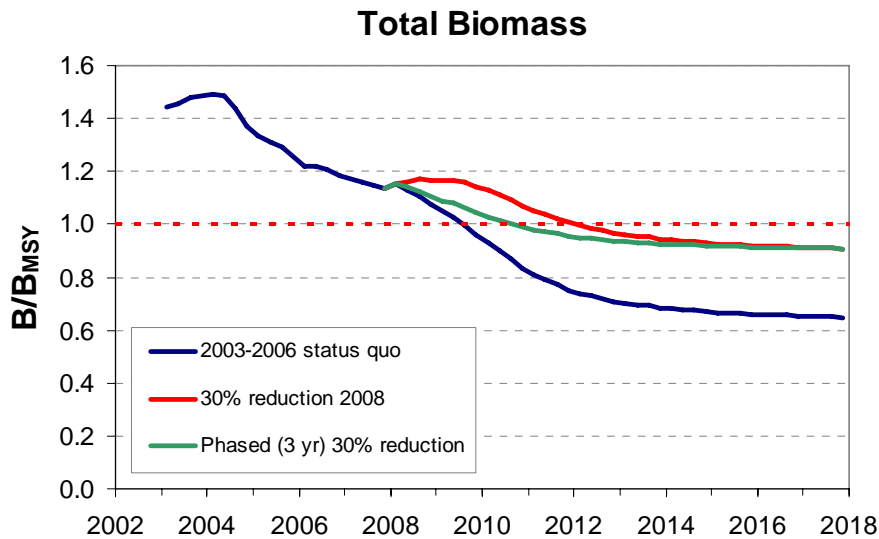


Figure 7. Estimated (2003–2006) and projected $B_{current} / \tilde{B}_{MSY}$ for bigeye tuna based on maintaining the status quo of continuing the average (2003–2006) $F_{current}$, reducing $F_{current}$ by 30% at start of projection (2008) and reducing $F_{current}$ from the status quo by 10% per year over 3 years.

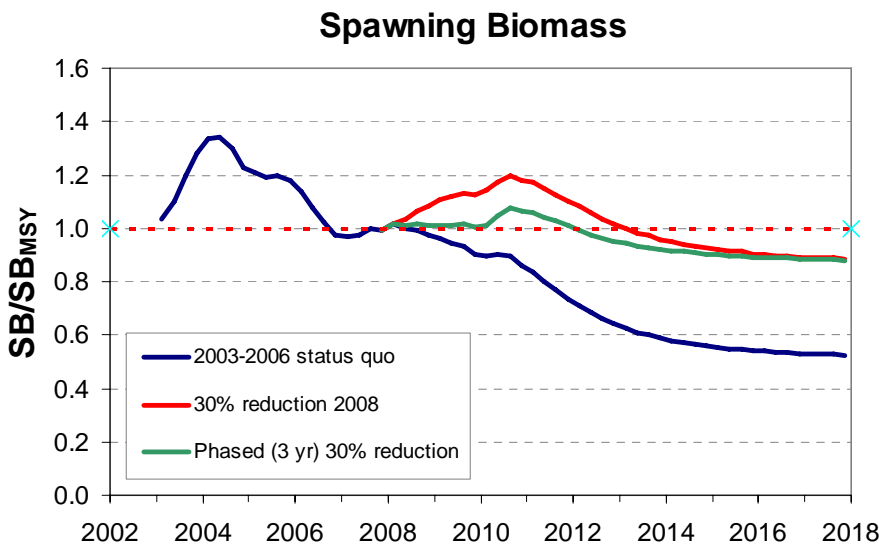


Figure 8. Estimated (2003–2006) and projected $SB_{current} / \tilde{SB}_{MSY}$ for bigeye tuna based on maintaining the status quo of continuing the average (2003–2006) $F_{current}$, reducing $F_{current}$ by 30% at start of projection (2008) and reducing $F_{current}$ from the status quo by 10% per year over 3 years.

Management Advice and Implications

10. The SC recommended a minimum 30% reduction in fishing mortality from the average levels for 2003–2006 with the goal of returning the fishing mortality rate to F_{MSY} . The point estimate of the $F_{current(2003-2006)} / F_{MSY}$ ratio (1.44) in the 2008 assessment was higher than the point estimate (1.32) in the 2006 assessment. A recommendation of a 30% reduction in fishing

mortality is consistent with the SC recommendation issued in 2006 of a 25% reduction. The SC acknowledged that projections indicate that the bigeye tuna stock may become overfished ($\text{biomass} < B_{MSY}$, spawning biomass $< SB_{MSY}$) in the future with regard to both total biomass and spawning biomass even with a 30% reduction in fishing mortality. Therefore, it may be necessary to recommend additional reductions in fishing mortality in the future if assessments indicate that fishing mortality is greater than F_{MSY} .

11. The SC also provided alternative schemes (as shown in Attachment L, Figures BET8–10 and Tables BET2-4) to achieve this reduction in fishing mortality and suggested that these results be seriously considered when management measures are discussed.

12. The SC reiterated SC2 advice that exploitation rates differ between regions and that exploitation rates were highest in the western equatorial region; therefore, the SC recommended a reduction in fishing mortality throughout the WCPO from all major fishing types with priority in the western equatorial region.

13. In relation to the Commission's request for advice on the potential for technological solutions to minimize the impact of fishing gear for small tuna on floating objects (or juvenile yellowfin and bigeye tunas) while minimizing the impact on the skipjack fishery (WCPFC4 Report, paragraphs 286-287), the SC noted that research was reviewed by the SC and is still ongoing in this area, but it had no further recommendations for the Commission beyond those provided by SC2.

14. In relation to the Commission's request that the SC will also provide information, analysis and evaluation of relevant management options (WCPFC4 Report, paragraphs 279-280), the SC noted that Tables BET2 and BET3 (Attachment L) contain information on the impact of fishing effort reductions by the main categories of fishing fleets on F/F_{MSY} and B/B_{MSY} .

WCPO yellowfin tuna

15. No stock assessment was undertaken for WCPO yellowfin tuna in 2008. Therefore, the stock status description and management recommendations from SC3 are still current.

WCPO skipjack tuna

Status and trends

16. The major conclusions of the skipjack assessment are essentially unchanged from the last three assessments (2002, 2003, and 2005) and Table 2 compares reference points between the 2008 and 2005 assessments. According to the key conclusions of the models presented, overfishing is not occurring and the stock is not in an overfished state. These conclusions are similar to the model runs from the 2005 base-case assessment. Depletion levels estimated in the 2005 WCPO assessment (0.86) were similar to the current equatorial model (0.66), $F_{current}/\tilde{F}_{MSY}$ was more optimistic (0.17 for 2005 compared to 0.26) and $B_{current}/\tilde{B}_{MSY}$ was essentially the same (3.01 for 2005 compared to 2.99, Table 2, Figure 9). There is a zero probability that $B_{current}/\tilde{B}_{MSY}$ is below to 1.0 (Figure 10).

Table 2. Estimates of reference points from the 2008 and 2005 skipjack tuna stock assessments. The spatial domain of the 2008 assessment is limited to the equatorial region of the WCPO. The ranges shown in the table provide the minimum and maximum values of each reference point across the range of sensitivity scenarios considered within each assessment. However, as the range of scenarios considered within each assessment are not consistent across years, the ranges shown for each reference point should not be compared across years. They should not be considered as confidence intervals.

Management Quantity	2008 Assessment	2005 Assessment
Most Recent Catch	1,546,436 mt (2007 ¹) 1,726,702 mt (2007 ²)	1,403,085 mt (2004 ²)
MSY	Base case: 1,280,000 mt	Base case: 1,996,000 mt Range: 1,304,000 ~ 2,656,000 mt
$Y_{F_{current}}/MSY$	Base case: 0.70	Base case: 0.46 Range: 0.45 ~ 0.63
$B_{current}/B_{current, F=0}$	Base case: 0.66	Base case: 0.86 Range: 0.82 ~ 0.86
$F_{current}/F_{MSY}$	Base case: 0.26	Base case: 0.17 Range: 0.08 ~ 0.34
$B_{current}/B_{MSY}$	Base case: 2.99	Base case: 3.01 Range: 2.91 ~ 3.38
$SB_{current}/SB_{MSY}$	Base case: 3.82	Base case: 3.72 Range: 3.21 ~ 5.00

¹ Equatorial region; ² WCPFC region mt

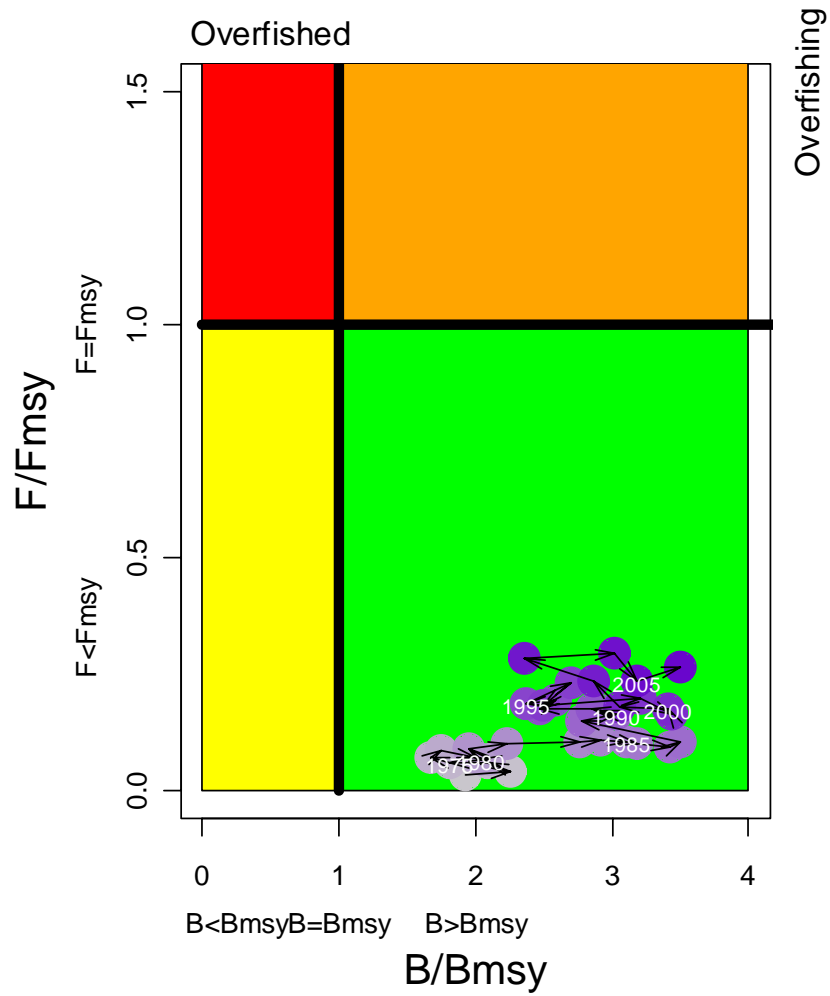


Figure 9. Temporal trend in annual stock status for skipjack tuna, relative to B_{MSY} (x-axis) and F_{MSY} (y-axis) reference points, for the model period (1972–2006) from the equatorial model. The colour of the points is graduated from mauve (1972) to dark purple (2006) and the points are labelled at 5-year intervals.

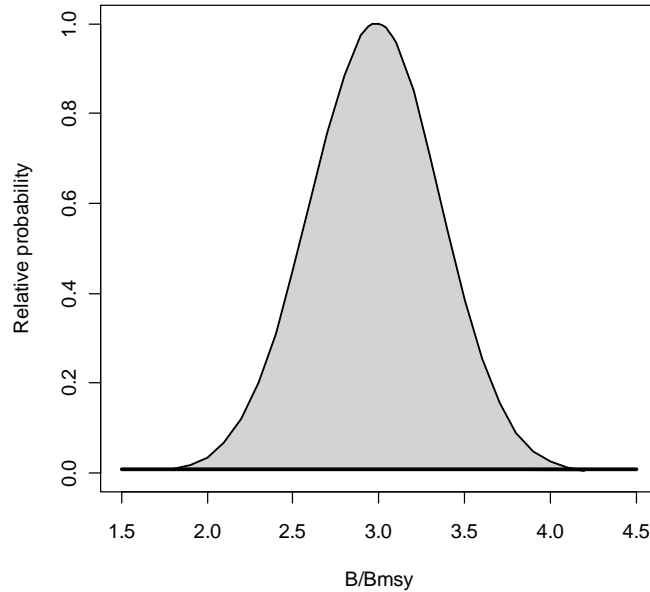


Figure 10. Likelihood profile for B/B_{MSY} from the equatorial model.

Management Advice and Implications

17. The SC acknowledged that skipjack catches in 2007 increased to a historical high of ~1.7 million mt. The SC noted the increasing trend in estimated recruitment throughout the entire time series of the fishery. This trend may reflect skipjack's high productivity relative to other tuna species and its position in the ecosystem. These high recent catches are considered to be sustainable unless recruitment falls persistently below the long-term average. However, any increases in purse-seine catches of skipjack may result in a corresponding increase in fishing mortality for bigeye and yellowfin tunas.

South Pacific albacore

Status and trends

18. The assessment results from the base-case model differ substantially from results from the 2006 assessment (Table 3), due to the changes in relative abundance indices, selectivity and biological parameters for natural mortality and reproductive potential. These changes represent both refinements to the model and substantive changes to model structure which reduced the biomass estimates and raised fishing mortality.

19. Table 3 compares reference points between the 2008 and 2006 assessments. The key conclusions of the models presented is that overfishing is not occurring and the stock is not in an overfished state (Figure 11). Reference point levels estimated in the 2008 assessment were more pessimistic than the 2006 assessment, depletion levels estimated in 2008 were 0.70 compared to 0.90 in 2006, $F_{current}/\tilde{F}_{MSY}$ was 0.44 compared to 0.04 in 2006, $B_{current}/\tilde{B}_{MSY}$ was 1.26 compared to 1.34 in 2006 and $SB_{current}/\tilde{SB}_{MSY}$ was 2.21 compared to 4.10 in 2006 (Table 3).

Table 3. Estimates of reference points from the 2008 and 2006 South Pacific albacore tuna stock assessments (WCPFC and IATTC RFMO regions). The ranges shown in the table provide the minimum and maximum values of each reference point across the range of sensitivity scenarios considered within each assessment. However, as the range of scenarios considered within each assessment are not consistent across years, the ranges shown for each reference point should not be compared across years. They should not be considered as confidence intervals.

Management Quantity	2008 Assessment	2006 Assessment
Most Recent Catch	59,495 mt (2007 ¹)	60,440 mt (2005 ¹)
MSY	Base case: 64,000 mt Range: 64,000 ~ 75,000 mt	Base case: 180,800 mt Range: 90,080 ~ 201,800 mt
Y_{Fcurrent}/MSY	Base case: 0.86 Range: 0.72 ~ 0.86	Base case: 0.33 Range: 0.28 ~ 0.59
B_{current}/B_{current, F=0}	Base case: 0.70 Range: 0.70 ~ 0.77	Base case: 0.91 Range: 0.79 ~ 0.93
F_{current}/F_{MSY}	Base case: 0.44 Range: 0.25 ~ 0.44	Base case: 0.04 Range: 0.03 ~ 0.11
B_{current}/B_{MSY}	Base case: 1.26 Range: 1.26 ~ 1.50	Base case: 1.34 Range: 1.13 ~ 1.48
SB_{current}/SB_{MSY}	Base case: 2.21 Range: 2.21 ~ 2.90	Base case: 4.10 Range: 2.86 ~ 6.11

¹ entire south Pacific Ocean

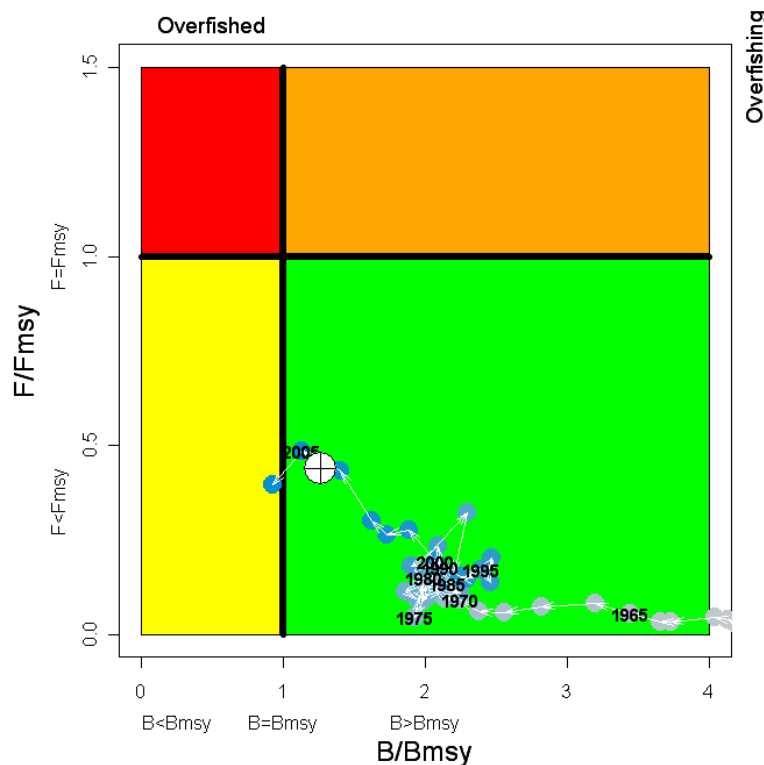


Figure 11. Temporal trend in annual stock status for South Pacific albacore tuna, relative to B_{MSY} (x-axis) and F_{MSY} (y-axis) reference points, for the model period (1960–2006) for the four main alternative models. The colour of the points is graduated from pale blue (1960) to blue (2006) and the points are labelled at 5-year intervals. The last year of the model (2007) is excluded as it is highly uncertain.

Management Advice and Implications

20. The current assessment indicates lower levels of stock size and maximum sustainable yield which appear to be more realistic than previous assessments. There is uncertainty regarding the sustainability of the south Pacific albacore stock and the SC recommended that catches of south Pacific albacore remain at current levels considering the current rates of fishing mortality on adult albacore.

Southwest and south-central Pacific swordfish

Status and trends

21. Stock assessments were undertaken for two areas: the south-west Pacific (SWP, 140°E-175°W) and the south-central Pacific (SCP, 175°W-130°W), both separately and combined.

22. The current status of biomass and fishing mortality (relative to MSY levels) for southwest Pacific swordfish are shown for a subset of plausible models in Figure 12. Table 4 compares reference points between the 2008 and 2006 assessments. The subset of models represents the most extreme (highest and lowest) of the models in terms of a set of reference points. The 2008 estimates appear to be much more certain than 2006, and near the centre of the distribution of estimates provided in 2006. This reduction in uncertainty is what might have been predicted given that the recent reduction in fishing effort seems to have been sufficient to break the “one-way-trip” nature of the fishery that was observed up to 2003-2004, and hence appears to now provide informative contrast with which to improve the estimation of stock productivity. The model predicts that following a period of continued decline the southwest Pacific swordfish biomass has recently increased.

23. The key conclusions of the models presented indicate that in the southwest Pacific overfishing is not occurring and the stock is not in an overfished state (Figure 12). Reference point levels estimated in the 2008 assessment were more optimistic than the 2006 assessment, $F_{current} / \tilde{F}_{MSY}$ was 0.44 compared to 0.71 in 2006, although $B_{current} / \tilde{B}_{MSY}$ was 1.57 compared to 1.70 in 2006 (Table 4) and the range estimated in the 2006 assessment included more pessimistic estimates.

24. The stock assessment attempted for swordfish in the south-central Pacific was unable to determine the current stock status. It was also noted that the available data do not indicate evidence of significant fishery impacts in the South-central Pacific, but catches have increased in recent years to levels exceeding those in the South-west Pacific.

Table 4. Estimates of reference points from the 2008 and 2006 south-west Pacific swordfish stock assessments. The values shown in the table correspond to the median of the Maximum Posterior Density (MPD) estimates for the most plausible ensemble of models for each assessment (the minimum and maximum values are indicated below). Note that the swordfish assessment paper reported in trunked mass, however this table reports whole mass assuming that trunked mass = 0.723 (whole mass), and the average catch in mass is derived from numbers assuming 67.2 kg per fish in 2004 and 61.1 kg per fish in 2007 (which may differ from the model estimates).

Management Quantity	2008 Assessment	2006 Assessment
Most Recent Catch¹ (mt)	2580 (final year = 2007 ²)	3760 (final year = 2004)
MSY (mt)	Median: 3310 Range: 2390 – 5720	not reported
C₂₀₀₇/MSY	Median: 0.77 Range: 0.45 – 1.08	n/a
B₂₀₀₇/B_{2007, F=0} (B=total biomass)	Median: 0.58 Range: 0.45 – 0.79	n/a
B₂₀₀₄/B_{2004, F=0} (B=total biomass)	Median: 0.55 Range: 0.44 – 0.74	Median: 0.59 Range: 0.31 – 0.69
F₂₀₀₇/F_{MSY}	Median: 0.44 Range: 0.18 – 0.67	n/a
F₂₀₀₄/F_{MSY}	Median: 0.71 Range: 0.37 – 1.13	Median: 0.70 Range: 0.33 – 2.2
B₂₀₀₇/B_{MSY} (B=total biomass)	Median: 1.57 Range: 1.22 – 2.06	n/a
B₂₀₀₄/B_{MSY} (B=total biomass)	Median: 1.47 Range: 1.18 – 1.94	Median: 1.7 Range: 0.87 – 3.0

¹ Catch in mass for this table was not derived from the model results and may not be entirely compatible with the other reference points

² 2007 catches are provisional, with 2007 catches from some fleets assumed to be equal to 2006.

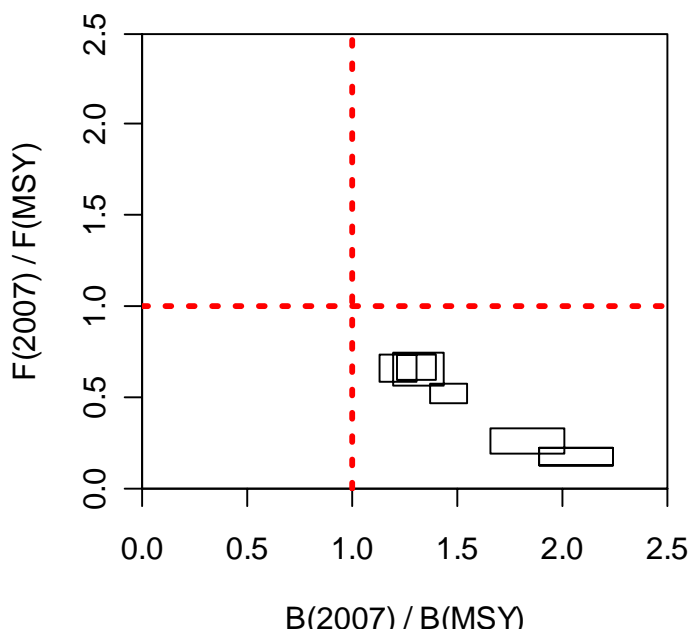


Figure 12. Summary plot comparing south-west Pacific fishing mortality, $F(2007)/F(MSY)$, and total stock biomass, $B(2007)/B(MSY)$, for south-west Pacific swordfish from a subset of plausible MULTIFAN-CL models. Boxes indicate the upper and lower 95% confidence limits (but not the covariance) for each individual model.

Management Advice and Implications

25. The assessment undertaken for swordfish in the southwestern Pacific region indicated an increase in stock abundance in recent years and the model projections predict further increases at current levels of fishing mortality. Plausible assessment results indicate that overfishing is not occurring and that the stock is not in an overfished state. However, due to the uncertainty in the assessment, the SC recommended that there be no further increase in catch or effort in order to keep the stock above its associated reference points.

26. The SC recommended that there be no increases in fishing mortality for south-central Pacific swordfish as a precautionary measure given the lack of a formal assessment. Constraining fishing mortality to current levels is recommended until there is a better understanding of fishing impacts in the south-central Pacific stock and the relationship between this stock and other south Pacific stocks is more certain.

Southwest Pacific striped marlin

27. There was no stock assessment undertaken for striped marlin in the southwestern Pacific Ocean in 2008. Thus, the stock status description and management recommendations from SC2 are still current.

Northern stocks

28. The SC invited the Chairman of the International Scientific Committee (ISC) to summarize the 8th Meeting of the ISC and the status of northern stocks.

North Pacific albacore

Status and trends

29. No stock assessment was conducted for this species in the past year.

Management Advice and Implications

30. The management advice presented by the ISC to the SC last year still holds. The key point of this advice is that the recommendation that F should not be increased from the current level (F=0.75, based on 2002-2004) is still valid.

Pacific bluefin tuna

Status and trends

31. The Stock Synthesis model was used for the 2008 assessment of Pacific bluefin, where the assessment spans the period 1952-2005. The main fisheries occur around Japan, including longline fisheries in the spawning season, purse-seine fisheries, set net fisheries, and troll fisheries. Recent catches have been dominated by small fish (0+ and 1+ years old) and there have been recent increases in catch by Mexico and Korea. Total annual catches are currently about 23,000 mt per year.

32. The stock assessment model estimates variable recruitment through the model period, resulting in three major peaks in spawning biomass through the model period. There has been an increase in fishing mortality rates during the last 10 years, principally for the youngest age classes. A retrospective analysis indicated that the model is underestimating the most recent year's (2005) recruitment. This in turn affects the reliability of the stock projections. Assumptions regarding the magnitude of the 2005 recruitment influence the stock status (spawning biomass) in the medium term. Projections also investigated the affect of increasing or decreasing fishing mortality.

Management Advice and Implications

33. The ISC provided the following conservation advice which the SC believes as appropriate for managers to consider:

- a) Given the conclusions of the May-June 2008 stock assessment with regard to the current level of F relative to potential target and limit reference points, and residual uncertainties associated with key model parameters, it is important that the current level of F is not increased.
- b) If F remains at the current level and environmental conditions remain favorable, then recruitment should be sufficient to maintain current yield well into the future.
- c) A reduction in F, in combination with favorable environmental conditions, should lead to greater Y/R and SPR and, after some lag, greater sustained yield.
- d) Increases in F above the current level, and/or unfavourable changes in environmental conditions, may result in recruitment levels which are insufficient to sustain the current productivity of the stock.

North Pacific striped marlin

The inclusion of NP striped marlin into the list of northern stocks

34. The ISC Chair reported on the analysis conducted by the ISC on estimation of the striped marlin stock biomass north of 20° N latitude in the western and central North Pacific Ocean. Results indicate that a majority (65-70%) of the estimated biomass of striped marlin in the western and central North Pacific Ocean occur north of 20° N latitude. This conclusion is consistent with the distribution of fishery catches.

Review of a draft CMM on NP striped marlin

35. The SC Chair explained that the Commission had requested that the NC form a working group with a view towards developing a CMM on North Pacific striped marlin with SPC, and FFA input, for consideration by the SC at SC4. However, this NC working group had been unable to collate the required information nor draft a CMM for the SC to evaluate.

Management Advice and Implications

36. The previous management advice for North Pacific striped marlin is retained, i.e. the fishing mortality rate should be reduced from the current level (to 2003 or before), taking into consideration various factors associated with this species and its fishery, and until appropriate measures in this regard are taken, the fishing mortality rate should not be increased. The information presented was not sufficient to demonstrate that North Pacific striped marlin be classified as northern stock.

North Pacific swordfish

Status and trends

37. A North Pacific swordfish stock assessment is scheduled for 2009.

Management Advice and Implications

38. As there is no currently available North Pacific swordfish stock assessment, no management advice is offered.

4.8 Review of stock assessment and management-related matters

Review of 'A comprehensive review and proposed investigation of the age, growth, and reproductive biology of bigeye tuna in the Pacific Ocean'

39. The SC generally supported future research on bigeye tuna age, growth and reproductive biology including temporal-spatial variation in spawning, as this is important in reducing uncertainty in model estimates of stock status. The SC recommended that the Commission approve funding for this work, particularly phase 1, so work could commence as early as possible.

Review of ‘A scoping study on reference points and management strategy evaluation (MSE)’

40. The SC received a presentation prepared in response to the Commission’s request to develop a report on “*Approaches for identification of appropriate reference points and implementation of management strategy evaluation within the WCPO*” as described in the terms of reference attached as Appendix 1 to WCPFC-SC4-2008/GN-WP-10.

41. Having reviewed the working paper “*Approaches for identification of appropriate reference points and implementation of MSE within the WCPO*” (WCPFC-SC4-2008/GN-WP-10), the SC made the following recommendations:

- a) The SC reaffirmed the recommendations made at SC3 in relation to reference points and approaches to evaluating them.
- b) CCMs be given an opportunity to provide comment on the scoping paper and work plan to the WCPFC Secretariat and for those comments to be submitted by 15 October 2008.
- c) A revised version of the scoping paper and work plan that accounts for comments received should be presented to the upcoming Commission meeting to inform the Commission about the use of reference points (and approaches of evaluating them) in the management of highly migratory fish stocks in the WCPO.
- d) In progressing work on reference points the Commission should establish a parallel/joint process for establishing key management objectives for each target species including the possibility of holding an inter-sessional workshop on management objectives in 2009; and
- e) Agencies such as the WCPFC and FFA Secretariats and SPC-OFP should work together on a strategy to increase CCM capacity to participate in the revised work plan for 2009 and beyond.

42. As a means of progressing the work program commenced in 2007 on this topic, the SC also recommends that a technical inter-sessional workshop be held during 2009 (in conjunction with the inter-sessional pre-assessment workshop) to review the numerical and technical properties of candidate reference points which may be used as default reference points (RPs) in the WCPO. In particular:

- Consider the estimation properties of candidate RPs;
- Consider the stability in candidate RPs from one year’s assessment to the next;
- Compare these with MSY-based RPs and consider their implications for SPR, SSB and B;
- Document any major concerns about the use of MSY-based RPs and any major advantages of using a different type of RP;
- Identify alternative means of operationalising candidate RPs.

43. It was proposed that the report of this technical workshop be discussed at SC5 from which the SC will make recommendations to the Commission on suitable reference points for management of the key target species within the WCPO.

44. The SC recommended that the implementation of the MSE approach via case studies in the WCPO (e.g. broadbill swordfish, south Pacific albacore or the complex multi-species skipjack, bigeye, yellowfin tuna fishery) be added as high priority research tasks to the SC Work Programme for 2009-2011.

BYCATCH MITIGATION

Seabirds

45. The SC noted that as of 18 August, 26 of 34 CCMs had submitted a Part 1 report. Sixteen of those 26 reports indicated that observers had been deployed by the CCM in 2007. Seven of the 26 reports included estimates of seabird catches required by CMM-2007-04. It was noted that for some CCMs the data in Part 1 of the National Reports are provisional.

46. The SC recommended that the Secretariat seek advice from other RFMOs on the wording of CMM-2007-04 (Attachment O of the WCPFC4 Summary Report), Annex 1, 1 a) (iv) and 1 b) (iv) to ensure that tori lines include branch streamers along the aerial extent of the line and that in 1 a) (iv) the branch streamers are of a length that ensures that they would touch the surface of the water in the absence of wind and swell. The issue will be further discussed by TCC4.

Sharks

47. The SC noted that the current limit on shark fin landings (5% shark fin-carcass ratio) was reviewed at last year's meeting and found to be appropriate. No additional information was presented to the SC this year, so it was not necessary to modify that advice.

48. The SC noted that, based on the ERA work presented in WCPFC-SC4-2008/EB-WP-1, there is no apparent difference in the catch rates for sharks by longliners above and below 24 m overall length. The SC recognized that there appears to be no scientific basis to justify the current exemption for small vessels. The SC recommended that the shark measure be revised to include vessels under 24 m.

49. The SC noted that as of 18 August, 11 of the 26 Part 1 Annual Reports included estimates of shark catches required by CMM-2006-05 and recommended by SC3. It was noted that for some CCMs the data in Part 1 of the National Reports are provisional.

50. The SC recommended that CCMs report on a minimum list of shark species, consisting of blue shark, oceanic whitetip shark, mako sharks and thresher sharks, that were easily identified by fishermen. These and other sharks should be identified to the lowest possible taxonomic level, especially by observer programs, and these four easily identified types of sharks should be recorded even in logbooks by fishermen.

51. The SC noted that under CMM-2006-05, CCMs are encouraged to co-operate in the development of stock assessments for key shark species within the Convention Area. The SC recommended that a review of data gaps and the general feasibility of single species stock assessment for sharks be carried out.

Small tuna on floating objects (STFO)

52. Recommendations for further study or industry-associated work endorsed by the SC included:

- i. A comparative analysis of the proportions of STFO in the western and central Pacific, as the purse seine CPUE of bigeye tuna appears to be higher in the central Pacific, although it is an area with relatively low purse seine effort.
- ii. A detailed characterization of vessels or fleets that have high catch rates of STFO and bigeye tuna in particular.

- iii. Monitoring and reporting to SC5 the results of EC acoustic selectivity project and IATTC pilot study on pre-set estimation of floating object aggregations.
- iv. CCMs are encouraged to develop industry-associated projects to address STFO reduction, emphasizing means to avoid encircling STFO.
- v. CCMs are encouraged to continue work on fine-scale characterization of tuna behaviour on floating objects, particularly on horizontal movements of tuna species.
- vi. The convening of a workshop or working group consisting of scientists, observer programme representatives, vessel owners and fishing captains to develop collaborative projects to seek ways to avoid STFO and bigeye tuna in particular on floating object sets.
- vii. The operational research plan for 2008-2009 and medium term work plan of the FT-SWG as adopted under Agenda Item 3.1.

Sea turtles

53. The SC noted that as of 18 August, 7 of the 26 Part 1 Annual Reports included estimates of sea turtle catches recommended by Resolution 2005-04.

54. The SC noted that FFA members have developed an Action Plan to reduce the impact of fishing on sea turtles as a responsible step under the flexible approach embodied in the WCPFC Resolution. FFA members also highlighted the environmental and cultural importance of turtles to many CCMs and looked forward to presenting information on implementation of the Action Plan at future meetings of the SC.

55. With the exception of WCPFC-SC4-2008/EB-IP-5, which tabled preliminary estimates of bycatch by Spanish fleets targeting swordfish, no new research on sea turtle interactions was presented and the SC offered no recommendations on those measures.

Ecological risk assessment (ERA)

56. SC recognized that the ERA project has provided several outputs that have helped formulate recommendations under other Agenda Items.

57. SC recognized:
- a. the role of ERA in identifying at-risk bycatch species, including ‘key shark species’, for further research or management action, and encourages further work in this area.
 - b. that further work to determine catches and catch rates of non-target species is also strongly encouraged. CCMs were invited to collaborate with SPC-OFP in order to facilitate this work.
 - c. that in purse seine fisheries, unassociated sets catch the smallest number of non-target species in the smallest proportion relative to target species.
 - d. that CCMs are encouraged to produce identification and handling guides for bycatch species such as sharks, turtles and seabirds, for distribution to observers and fishers. CCMs were invited to discuss the translation and printing of existing guides with SPC-OFP.

Other matters

58. The SC noted that the development of the WCPFC bycatch mitigation database system had progressed during the past year and test data have been added to the system. Access to and dissemination of these data will be governed by the Commission’s data security policies.

DATA AND INFORMATION

Issues related to data gaps

Data gaps website and achievements toward filing gaps

59. The SC noted that many gaps in data remain. It is common for CCMs to not meet the specification for *Scientific Data to be Provided to the Commission* adopted at WCPFC4. SC4 urged:

- a. CCMs that have not yet provided both current and historical operational (and other) data to the Commission to do so as a matter of urgency, in accordance with the specification for Scientific Data to be Provided to the Commission; and
- b. CCMs that have not already done so to provide the SPC with formal authority to release their historical data, including operational data, to the WCPFC.

Review of 'A study to identify causes of data gaps in the work of the WCPFC'

60. The SC recommended that all CCMs complete and submit responses to the data gaps questionnaire via email by 31 August 2008, and that an updated analysis be presented for information at WCPFC5.

Species composition of purse-seine catches

61. Paper WCPFC-SC4-2008/ST-WP-2 noted that multi-species sampling is of key importance in estimating the true catch of tuna species taken by surface fisheries, as some species are widely misidentified in most log book and landing statistics. This misidentification artificially increases the estimates of catch for some species and artificially decreases estimates for other species.

62. The SC recommended that catch sampling programs should be designed to overcome the sampling biases and other issues raised by WCPFC-SC4-2008/ST-WP-2 and WCPFC-SC4-2008/ST-WP-3. Sampling designs should build on further comparative trials, which should include both observer sampling versus port sampling, and also comparison among different techniques within observer and port sampling.

63. The SC encouraged CCMs and the fishing industry to support the trials.

64. The SC recommended that the Commission's scientific service provider review ways of correcting historical catch sampling data, and that a future meeting of the SC consider that review.

Information on seabird mortality

65. The SC:

- a. Recommended that seabird identification guides be made available to observers and vessel masters;
- b. Emphasised the recommendation made in SC2 that the objective of the Regional Observer Programme should initially be to attain a minimum coverage of 5% of fishing effort across all strata; and the distribution of observer effort is to be representative of species of interest, fishing areas, seasons, and fishing fleets.

Information on shark catches

66. No new information or recommendations on shark catches was available.

Regional Observer Programme (ROP)

67. SC4 thanks the IWG-ROP2 the second Inter-sessional Working Group for the Regional Observer Programme met in Nadi, Fiji 7-10 July, 2008 for their work in progressing the draft minimum data fields required for the ROP. No changes were proposed to the data elements documented in WCPFC-SC4-2008/ST-IP-5.

Indonesia and Philippines Data Collections Project (IPDCP)

68. The fifth meeting of the Steering Committee on the Indonesia and Philippines Data Collection Project (IPDCP) was held on 12-13 August 2008, at Port Moresby, Papua New Guinea. The Steering Committee accepted a financial report for the Project through until July 31 2008 prepared by the Secretariat and reviewed current and planned Project activities in both Philippines and Indonesia during 2008-2011.

69. The SC agreed to recommend to the Commission a request for US\$ 100,000 from the WCPFC core budget for 2009 to continue to support this work in 2009 and place this as a matter of high priority in the SC's 2009 work programme.

Tagging initiatives

70. The Pacific Tuna Tagging Programme (PTTP) Steering Committee met on Saturday 16 August to review PTTP progress and further plans for implementation. Phase 1 of the PTTP in Papua New Guinea and Solomon Islands resulted in the release of approximately 103,000 conventional and 318 archival tags. Tag recovery rates are currently 12% and 14%, respectively. A successful first cruise was conducted in the central Pacific targeting bigeye tuna aggregations beneath TAO moorings. A total of 1,909 conventional and 50 archival tags (90% bigeye tuna in both cases) were deployed. Phase 2 of the PTTP is now underway. Of the original USD 9.8 million budget, funding commitments of approximately USD 6.4 million have now been obtained. Upcoming plans for 2008-2009 (Phase 2) include three five-month cruises in the western equatorial Pacific utilizing a chartered pole-and-line vessel, two central Pacific cruises, and a range of tag recovery and data quality enhancement activities.

Data confidentiality, security, and dissemination

Scientific needs for VMS data

71. At the request of the Ad-Hoc Task Group-Data (AHTG [Data]), the SC4 considered what kinds of VMS data needed and the purpose of scientific research.

Impact of the three vessel restriction on public domain data

72. The SC recommended that the Secretariat write to CCMs encouraging them to use paragraph 34 of the Rules and Procedures to voluntarily authorise the Commission to waive the three vessel restriction for catch and effort data that they have provided and that the classification of public domain catch and effort data should be reviewed at SC5.

Requests from the Commission on purse seine fishing effort

73. In response to a request from WCPFC4, reflected in para 325(d) of the Summary Record, and following discussion at SC4 in the ST-SWG, the SC:

- Noted the data contained in WCPFC-SC4-2008/ST-WP-4 represent the best assessment of purse seine fishing effort on the high seas and in the zones on non-PNA members available at this time (August 2008);
- Recommended the working paper (WCPFC-SC4-2008/ST-WP-4) should be forwarded to TCC4 and the Commission;
- Recommended any CCM who believes that they have additional data that should be included in this paper, should provide their proposed changes (along with supporting documentation) to the Secretariat by 15 September 2008.

COOPERATION WITH OTHER ORGANIZATIONS

Review of existing MOUs and relations

74. The SC4 noted existing formal relations and proposed the development of no new relationships.

CONSIDERATION OF THE SPECIAL REQUIREMENTS OF DEVELOPING STATES AND PARTICIPATING TERRITORIES

Special Requirements Fund

Review of 2007/2008 activities

75. The SC4 received a status report for the Commission's Special Requirements Fund (SRF), noting the recent voluntary contribution of US\$50,000 from the United States.

FUTURE WORK PROGRAMME

Process of formulating the work programme of the Scientific Committee

76. The SC adopted new guidelines for formulating the work programme of the SC.

Strategic Research Plan 2007-2011 for Scientific Committee

77. The SC committee noted that the current 2007-2011 Strategic Research Plan is in its second year and there is no current need to update it.

Review of 2008 Work Programme

78. The SC reviewed the 28 projects carried out under the MOU with SPC-OFC and noted that nearly all were successfully completed. The SC noted that there were no issues with the progress of 10 independent consultancies conducted in 2008.

2009 Work Programme and budget and 2010-2011 provisional Work Programme and indicative budget

79. The SC considered budget allocations for existing activities and provided an indicative budget for 2009, 2010 and 2011 (Table 5).

Table 5. List of SC work programme titles and budget for 2009 and indicative budget for 2010–2011 that require funding from the Commission’s core budget (USD). Table 6 in the SC4 Summary Report includes detailed description of each project.

Strategic Research Activity or Project with priority identified at SC3 ¹	2009		2010		2011	
	Core	Other	Core	Other	Core	Other
Project 14. (Priority = High) Indonesia and Philippines Data Collection Project (IPDCP)	100,000		75,000		25,000	
Project 16. (Priority = Medium) Publication and distribution of Commission’s training and educational materials.	7,500		7,500		7,500	
Project 60. (Priority = High) - NEW Collection and evaluation of purse-seine species composition data						
Project 61. (Priority =High) - NEW N. Pacific striped marlin mitigation methods						
Project 35. (Priority = High) Refinement of bigeye parameters Pacific-wide: A comprehensive review and study of bigeye tuna reproductive biology.	30,000		30,000		62,000	
Project 39. (Priority = High) Regional study of the stock structure and life-history characteristics of South Pacific albacore.	25,000	500,000	25,000	500,000	0	0
Project 42. (Priority = High) Pacific-wide tagging project	10,000	2,500,000	10,000	2,500,000	10,000	500,000
Project 56. (Priority = Medium) - Extended Utilize underwater videos and other tools to characterize species, size composition and spatial distribution of tunas aggregating around floating objects.	2,000		0		0	

¹ Project numbers and priorities were from Attachment O of the SC3 Summary Report. Project 60 and 61 are new projects from the SC4.

Project 57. (Priority = High) Technical workshop to consider suitability of MSY-based reference points as default limit reference points and how they may be operationalised.	10,000		10,000		10,000	
UNALLOCATED BUDGET	60500		66,550 ^a		230,505 ^{a1}	
SUB-TOTAL FROM THE SC PROJECTS (NON SPC-OFP SERVICES, excluding ERA and unallocated budget)	184,500	3,000,000	157,500	3,000,000	114,500	500,000
SUB-TOTAL (SPC-OFP SERVICES, including ERA until 2010)	550,000		605,000 ^a		508,200	
NEW PROJECT FROM THE SC4						
GRAND TOTAL, including unallocated budget	795,000 ^b	3,000,000	829,050	3,000,000	853,205	500,000

^a An annual increase of 10% was applied from the previous year.

^{a1} Budget for ERA added

^b An indicative budget was 745,500.

Work Plan for 2009

80. The SC agreed that the workplan for 2009 will be a full yellowfin tuna stock assessment and a streamlined South Pacific albacore assessment.

ADMINISTRATIVE MATTERS

Rules of procedure

81. The SC4 received no proposals for the development of separate rules of procedures for the SC.

Independent review of the Science Structure and Function of the Commission

82. G. Parkes (MRAG, UK) presented a progress report on the Independent Review of the Commission's Interim Arrangements for Science Structure and Functions. A draft report of the review will be presented at the Commission meeting in December 2008, and a revised report prepared in January 2009. No further activities are currently anticipated in 2009.

Future Operation of the Scientific Committee

83. The SC4 proposed several means to improve its operation and function.

Review of Part 1 of the Annual Report to the Commission

84. The SC adopted a revised Part 1 Report template.

Election of the Chairman of the Scientific Committee

85. No nominations were forthcoming.

Next meeting

86. The SC4 recommended that SC5 be held in Palau, 10-21 August 2009.