



**SCIENTIFIC COMMITTEE  
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**Report on the Third Management Objectives Workshop**

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**SC11-WCPFC11-01  
(WCPFC11-2014-12a Rev2)**

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<sup>1</sup> Facilitator



**ELEVENTH REGULAR SESSION**

Faleata Sports Complex, Apia, Samoa  
1-5 December 2014

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**Report on the Third Management Objectives Workshop**

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WCPFC11-2014-12 Rev2<sup>1</sup>  
03 December 2014

Ian Cartwright<sup>2</sup>

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<sup>1</sup> Minor edits reflecting comments made from the floor of WCPFC11 This version of the Workshop Report is cross posted on the MOW3 site

<sup>2</sup> Facilitator



**WCPFC  
THIRD MANAGEMENT OBJECTIVES WORKSHOP**

**Faleata Sports Complex, Apia, Samoa  
28th November 2014**

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**Report on the Third Management Objectives Workshop**

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3 December 2014

**Ian Cartwright**

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## 1. Introduction

The first Management Objectives Workshop (MOW1) convened by the Commission secretariat in Manila on 28-29 November 2012, sought to increase the understanding of management objectives, indicators and reference points. A candidate list of management objectives was developed and categorised under by biological, economic, social and ecological objectives.

The MOW1 Expert Panel, assisted by the Commission Secretariat and SPC, developed a 'Strawman' consisting of a candidate list of management objectives, performance indicators, and target reference points for each major fishery. These were:

- Tropical longline
- Purse seine
- Southern longline
- Pacific bluefin tuna
- North Pacific albacore

Following presentations of the draft 'Strawman' to the Scientific Committee (SC9), the Northern Committee (NC9) and the Technical and Compliance Committee (TCC9), elements of the 'Strawman' report were reviewed by the second Management Objectives Workshop (MOW2). Comments and suggestions made throughout this consultative process were taken into consideration and a final draft of the 'Strawman' report, including revisions and suggestions, was developed prior to MOW2.

MOW2 was held in Cairns on 28-29 November 2013. The workshop Considered and provided advice/commentary on: the 'Strawman' report, which listed draft management framework options (refined candidate objectives, performance indicators, and reference points); maintaining viable fisheries across the extent of the stocks; management strategies for skipjack and albacore tuna; options to address bigeye tuna overfishing; and a future workplan for the development of a management framework.

WCPFC10 accepted the report of the Expert Panel and agreed to the following:

*WCPFC agreed to hold an additional workshop on management options (MOW3) in 2014 and to task the Executive Director with exploring external sources of funding for a second workshop in 2015, further input from the expert panel and supporting analyses by the Scientific Services Provider.*

## 2. The workshop and MOW process to date

MOW3 was opened by the WCPFC Interim Executive Dr Lara Manarangi-Trott, who explained that the workshop is an informal meeting of stakeholders with an interest in WCPO tuna fisheries and while advice would be provided to the Commission in the form of a report, it did not have formal standing in the Commission process. It was noted that unlike the previous two MOWs, MOW3 had just one day to complete its work and provide advice for consideration by WCPFC11. The facilitator for the workshop, Mr Ian Cartwright was introduced.

The facilitator outlined some observations on the MOW process, based on discussions with stakeholders and previous MOW meetings and reports. These observations are summarised below:

- The MOW process provides the opportunity to discuss technical fisheries management issues in an informal setting, which allows for an open exchange on key matters of interest.
- It is an informal process, which has grown from its original (and ambitious) primary purpose, which was to determine fisheries management objectives for key fisheries.
- The process has limited resources – and has been largely reliant on SPC work produced primarily for PNA/FFA.
- Relatively cost-effective (workshops alongside Commission meetings).
- Too large for detailed technical discussions and intercessional work by a small group is required.
- No clear place in Commission structure in which to feed advice/recommendations.

The key objective for the workshop was outlined, which was to discuss and provide advice to the WCPFC11 on management issues including:

- the establishment and development of a management framework based on a harvest strategy approach, including reference points (RPs), harvest control rules (HCRs) etc.;
- a target reference point (TRP) for skipjack tuna (SKJ) and associated multispecies impacts;
- a process for developing a TRP for south Pacific albacore (SPA); and
- methods for determining risk levels to be associated with Limit Reference Points.

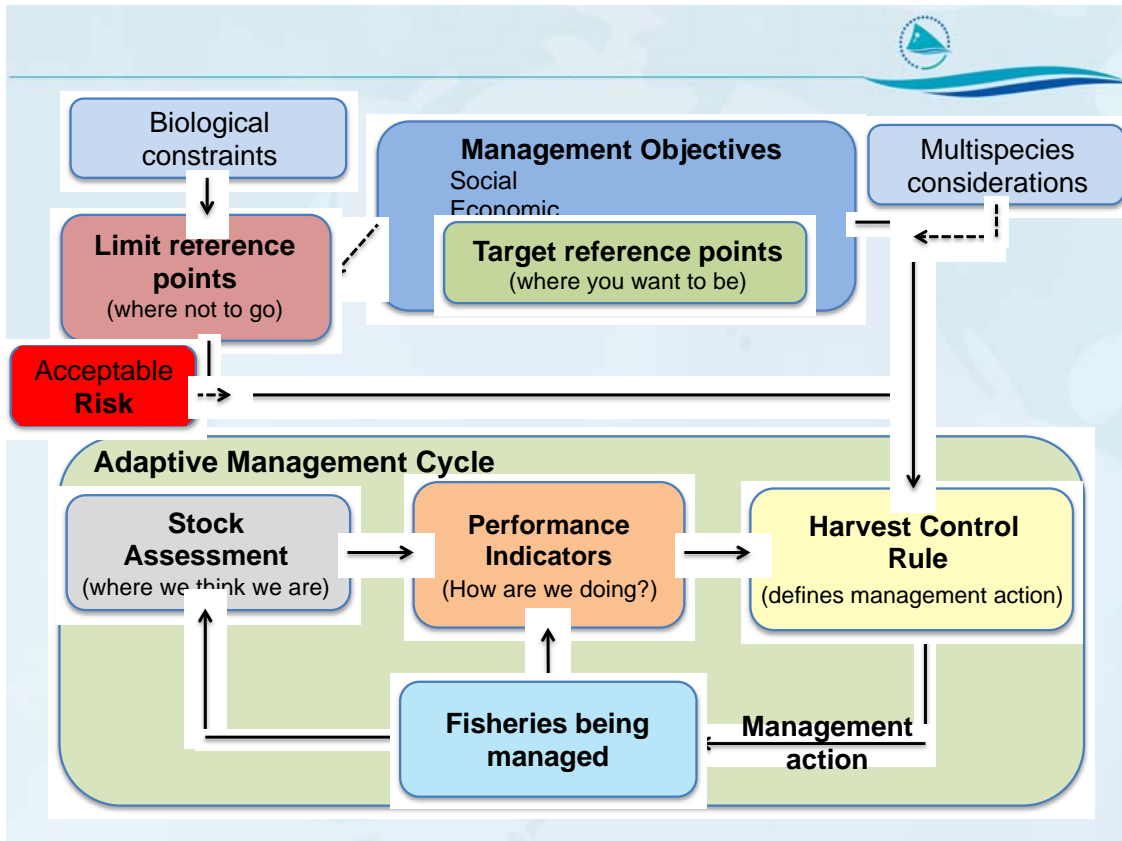
The agenda for the workshop is provided at **Attachment A**, and a participant list is provided at **Attachment B**. Owing to time constraints, there were no break-out sessions as planned in the Agenda and the workshop was run entirely as a plenary session.

At various points during the workshop, it was confirmed that none of the statements or comments at the MOW would be attributable to an individual or CCM in the report of the meeting. Any advice to the Commission would be based on the general sentiments of the workshop and would not infer the commitment of any CCM to any particular proposal or suggestion made at the workshop, or in the working papers. If any of the participating CCMs felt sufficiently strongly they could refer to the MOW3 report and make recommendations directly to the Commission.

As noted by one participant, as a matter of principle, final support (or otherwise) for any proposed CMM is a decision for Commission.

### 3. The management framework

SPC provided a brief recap of the management framework that had been developed through the MOW process (Figure 1 below).



#### 4. Harvest Strategy for Key Tuna Species in the Western and Central Pacific Ocean (MOW3-WP-01/07/08)

The FFA proposal to establish a process to develop and implement a management framework based on a harvest strategy approach for each fishery under the purview of the Commission was presented. It was noted that the aim of the draft CMM is to ensure the Commission has a structured, evidence-based decision making process, informed by scientific assessment outcomes. The proposed process comprising seven main elements was described in the context of work completed to date and the further work that would be required.

The presentation noted that considerable progress has been made in developing harvest strategies, particularly in the areas of limit reference points and monitoring, with some work completed in other areas of the harvest strategy process. In this regard, the Commission was well placed to move forward with the development of structured fisheries management framework based on harvest strategies.

An indicative timeline example covering the development of a harvest strategy for SPA was described.

In WP 8, Australia suggested that MOW3 recommend to the Commission that a detailed work plan for the development of a management framework and associated harvest strategies be drawn up in the intersessional period. Such a plan would lay out how and when the work on harvest strategies would be undertaken and resourced going forward. The paper notes that Commission needs enough space and time to develop and discuss potential management frameworks and there is no subsidiary body focused on fisheries management. Further, the Commission cannot rely on the Science Services Provider to provide scientific and analytical input into the forward process unless adequate funding and other

resources are identified as the Commission continues to develop harvest strategy elements.

**Key issues from plenary discussions are provided below:**

*Harvest strategy/management framework*

A harvest strategy and associated control rule(s) could be applied to either a fishery or species. The choice would depend primarily on the nature of the chosen management control, e.g. if a catch limit is imposed, the harvest strategy is likely to be species based, whereas an input control e.g. VDS would be fishery based. It was noted that the revised CMM on the development of harvest strategies now referred to 'fishery' (single or multi-species) rather than 'species'. It was recognised that south pacific albacore might be one stock so it could be treated as a stock or fishery. Tropical tunas may have a harvest strategy for a whole fishery, with RPs and HCRs for individual species.

With regard to the effective use of harvest strategies in input control fisheries, an Australian example (a tropical prawn fishery, which involves several species and is managed by head-rope length), was cited. All tuna fisheries in Australia, all are managed by output controls

There was some uncertainty as to whether RPs are fixed by species and harvest controls rules by fishery. It was noted that in Australia, most RPs are species based, but if there are interactions with other species, then a different target may be applied to manage non-target species.

It was noted that in some instances the target fishery was managed through controls on bycatch, citing the example of albacore tuna as a target fishery and bigeye tuna as a bycatch, and hence there may be a need for bycatch TRPs.

It was noted that the intent of this CMM was to make the measure flexible enough to allow all possible options for Harvest Strategy development within the overall framework, and no particular approach to species or fisheries-based approaches was specified.

There was a view that although the VDS was set at a country level, there was actually an overall limit, and controls should be set at a fishery and stock level. It was further noted that catches of tuna species varied by area depending upon external factors such as ENSO, hence if there were catch or effort limits by country these could vary considerably year by year.

It was noted that in some instances the target fishery was managed through controls on bycatch, and the example of albacore tuna as a target fishery and bigeye tuna as a bycatch was cited. This approach suggested the need for bycatch TRPs.

There was a suggestion that there should be a reference to MSY in the CMM as it is in the convention, but only as the minimum level for a TRP.

If the harvest strategy, including HCRs and RPs, does not work or is found to have implementation/outcome issues, it is important that there is an understanding that there will be a mechanism to review and refine it.

<p>There was general support for the development of harvest strategy based approach management framework as outlined in the CMM proposed by FFA, which should include flexibility in terms of its application and subsequent performance review of harvest strategies.</p>
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***Progressing the management framework and harvest strategies***

The workshop discussed options for moving forward and the future of the MOW process. Various ideas were proposed regarding who should progress the MOW work for the Commission, including:



intersessional work done by interested parties, e-meetings to reduce costs and physical meetings held back to back with other meetings as happens now with the MOW pre-WCPFC regular sessions.

The MOW process to date had been found to be useful as an informal meeting to allow for a free flowing discussion that feeds into Commission meetings; there is currently no other forum for this activity.

The development and agreement of harvest strategies, including harvest control rules, is a significant task. In the case of southern bluefin tuna, it took around 10 years to agree a full harvest strategy with HCRs, including a number of intercessional 3-7 day meetings.

In developing harvest strategies, and while noting that the Kobe process was moribund, it would be important to cooperate and build on the experiences of other tuna RFMOs who are asking related questions e.g. ICCAT, which is currently developing HCRs. There is also a need to cooperate with other research bodies, including the EU Science Centre in Milan, which is reportedly a centre of excellence for management strategy evaluation (MSE).

Noting that the process laid out in the CMM had a long time-line, rather than work with one species, e.g. south pacific albacore as a test case, it could make more sense to start working on other species in parallel. However this raised the question of how to prioritise species/fisheries, and bigeye tuna was cited as one species that might be considered for prioritisation.

The Commission may agree the need for an MOW every year and a minimum funding level is assumed, and as work plans progress, additional funding may be required for specific tasks. One NGO stated support for the MOW process, and it was prepared to offer funding, noting that WWF was translating some of these materials into other languages.

The EU indicated that some funding for 2015 (€50k) had been earmarked as a voluntary contribution to advance the process, but that this funding needed to be confirmed.

The workshop noted that in MOW3-WP8 Australia proposed that as a starting point, MOW3 should recommend that the Commission budget include a new budget line of \$70,000 at a minimum, for management options/ harvest strategy work.

There was a general sentiment that a one or two day annual workshop may not sufficient to address work required to develop harvest strategies and it was recognised that there was a need to make more time available for technical discussion and that the process needed to be funded at an appropriate level. If a small technical working group was included in the workplan as was suggested by some delegations, such a group would report though the established channels, including SC and the Commission, with discussion of outcomes at MOW.

## **5. Acceptable levels of risk of exceeding Limit Reference Points: Uncertainty and implications for Target Reference Points and Harvest Control Rules (MOW3-WP-02)**

SPC provided a presentation on acceptable risk levels in WCPFC fisheries management. The presentation:

- introduced the concept of uncertainty in the evaluation of management options;
- demonstrated the relationship between acceptable risk and uncertainty and potential minimum standards for target reference points;

- indicated the implications of risk and uncertainty in relation to current stock status; and
- highlighted the importance of developing and testing harvest control rules to evaluate the implications of particular levels of risk.

Risk was defined as the % of times a population is predicted to be below the LRP when projected into the future under a particular management strategy, using the analogy of a 'cliff edge' scenario. Acceptable risk is the particular percentage of times a population is predicted to be below the LRP when projected into the future that is considered by fishery managers to be sufficiently precautionary for a given stock.

Uncertainty is a key factor in determining acceptable risk. An analogy of fog at the cliff edge was used to show the effect of uncertainty in predicting the future under a given management strategy. Two main sources of uncertainty were covered in the presentation i) current stock levels and ii) the level of recruitment to the fishery going forward.

Three key 'lessons' from the SPC risk analysis were

- the lower the acceptable risk (*of going over the cliff edge*), the higher and further away from the LRP you need to maintain the stock;
- the greater the uncertainty (*the fog, making the position of the cliff edge difficult to determine*), the higher and further away from the LRP you need to maintain the stock; and
- the expected average biomass levels presented in the paper give some indication of the minimum value the minimum value of a TRP that could be compatible with the LRP at a given risk level.

***Key issues from plenary discussions are provided below:***

*Choice of risk level*

It was noted that the paper seemed to ask a lot of questions but appeared not to provide any answers. There is a need to determine what additional information might be required; the decision on acceptable risk is one for the Commission, using the sorts of analysis (and other information) provided by SPC.

It was suggested that if a level of risk is determined, that predisposes a minimum TRP for a given fishery.

It was suggested that there was likely to be a need for trade-offs in arriving at decisions on acceptable risk. This task should be the work of the Commission and done on a case-by-case basis. However, risk level relates to the adopted LRP; hence the commission might be content with a higher risk if a conservative LRP had been applied and vice-versa. Hence the Commission should be prepared to consider a wide range of risk levels for consideration

*Technical questions:*

- With respect to Table 1 why are BE and SKJ considered similar (as are yellowfin and albacore) with respect to risk outcomes under the projections, given that in view of biological considerations one might expect a different pairing? It was explained that the median relates to distribution of uncertainty – uncertainty for BE and SKJ was more similar

than the distribution for SPA and YF, hence the grouping relates more to uncertainty than to the life history characteristics of the species.

- It was asked if the levels of spawning biomass in Table 1 of MOW3-WP-02 could be considered an expression of the level of escapement in the fishery. It was explained that the concept of 'escapement' had not been used in the presentation or considered in the analysis; the discussion is around a biomass-based LRP.

## 6. Current and projected stock status of skipjack tuna to inform consideration of Target reference points (MOW3-WP-03).

SPC provided a presentation that:

- Provided estimates of current skipjack stock status with respect to the
- The range of TRP levels requested at WCPFC10 (40-60% SBF=0)
- Provided projections of the skipjack population to indicate possible levels of future abundance under status-quo conditions;
- Provided a comparison of very basic fishery performance metrics against different candidate TRPs; and
- Highlighted the importance of developing Harvest Control Rules to enable evaluation the implications of particular levels of skipjack TRPs.

The SPC analysis covered three specific areas: 1) evaluation of current stock status from the skipjack stock assessment model against the potential TRP levels; 2) projections of the skipjack stock into the future under two 'status-quo' scenarios to identify the stock status that results; and 3) estimates of catch, effort, stock status and fish size that might be expected 'on average' at TRPs of 40, 50, and 60% SBF=0. Uncertainty in the 'state of nature' across all analyses was considered.

The table below covers the key outcomes of the analysis presented.

Median depletion level (%SBF=0)	Change in spawning biomass from 2012 levels	Change in effort from 2012 levels*	Median equilibrium yield (%MSY)	Mean size of fish**
60%	+22%	-33%	76%	54cm
50%	+2%	0	90%	53cm
40%	-18%	+50%	98%	52cm

The need for a better understanding the extent of efficiency changes in the fishery to inform management strategies, and the relationship between CPUE and stock abundance for purse seine fishing was highlighted.

Discussion on this issue was combined with discussions on the next issue (the two proposed CMMs on a TRP for SKJ)

## 7. Proposed CMM on a TRP for skipjack tuna (MOW3-WP-04)

PNA presented the background and rationale for the proposed CMM on a TRP for skipjack tuna.

It was noted that WCPFC has adopted a hierarchical approach to LRPs using a SB-based approach for skipjack, and that there had been a commitment from WCPFC10 to undertake certain analyses to inform the adoption of a TRP at WCPFC11.

The proposed TRP is considered to be at level that would maintain the SB at approximately current levels and:

- i. is sufficiently distant from the LRP,
- ii. broadly maintains recent patterns of fishing;
- iii. is projected to result in spawning biomass increasing slightly from 2012 levels;
- iv. suggests purse seine catch rates are likely to remain at around current levels; and
- v. provides around 90% of MSY

The proposed TRP of 0.5 (50%) of the estimated recent spawning biomass without fishing meets the objectives of PNA members and is generally consistent with the objectives for the fishery developed at MOW 1 and 2. Specifically, the TRP meets the objectives of:

- resource sustainability in terms of an acceptable risk of breaching the agreed LRP;
- stability within the fishery;
- being risk adverse;
- avoiding additional impacts on other fisheries for skipjack; and
- avoiding additional impacts on other target stocks and non-target species.

The presentation concluded that the proposed TRP

- Will be applied in assessing the stock and in reporting on management advice and implications for this stock.
- Will provide a basis, with the adopted LRP for skipjack, for the Commission to proceed with the development of harvest control rules related to skipjack.
- Can be expected to require moderate reductions in purse seine effort over time, at least to adjust for effort creep.
- Will set a new global standard for responsible management of sustainable tuna fisheries in a way that adds economic value to the WCPO skipjack tuna stock.
- Is a simple, straightforward and powerful step.

#### **Japan's proposal on WCPF Skipjack TRP (MOW3-IP-01)**

The Japanese delegation provided a presentation of their view of an appropriate TRP for skipjack tuna. The presentation noted that while the extent of the stock as 40 degrees north to 40 degrees south, most of the WCPF catch (more than 1.5 million t) comes from the Tropical Zone. As a result, the management interests of WCPFC seemed to have been focused on PS fisheries in equatorial zone and the needs and plights of other area have seemed to be overlooked

It was suggested that while the skipjack stock is considered to be healthy overall, the current assessment cannot explain poor migration to higher latitude. The presentation drew the inference that less fish are now migrating into the Japanese zone as a result of decline in SB/SB current  $F=0$  since 2002,

as evidenced by a fall in both the Japanese coastal catch and Japanese coastal TL catch.

In support of its case, Japan suggested the following issues should be taken into account in considering the skipjack tuna TRP:

- The obligation to manage stocks in their entirety (Art. 5)
- The interests of artisanal fisheries (Art. 5 (h))
- The historic catch in an area (Art. 10. 3 (c))
- The needs of coastal communities which are dependent mainly on fishing for the stock (Art. 10.3 (g))

As a result of the above issues, Japan suggested that the skipjack TRP should be at least 60% of the estimated recent average spawning biomass in the absence of fishing.

**Key issues from plenary discussions are provided below:**

Some participants suggested that a fishing mortality (F)-based TRP may be more appropriate and that the Commission had endorsed biomass based LRPs not TRPs, hence fishing mortality based TRPs may should still be considered as an acceptable option.

in response, SPC indicated that it would be a simple matter to derive a fishing mortality (F) equivalent for the biomass-(B) based models (harvest strategies and HCRs), and observed that effort or catch are likely to be key factors for model projections along with effort creep. HCRs would be based on catch and effort rather than fishing mortality. SPC has worked with FFA and others to develop a regional bio-economic model. While more work can be done, especially in relation to costs for purse seiners; the work is ongoing, will be reported to the Scientific Committee.

Some participants were comfortable with biomass based RPs and had no problems with their use (in terms of easily interpretable and understandable outputs)

MFCL models depletion and distribution of the fishery across different sizes and ages and the effect on spawning biomass.

In answer to a question, it was confirmed that 50% of unfished biomass is a more conservative TRP than any currently being considered or applied by other tuna RFMOs.

There was some uncertainty concerning the need to revisit the current proposal for a TRP if the process outlined in the FFA CMM for a harvest strategy is adopted. It was clarified that part of the intention of the FFA CMM Harvest Strategy paper was to fully acknowledge existing actions as part of larger process. As such, it should be seen as a framework and parallel work on elements of that framework, such as the establishment of TRPs, and should not be hindered. It was acknowledged that when a management framework is fully established and operational, revisiting the SKJ TRP using MSE would be an option.

In response to a number of questions about the overarching objective behind the proposed TRP, an explanation was provided that as with many fisheries, there was not a single overarching objective used in identifying the skipjack TRP. The three candidate TRPs had been mapped out using SPC and PNA analyses against the objectives derived from MOW1 outputs and the list of objectives from CCMs listed in the 'Strawman' document. The resulting comparison, as explained in the PNA paper and presentation, indicated that the TRP of 50% of unfished biomass best met all these objectives.

It was thought by some participants that a 60% unfished biomass TRP would have a strong negative impact on the economics, yield and returns to coastal states of the skipjack fishery given the very

substantial decrease in effort (33%) necessary to achieve such a TRP. The mean equilibrium would be 76% of MSY and an increase in spawning biomass of 22%.

A participant noted that a 50% unfished biomass TRP may not sufficiently high in relation to the issues raised by Japan, given that the current stock assessments are not perfect, and giving due consideration to the precautionary principle, a TRP set at 60% unfished biomass would be preferable. Another participant shared concerns about range contraction, and suggested that it might be appropriate to look at a higher TRP, especially since some islands have issues with food security. Consideration should be given to disproportionate burden and management processes which mitigate impacts on some island states should be considered.

The 40% TRP would require a substantial increase in effort (50%) for a very limited increase in long term yield (to 98% of MSY. For many island counties and in particular SIDS, the skipjack fishery needs to perform economically due to contribution to GDP; hence these countries are risk averse. A 40% TRP would also increase the cost of fishing to point where it may no longer be cost effective.

It was noted that economic goals may be affected by outside factors, e.g. markets and exchange rates.

Uncertainty is derived from the relationship between purse-seining and the abundance of fish, e.g. with a 60% unfished biomass TRP, the reduction of effort would be 23% or 24%, which gives an indication of the high level of confidence.

In answer to the question of whether or not it was advisable to set a TRP without an HCR, it was noted that the TRP is generally considered to be a management/political decision, while the HCR is more technical. Each HCR may have a different impact on any given fishery and so testing (using MSE) and deciding on HCRs was a process that could usefully occur after the desirable state of a fishery (TRP) had been established

## **8. Multi-species implications of reference points: what might a target reference point of 50%SBF=0 for skipjack tuna mean for bigeye and yellowfin tuna (MOW3-WP-05)**

SPC provided a presentation on multi-species implications of pursuing candidate TRPs. The presentation:

- highlighted the importance of multi-species impacts when considering TRPs and [later] harvest control rules in WCPO fisheries
- highlighted the need for additional analyses – both biological and economic – to assist in this wider process; and
- supported WCPFC11's consideration of a TRP for skipjack tuna and the development of management measures for the three tropical tuna stocks.

20 year deterministic projections were conducted for the period 2012 to 2032 (a period chosen to ensure that stocks had sufficient time to reach an equilibrium age structure given the recruitment and effort conditions applied) using the 2014 reference case assessment run for WCPO skipjack, bigeye and yellowfin stocks. Three major conclusions were drawn:

- There are many combinations of associated and unassociated set purse seine effort that are consistent with achieving the candidate skipjack TRP of 0.5SBF=0 and these are close to 2012 overall purse seine effort levels.
- **Yellowfin tuna** stocks are predicted to remain at or above current levels across the range of

combinations of purse seine effort compatible with the skipjack TRP.

- The impacts for **bigeye tuna** are sensitive to the mix of FAD and free-school effort – some combinations (with higher associated set proportions) would cause the bigeye stock to remain below the LRP.

It was noted that no account has been taken of future recruitment variability. In addition the analyses do not consider factors that might have economic impacts such as catch variability. Evaluation of these types of multispecies impacts is most appropriately done in a framework that considers current uncertainty, future variability, and economic factors.

**Key issues from plenary discussions are provided below:**

It was confirmed that the analysis presented in MOW3-WP-05 used 2012 levels of LL fishing for bigeye, which were assumed to remain constant.

It was noted that the stock status of yellowfin presented at SC10 showed higher yields with a greater proportion of unassociated sets.

The pattern in fishing mortality mimics pattern in depletion but the mix of gears impacts MSY – this factor may be considered in future analysis.

If a different TRP, e.g. 60% of unfished biomass was applied to the skipjack fishery, it is expected that the same sort considerations necessary to address the issue of bigeye overfishing would need to be addressed, i.e. the proportion of FAD and non-FAD sets, as would be the case with the 50% TRP.

## **9. Compatibility and consequences of alternative potential TRPs for the south Pacific albacore stock (MOW3-WP-06)**

SPC provided a presentation that:

- identified the consequences of using the ‘minimum’ south Pacific albacore biomass target reference point levels compatible with different levels of risk of falling below the agreed LRP, estimated through Project 57 of the WCPFC;
- examined the consequence of achieving the ‘default’ reference point of MSY;
- examined candidate TRPs based upon fishery objectives such as catch rates, fishery profitability and MEY;
- raised the issues compatibility and acceptability of the candidate biological, fishery and economic target levels, and the potential implications of those management options for the southern longline fishery.

The stock and fishery consequences of candidate TRP levels were examined through 20 year stochastic projections, based upon the recommendations of WCPFC SC10 for capturing existing and future uncertainty. Following identification of future longline fishing levels that achieved the TRP, summary metrics related to the median population biomass and consequences for longline CPUE and catch were provided. Fishery performance in relation to TRP is defined by LRP risk levels, MSY, maintaining CPUE at 2010 levels, and at MEY were examined, and the following conclusions drawn:

- MSY as a long term target implies a high risk of falling below the LRP (1 in 3 chance)
- Recovering CPUE to 2010 levels is not enough to make profits in the fishery at current prices and

fishing costs (i.e. 2010 CPUE is below levels needed to breakeven)

- MEY as a target implies major reductions in effort are necessary to achieve this level at current prices
- Achieving a 10% profit within the fishery may be a more sensible target at current prices, but reductions from 2010 effort levels of 6%-53% are still required, dependent on costs.
- Breaking even' (basic returns) generally required reductions in effort from 2010 levels (dependent upon prices and costs)

**Key issues from plenary discussions are provided below:**

In answer to questions from workshop participants, SPC provided the following clarifications:

- The south pacific LL fishery is defined as south of 10 degrees south.
- Economics related to bycatch were not considered in detail in this paper. Rather there was a simplistic approach in the model. Catch in a given fleet is defined a constant relationship in the model. A new regional bio-economic model under development decouples the relationship between albacore and other species, some of which are integral to the southern longline fishery (BE and YF).
- The different fleets targeting albacore fleets perform vary considerably in terms of costs and catch rates. The analysis provided in WP06 reflects an average across fleets. The sensitivity of the candidate TRPs was considered against fleet variability.
- In the regional bio-economic model, changes in costs and fish price are allowed for and SPC has worked closely with FFA on the economics, pricing and cost analysis, i.e. used the best available science available.
- Three fleets in the analysis have lower catches of albacore and larger catches of yellowfin, and it would appear that that albacore is not being targeted. However these fleets were chosen because they are they are included in the south pacific albacore assessment. One reason for low catches of albacore is that the fleets may change their targeting focus seasonally.
- Cluster analyses were not conducted to separate bigeye:yellowfin targeting from albacore or albacore:yellowfin targeting. They are usually performed at pre-assessment, i.e. for the previous assessment in 2012 and the upcoming assessment in 2015.
- The stock assessment is conducted for the entire south Pacific, and scalars are used throughout, though the economics apply only to the WCPO.
- The range of the scalars presented in MOW3-WP-06 represent the average ranges in the fishery and the biggest driver is fishery costs.

Within FFA it is anticipated that within 3 years the south pacific albacore fishery will transition from an open fishery to a closed fishery. More data will be required to set quotas, and it was noted that there is a problem with effort creep on the high seas.

It was observed that this agreement was less about revenue, but more to do with domestic development. While SIDs were seeking to establish domestic fisheries, one DWFN fleet was expanding their effort considerably. It was noted that American Samoa is particularly dependent upon the albacore fishery; domestic vessels can only fish inside their EEZ, and that fleet had a very poor fishing year in 2014, as evidenced by the high quality and coverage of observer, logbook and economic data.



It was suggested by some participants that maintaining CPUE at 2010 levels appears to be a reasonable minimum target level for the fishery, however it is difficult to analyse levels of CPUE in relation to future profits in the fishery using a single point in time. MEY as a TRP cannot be considered static and allowance should be made for the fact it is variable over time as costs of fishing and fish prices change (e.g. the fall in albacore price). This same comment applies to skipjack.

Given that a high biomass was needed to achieve MEY, there was no objection to the suggestion that ‘a pretty good yield’ was an appropriate objective for the albacore/southern longline fisheries and that it will be necessary to trade off objectives to achieve this

One participant noted that the key issue for the southern long line fishery was overcapacity. It was suggested that freezing and/or reducing capacity should be a precondition south pacific longline measure.

It was noted that cost per hook analysis was conducted for the American Samoan south Pacific albacore fishery, it wasn’t clear if this sort of work had been conducted elsewhere.

A suggestion from the floor indicated that for 20 year projections, given south Pacific albacore life span and maturity, it may be appropriate to use other indicators such as cumulative catch over the entire time period, including bycatch and perhaps inter-annual variability might also be captured. Although these PIs could be considered when considering HCRs, it was noted that the stock was in equilibrium at the end of the time period for the purpose of this work.

In respect of the further development of a harvest strategy for the southern longline fishery the workshop noted that:

- Given the quality of cost earnings data held – that the American Samoan longline fleet could be a good candidate for an indicator fleet.
- The strengthening of cost information for various fleets and their relative reliance on albacore is a critical area.
- It was noted that there should be a clear distinction between domestic fresh fish and DWFN longline fleets, noting that they each have different fishing strategies and patterns
- It was suggested that a better opt than the 2010 state of the fishery should be selected in order to restore profitability to the fishery

The workshop agreed that there is a clear need to implement an effective management framework/ harvest strategy for the south pacific albacore fishery that meets management objectives (e.g. economic, social and biological).

## **10. Development of a future work-plan for advancing the development of a management framework for the WCPFC)**

Recognising the need to develop a realistic budget and workplan in support of a process to develop harvest strategies (Management Strategy Process (MSP)), it was agreed that the Secretariat, in discussion with interested parties, would develop an initial plan and budget for the MSP. To assist this planning the following suggestions were made:

- It is important not to link the proposed Harvest Strategy CMM a stand-alone proposal to establish a process with the need to obtain adequate funding. There is no intention to have the Harvest Strategy CMM tied to discussions about budget.

- Adequate funding is necessary and given constraints some prioritisation is necessary; as a start an indicative budget to work on skipjack and the south pacific longline fishery might be appropriate.
- While the suggested CMM process to develop harvest strategies was somewhat stepwise and detailed, there needed to be sufficient flexibility to allow it to mesh with other parallel processes, including those of PNA and FFA.
- It is important to bring outside expertise into the process, especially with regard to MSE – this too should be included in the workplan and budget.