Western and Central Pacific Fisheries Commission

SCIENTIFIC COMMITTEE

FIFTH REGULAR SESSION

10-21 August 2009

Port Vila, Vanuatu

Report from the SPC pre-assessment workshop, Noumea, April 2009

WCPFC-SC5-2009/SA- IP-1

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Report from the SPC pre-assessment workshop, Noumea, April 2009

S. J. Harley, N. Davies, and S. D. Hoyle

Introduction

To assist it in undertaking its stock assessments for the WCPFC, OFP sought input from stock assessment scientists in the region. The fourth pre-assessment workshop was held in Nouméa, New Caledonia 6-9 April 2009. Nine scientists from seven organizations participated in the workshop as well as OFP-SPC staff (see Appendix 1). The agenda was focused on stock assessment methods, and the proposed approaches for the stock assessments for South Pacific albacore and yellowfin tuna (see Appendix 2). Several draft working papers were provided by OFP for the meeting with the intention of finalizing these for SC-5 as either working or information papers (see Appendix 3) and some participants provided presentations of relevant research.

This report briefly describes the various presentations made and reports the conclusions or matters outstanding from the discussions. It is expected that the outcomes of this meeting will be reflected within the papers submitted to WCPFC-SC.

MULTIFAN-CL developments (WP 1)

Dr Hoyle described the recent developments with MFCL which included fixes of known bugs, incorporation of new features, and establishment of collaborative projects. The WS noted that the following bugs have now been fixed:

- The 'no-fishing' analysis incorporates spawner-recruitment effects; and
- Method used to generate missing values of effort

The following new features will be available for the 2009 assessments

- Length-specific selectivity;
- Projections with catch for some fisheries and effort for others;
- Parallelizing the Hessian and variance-covariance matrices for estimated and dependent variables; and
- Time varying effort deviate weights (i.e. allowing the standard deviation of the CPUE to vary with time).

With respect to length-specific selectivity, the WS noted that this was an important development and should improve the model fit to catch at length data, particularly for fisheries which caught large fish and those small fish fisheries with tight modal structure. While selectivity is estimated as length-based it

is back converted to age-based selectivity to allow the generation of the age-specific fishing mortality values.

Some concern was noted that the importance of this approach might be over-emphasized, since the potentially improved fit comes at the cost of an internal inconsistency (i.e. the effects of size selective mortality are not propagated over time, and these effects could be important if F is high or F is low and sustained for several years for fish approaching Linf).

The WS noted that including length-specific selectivity could lead to quite different solutions so it was necessary to rerun the models from scratch to be confident that a global minima was being found.

Work is still outstanding with respect of outputting the new selectivity curves in the plot.rep file and allowing them to be viewed thru the MFCL-viewer.

Dr Hoyle indicated the following activity with respect to software development:

- MFCL development has begun to use a code repository, using the open source software SVN. The software keeps track of different versions of the software, and allows developers to merge different versions of the software. The repository is held at SPC, but is accessible via the internet to the development team. The repository and overall development are coordinated via the GForge website http://gforge2.spc.int/. This website is administered by Fabrice Bouye fabriceb@spc.int;
- The establishment of a "Google code" website containing R-scripts for use with MFCL input and output files;
- Conversion of the MFCL manual from LaTeX to Microsoft Word 2007. It can be found on the MFCL repository.

The WS discussed some potential future developments of MFCL:

- Incorporation of catchability trends / nonlinearity between CPUE and abundance
- Environmental correlates with movement, recruitment, and other relevant processes
- Modifications / enhancements relating to the incorporation of the new tagging data

South Pacific albacore

Review of 2008 assessment (WP 2)
Dr Simon Hoyle provided a brief summary of the 2008 South Pacific albacore assessment presented to SC-4 in Port Moresby. The WS noted the two major issues raised at SC-4, and to be addressed in the 2009 stock assessment: 1) standardization of operational-level CPUE, in particular addressing the changes in targeting practices by the Taiwanese vessels; 2) investigating the patterns in the length-frequency data.

In response to a question from a WS participant it was noted that the model assumed a single pool of fish and that six regions were only used for the purpose of defining different fisheries. WS participants

were reminded that previous attempts at multi-region albacore models have often resulted in unrealistic movement estimates.

Operational CPUE analyses for South Pacific albacore (WP 3)

Dr Simon Hoyle presented WP-3 which describes some initial findings and planned work on CPUE for the South Pacific albacore assessment. The WS noted that the data set was to be expanded to include operational level data provided by PICTs.

The WS noted that Taiwan have recently begun collecting observer data from their longline vessel. Dr Wang indicated that since 2004 there has been a change in permitting conditions with vessels now having to apply to target BET. The WS noted that this permit condition came in a few years after the BET fishery developed, but should still be a source of useful information.

Concerns were raised regarding the reliance on CPUE for other species to provide insights into targeting and it was noted that it might be more robust to indentify targeting at the trip rather than set level.

Dr Wang's presentation on Taiwanese longline CPUE

Dr Wang presented the results of research that was motivated by the conclusions from SC-4 regarding the interpretation of Taiwanese longline CPUE data. The analysis included both CPUE and size composition data.

The analysis of CPUE data involved using cluster analysis (incorporating HPB and other targeting information) to indentify two fleets, e.g. ALB and BET targeting. The nominal CPUE from the ALB targeting fleet was relatively stable post 2000 compared to the large declines seen in the CPUE series used in the 2008 assessment.

SPC indicated that it appeared that the Taiwanese data set post 1998 was more complete than the joint SPC/ NMFS data holdings. Appeared to have much more data in recent years than is available for the current SPC/NMFS collaboration. Also, it was not clear if there was size data that were held by Taiwan or NMFS, but not available to SPC and WCPFC.

The WS noted that there are two types of vessels in the Taiwanese fleet and some of these don't have the capability to target BET (presumably relating to freezing capabilities). In fact some of the older vessels still use non-monofilament materials for their mainlines.

The WS participants were very grateful for the work presented by Dr Wang and recommended that a collaborative project between SPC and Taiwan be established with the aim of calculating a revised CPUE series for incorporation in the 2009 assessment. It was noted that there would be data ownership / confidentiality issues to be resolved to ensure that the most complete data were available for any joint analysis.

Albacore size composition data (WP 4)

Dr Simon Hoyle presented WP-4 which considered the second of the issues raised by SC-4, namely the explanation for the patterns in the longline size composition data. The work was in its early stages and the paper mostly focused on alternative hypotheses and suggested analyses to investigate these.

The four hypotheses considered related to: 1) sampling bias; 2) selectivity changes; 3) growth changes; 4) recruitment trends. It was noted that it is the 4th option that the model is currently configured for, though attempts have been made to split the time series of data into blocks with separate selectivity curves.

In further developing this work, the WS noted the following:

- It is probably less difficult to examine trends in the northern regions than the southern regions where multiple modes were apparent.
- It might be useful to consider any available Australian data of depth specific trends in fish size
- The regression tree methodology might be a useful approach to examine the data in addition to traditional GLM approaches;
- Preliminary examination of TWN data indicated increasing fish sizes as you headed north and east;
- Some of the TWN albacore boats targeting albacore get high such high ALB catch rates that they are not reliant on YFT and BET. Some of these boats have not even updated their gear to take advantage of the new monofilament lines;
- That the driftnet fishery occurred prior to the more recent decreasing trend in mean size which is not consistent with the driftnet fishery significantly impacting on recruitment (as this would typically result in increases in mean size); and
- That access agreements may have lead to fleet movements that could produce trends in size, e.g. EEZ's dominate the waters from 25S to 10S with the high seas dominating further south. Subsequently some finer scale analyses may be of use.

Taking into consideration the insights and comments from the WS, SPC would put together a suite of analyses and potential stock assessment model runs to investigate the alternative hypotheses.

Albacore structural sensitivity analysis (WP 5)

Mr. Nick Davies presented WP-5 which described the results of the South Pacific albacore structural sensitivity analysis. The WS noted that the goal of this analysis was to see how sensitive the key model outputs were to plausible alternative model and data structures. This analysis would help OFP determine what sensitivity analyses should be considered for the full assessment.

In further developing sensitivity analyses for the assessment, the WS noted the following:

- the range of values considered for natural mortality, M, is probably a bit narrow and guidance should be sort from relevant ICCAT assessments for ranges used elsewhere;
- that juvenile mortality might be higher relative to that of older fish and alternative functional forms might be considered;
- that model runs that included a time-split in selectivity had some strange results that required further consideration, e.g. not splitting catchability as well and checking the levels of data available for various periods to determine if sufficient data was available to estimate selectivity;

- a range of growth options should be considered including fixing mean length at age and perhaps even some of the parameters controlling variability in length at age based of recent and historical growth studies.

In terms of using this structural sensitivity approach to run over 100 models, it was noted that some of the structural assumptions (e.g. time-split, length-specific selectivity, and estimating growth) tested could lead to quite different solutions. The WS recommended that the focus be on the refinement of model runs rather than exclusion. So it was recommended that diagnostics be developed to detect poor model convergence and that maybe changes in the order of estimation. The WS noted that adding an additional phase of 1000 iterations often helped better refine the minimization.

Pacific-wide albacore assessment

The WS noted that, based on recommendations from SC-4, SPC had sought to collaborate with the ISC on a Pacific-wide albacore assessment. Such a model would likely provide insights that would improve both the North and South Pacific assessments.

There had been some interest from NMFS La Jolla, but it appears that the ISC are currently focused on developing their own North Pacific albacore assessment (scheduled for March 2010). It is unlikely that the ISC will be in a position to collaborate with the SPC until after that time.

Recommendations for this year's albacore assessment (WP 5b)

Dr Hoyle presented a summary of possible issues to consider for the assessment based on the results of the 2008 assessment and the structural sensitivity analysis. Based on these discussions, the WS came up with the following guidance to SPC on issues to be considered and their priority:

1. Top priority: Revise spatial stratification – additional strata in the east (for new fishery definitions)
2. Top priority: Improved CPUE series – for the main LL fisheries. Collaboration with TWN and NZ researchers (free up catchability for NZ troll fishery)
3. Secondary priority: Address decadal changes in the mean size of fish in the catch and other spatial-temporal patterns in size composition data. Many options to address this depending on the outcomes of the data analyses. Within this:
   a. Most likely increase the number of longitudinal spatial strata in regions 2 and 4 in particular.
   b. Variable growth in each region (maybe more data needed) and model each region separately
   c. Further development of the time-split
4. Secondary priority: Growth-related issues. Considering regional growth and alternative fixed growth curves.
5. Lower priority: Other length-related issues: cleaning up the size data to make sure that it is weighted properly (e.g. samples were weighted to the catch). Apply length-specific selectivity.
6. Lower property: Other issues:
   a. Monthly time step for surface fisheries

b. Catch conditioned
c. 2cm length bins
d. Reconsider tagging data

Yellowfin tuna

Review of 2007 assessment (WP 6)

Mr. Adam Langley provided the WS an overview of the important aspects of the 2007 YFT assessment presented to SC-3. In particular the WS noted:

- that some newer features of MFCL were not available at the time of the previous assessment, e.g. individual weights to CPUE observations;
- the lack of fit to recent size data in the LL fisheries;
- that the conversation factor work done in 2008 would be relevant to the new YFT assessment;
- that the data available for Region 3 (where 80% of the catch comes from), indicates very different juvenile growth patterns in this region compared to other parts of the WCPO; and
- that TWN was excluded from LL-ALL fisheries because we had less operational data (e.g. HPB) for this fleet.

The WS also noted that some work on relationships between recruitment and oceanographic conditions had been undertaken for Region 3 and would soon be published. Attempts would be made to incorporate this work into short term projections.

Other issues relating to the 2009 assessment were discussed under a later agenda item.

Revised biological characteristics (WP 7)

Dr Simon Hoyle discussed the approach that would be taken to revise the biological parameters for the 2009 yellowfin assessment. The analysis would be based on the approach taken for BET in 2008. The WS noted that the purpose was to make the biological parameters to be internally consistent and to also make estimates of spawning potential as biologically sensible as possible.

The WS noted that there was not currently good data on YFT spawning fraction for the WCPO and that would be important for future refinements.

Standardized CPUE analyses (Presentation only)

Mr. Adam Langley provided a PowerPoint presentation summarizing recent work on the standardization of longline CPUE for the key longline fisheries. Mr. Langley noted the workshop held in Hawaii in 2007 and recent analyses of operational level catch and effort data for DWFN based on data provided to SPC by PICTs (SC3-SASWG/WP-6).

The WS noted that the analyses of operational level data and other auxiliary analyses, e.g. concentration of reduced effort, do raise concerns about our level of confidence in the aggregated data indices that should be the focus of future research.

Other recommendations or conclusions of the workshop included:

- SPC should continue to conduct analyses of the levels of effort and the potential for effort to become more concentrated as overall effort is reduced, e.g. Gulland's index;
- Consider other fleets that it might be possible to develop indices for, e.g. TWN in region 4 and 6 and KOR in region 4; and
- Where possible economic information on the value of the different species in the catch should be considered when changes in targeting are suspected.

There was considerable discussion regarding the concerns surrounding the inclusion of CPUE for another species in the standardization process. It was noted that this was probably the best source of information in relation to targeting, but there were problems in using it. The WS noted that the YFT indices were far more pessimistic when BET CPUE was not included. SPC indicated that it would investigate some new approaches for incorporating the CPUE of a secondary species in CPUE analyses and report this to SC-5.

Tropical tuna CPUE analyses TWN fleet (Presentation)

Dr Eric Chang presented a PowerPoint presentation outlining the current TWN holding of logsheet data for their vessels and standardized CPUE for YFT.

The WS noted the following:

- TWN had received Pago Pago data from NMFS for 1964-1996, but had lost their own records of logsheet data prior to 1981;
- Since 1990 the coverage rate of the Pago Pago data declining.
- The analysis was for the DW fleet (e.g. large freezer longliners). These vessels are currently included in the LL-ALL fisheries (i.e. it is only the off-shore fleets that are split out) so new fisheries would need to be developed within the MFCL model to accommodate standardized CPUE indices for this fleet. Associated with this would be assumptions regarding selectivity and any available length-frequency data;
- The analysis attempted to account for changes in targeting (between ALB and BET) patterns.

The WS considered that it might be useful to consider using catch and effort data for the TWN ALB targeting fleet in regions 5 and 6 (mostly 6) for YFT assessment. It is possible that the YFT CPUE trends from the ALB target fleet might be less vulnerable to changes in catchability over time. It might be possible to combine the JPN and TWN data for region 6, noting that the Japanese data are sufficient until the 1980s.

Finally, a desire was expressed to have collaboration on the analysis of the operational data from all DWFN's together. It was noted that currently the DWFN's did not submit these data to the Commission, citing confidentiality issues. It was hoped that the framework of the WCPFC might provide a basis for collaboration.

YFT SS3 assessment

Dr Simon Hoyle briefed the WS on work on a Stock Synthesis assessment for YFT. Work had begun in conjunction with NMFS in La Jolla, but as yet it had not been possible to get a model working. Problems had been encountered in estimating selectivity (e.g. need to get cubic splines incorporated into SS).

The WS noted that some features of SS3 might be desirable to test, e.g. growth morphs, movement constraints, time-varying selectivity.

While it was considered desirable to have something for SC-5, it appeared that there would be minimal involvement from NMFS in La Jolla and therefore this work was only considered a moderate priority.

Yellowfin SSA (WP 9) and recommended approaches for the 2009 YFT assessment

Dr Shelton Harley presented WP-9 which described a structural sensitivity analyses based on the 2007 YFT assessment data. The WS noted that the goal of this analysis was to see how sensitivity the key model outputs were to plausible alternative model and data structures. This analysis would help OFP determine what sensitivity analyses should be considered for the full assessment.

From this discussion flowed several recommendations from the WS regarding the 2009 assessment:

- Selectivity: length-based selectivity should be implemented where appropriate with comparisons of the old and new curves presented;
- Steepness: alternative values of steepness should be considered. It was noted that when steepness was fixed the resulting likelihood profiles for key management quantities were much narrower;
- Biological parameters: the results of the study described in WP-7 should be incorporated into the assessment. Alternative values for juvenile natural mortality should be considered;
- CPUE series: any improved series that come from the investigations of data for JPN or any other fleets should be considered;
- CPUE weightings: the current assumed CV's (0.1) are too narrower and should be increased to 0.2. In addition the new feature within MFCL to allow for temporal trends in the CV's should be considered. This may help address some of the patterns that occur due to the early CPUE trajectories;
- Purse seine catches: two alternative series should be used to cover the range of uncertainty that has been determined through the various analyses of Dr Tim Lawson;
- Indonesia/Philippines catches: two alternative series should be used to cover the range of uncertainty that has been determined through the various analyses of Mr. Peter Williams;
- Effort creep: if analyses of catch and effort data provided some insights into potential effort creep then a scenario should be constructed for the key longline fisheries;
- Region 3 model: given the importance of this region and the different growth patterns observed, then a standalone Region 3 model should be developed.
- Iterative reweighting: this approach should be continued in an exploratory manner.

Bigeye tuna

Proposed approaches for 2009 assessment (discussion)
The WS noted that SPC would be providing a simple update of the 2008 BET assessment and that any major developments in the YFT assessment would be incorporated into the BET assessment.

Stock assessment methods

Analysis of fishery data (Presentation)
Dr Fonteneau provided a presentation outlining some of the analyses that he felt could provide further insights into the analysis of longline CPUE data. In particular he presented a range of indices (e.g. Gulland's concentration index) that could usefully be developed and updated each year. Dr Fonteneau also stressed the importance of incorporating information on the value of the catch of different species into analyses of targeting behavior.

The WS agreed that such analyses were useful and should be conducted where possible.

Approaches for estimating uncertainty (WP-11)
Dr's Shelton Harley and Simon Hoyle presented the draft WP-11 which described several approaches that could be used to calculate the risk of particular reference points being exceeded. The WS noted that the current approach is based on a single model run (referred to as a base case) for which a likelihood profile is generated for current stock status in relation to the key reference points. This approach incorporates only parameter uncertainty within a single model, and it was noted that there are often plausible alternative models which give different results. Dr Harley indicated that the goal of the research was to come up with an approach which provided a more realistic estimating of the risk, taking into account both parameter uncertainty and structural uncertainty.

The paper considered the following approaches using the model runs undertaken as part of the structural sensitivity analysis:

- Base case model results with uncertainty based on likelihood profiles;
- A full cross grid of 128 point estimates based on all possible combinations of seven key model assumptions tested in the structural sensitivity analysis(each with two options); and
- A subset of the point estimates from the 128 runs based on alternative partially confounded factorial designs (PCFD's).

Due to some refinements with MFCL and time constraints, the following approach was not considered: base case model results with uncertainty based on the normal approximation.

It guiding further work in this area, the WS provided the following comments:

- It is important that all model runs are considered reliable so plausibility/diagnostics criteria be developed that include both goodness of fit statistics as well as biological realism. These will

need to be automated to facilitate examination of multiple statistics over a large number of runs. In using these statistics, the goal will be to ensure that full confidence is had in the individual model runs – the focus should be on inclusion not exclusion;

- In addition to this screening process, approaches should be considered based on goodness of fit and prior probabilities to consider weightings for different model runs;
- When one-change sensitivity model runs are considered, most of the base case model specifications are in each run and therefore overrepresented (if you were to calculate risk based on the results from these set of model runs). Using a full grid should reduce this bias;
- As 'plausible' alternative hypotheses are used rather than model runs designed to sample the 'surface' of the axis of uncertainty, careful consideration is required of how to best describe the resulting distributions of results, i.e. you might be oversampling at the edges and under-sampling the more central parts of the parameter/model space;

With respect to the PCFDs, Dr Hoyle presented the results from some simulations that compared the uncertainty estimated by a full grid compared to various subsets of the 128 model runs based on different PCFD's. The WS noted the finding that the 5th and 95th percentiles of the model quantities of interest were quite well estimated with very reduced PCFD's, e.g. these percentiles were similar to those of the full grid when only eight model runs from the full grid of 128 were selected.

The WS noted the recommended approach outlined in WP-11:

1. Come up with a base case scenario
2. Develop several one-change scenarios – plausible and well worked with likelihood profiles and Hessian's for the key parameter estimates
3. Provide estimates of risk based on point estimates and single and combined likelihood profiles
4. Create a full grid (or PCFD) based on these model runs and try and get a full grid or PCFD of converged runs (confidence in all model results required) – therefore there is a need for good diagnostics to apply to the grid. Then provide estimates of risk based on these point estimates.
5. Consider the relative weightings of the different hypotheses and whether they are independent

With respect to this, the following recommendations were made:

- Include a reasonable range for fixed parameters, e.g. steepness – use 4 values
- Run a full grid for the critical sensitivity analyses (if resources allow)
- Get small factorial design of say 16 models from the grid; calculate the profiles for each – hence, both structural and parameter uncertainty is estimated for a representative range of models.

MSY versus projections for evaluating management options (discussion)

In 2008 two approaches had been used to estimate the impacts of various management options: 1) Yield-based calculations that involved modifying fishing mortality patterns based on interpretations of outcomes of a management measure; and 2) effort based projections. It was noted that there were several reasons why the outcomes may be different, e.g. assumptions about future recruitment, integration of regional structure (in projections), and slightly different assumptions regarding catchability.

While there are advantages to using the yield-based approach (e.g. consistency with the approach used to estimate stock status), the WS recognized that neither this approach or constant effort projections would be sufficient to mimic the complex bigeye and yellowfin tuna conservation and management measure (CMM2008-01) which has a mixture of catch and effort limits.

It was stressed that given the uncertainty (and variability) in recruitment and short life spans of these fish, projections should only ever be seen as indicative or 'on average' in their predictions.

SPC indicated that the MFCL consultant was currently implementing the capability to undertake projections with catch for some fisheries and effort for others and that this feature should be available for the analysis of CMM2008-01 prior to SC-5[2].

The WS noted that SPC should give further consideration to the relative merits of yield and projection based approaches in their work leading up to SC-5.

Other matters

The meeting took advantage of the availability of several SPC scientists to get updates on other work in progress.

Purse seine catch species composition (WP-12)

Mr. Tim Lawson presented the draft paper WP-12 which described recent experimental work undertaken to help improve the estimates of the species composition of purse seine catches estimated by observers. The WS was reminded of Mr. Lawson's paper to SC-4 which outlined several sources of bias that could impact on both at-sea observer sampling and shore-based port sampling. One of the key conclusions of this work is that it is better to sample the catch at the time of capture so as to maximize the information associated with the sample and minimize the potential for sorting / mixing of the catch.

The WS noted that trials where paired grab and spill samples were taken from the same sets had been undertaken in PNG. This work in PNG is continuing and being supplemented with work aboard New Zealand purse seine vessels. In the case of the NZ vessels it might be possible to get three types of samples from the same set: grab, spill, and port sampling.

Early results to date indicate a size selectivity bias with smaller fish more prevalent in the spill samples than the grad samples. This results in increased estimates of the catches of juvenile bigeye and yellowfin.

Some WS participants noted the given the preliminary nature of this work, and that there is likely to be several factors leading to grab sampling bias, that it would be premature to attempt to correct the historical grab sampling data based on the limited PNG data currently available.

Noting this, it was recognized that there is little doubt that the current estimates of juvenile BET/YFT are far too low and that this uncertainty must be accounted for in the assessment. Dr Lawson presented alternative catch histories based on: 1) corrections based on the estimated grab sample bias, and 2)

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[2] This was completed in mid-April, shortly after the workshop.

corrections based on US Pago Pago port sampling. For bigeye tuna both alternatives provided catch histories for BET over double the estimates based on grab samples.

Dr Fonteneau indicated that a joint IOTC/ICCAT workshop on sampling purse seine catches would be occurring later in the year and encouraged SPC to attend and present it research.

The WS strongly supported future work of this type, in particular the application to other fleets and regions.

Indonesia / Philippine catches (presentation)

Mr. Peter Williams provided a presentation outlining the current state of knowledge with respect to tuna fishery data for Indonesia and the Philippines.

Philippines

The WS noted that there are several fisheries in PH which target both large and small tunas (e.g. there are two PH handline fisheries: large fish (night fishing targeting large fish YFT)and small-scale hook-line fishery - small fish (surface HL, troll, day fishing)). The splitting of overall catches into these various categories is difficult. A major change in recent PH YFT catch weights was due to a reduction in the catch estimate for large-fish handline fishery. This relates to the period prior to 1997 which was when a new catch reporting scheme began. Before this time there is insufficient data to separate the various fisheries. Such uncertainty needs to be incorporated into the stock assessment.

The WS noted that it would be good if SPC could attempt to make historical corrections to the PH catch time series to avoid this abrupt shift.

Indonesia

The WS noted that the current assessment data used for ID starts in 1970 – SPC indicated that further investigations would be made into the availability of any earlier data.

The WS noted that some operational level data had been located, but most of it was for the Indian Ocean rather than the Pacific Ocean, and that available size data comes mostly from tagging programmes and is unlikely to be representative of the catch.

The WS indicated that any support that could be provided to ID to obtain logbook data to WCPFC provides standards would be useful (noting that ID are not yet WCPFC members). SPC noted that they are currently involved in such work.

Conclusions

The WS noted that the 2008 BET assessment bounded the ID/PH catch by +-50%, and a similar strategy would be used for this year's assessments in addition to consideration of how best to spilt the PH catches among the large and small fish fisheries.

Dr Fonteneau indicated that a 1980's report by "Schticher" (???spelling) – may have substantial information on catch.

Incorporation of tagging data

Dr Simon Nicol provided a brief update on recent and 2009 planned activities as part of the PTTP. Two three month cruises were planned for the western Pacific and additional tagging was planned for the central Pacific.

Dr Simon Hoyle presented an analysis of the various factors affecting tag reporting rates, e.g. tagger effects and fish condition. The WS noted that incorporation of this type of information was critical to the analysis of tag recapture data to ensure that initial mortality / tag shedding was correctly accounted for. It was expected that this type of analysis would be used to pre-process data before it was incorporated into the MFCL assessments.

The WS noted the intention to include the recent tagging data into the 2010 assessments.

Movement plots (presentation)

Dr Pierre Kleiber presented the results of a modelling study to investigate how tagging data affect the estimates of age-specific movement between regions. The one-change sensitivity analyses used in the YFT SSA were rerun excluding the tagging data. A similar pattern was found in the specific movement estimates by region, age and season were very consistent among runs that included the tagging data, but different and relatively uninformative results were obtained without the tagging data (included situations where "sinks" were obtained. The preliminary conclusions were that the tagging data must be informative, and the LF data must be reasonably consistent with the tagging data.

Japanese survey work

Dr Naozumi Miyabe described some upcoming purse seiner survey work aimed and determining ways to reduce the catch of small BET. The study is planned for July-August 2009. Dr Miyabe outlined the research survey that includes a trial of a large mesh net on-board a commercial Purse seiner. Will take place in the high-seas pocket between PNG-FSM. They propose to fish on drifting FADs with already associated schools. The following activities / monitoring would be undertaken:

- Survey during the purse seine operation: ID pingers, quantitative echo sounder
- School behaviour around FADs
- School behaviour in response to stimulus
- School behaviour inside the net
- Catch composition

Workshop conclusions

The WS noted that SPC and other WS participants have presented some preliminary work at the workshop and this should not be cited or distributed further without permission from the researchers. With respect to the SPC research, it is intended that the papers will be further developed based on the discussions at the WS and submitted to SC-5 as either WP's or IP's. SPC noted its gratitude for the work undertaken by the researchers from Taiwanese, and hoped that it would be possible to collaborate to further this work for inclusion in the assessments for SC-5.

Dr Harley indicated that the proceedings from this WS would be compiled and circulated to participants as soon as it could be completed (noting that he would be going to sea for three weeks). The expectation would be that the final version would be submitted to SC-5 as an IP.

Finally, Dr John Hampton thanked all participants for a very constructive and busy week and looked forward to meeting again at SC-5 for further constructive and fruitful discussions.

List of participants

Participant	Affiliation
Alain Fonteneau	IRD, France
Adam Langley	SPC consultant, New Zealand
Eric Chang	National Sun Yat-Sen University, Taiwan
Shyh-Bin Wang	National Taiwan Ocean University, Taiwan
Pierre Kleiber	NMFS, United States of America
SungKwon Soh	WCPFC, Federated States of Micronesia
Naozumi Miyabe	NRIFSF, Japan
Hiroaki Okamoto	NRIFSF, Japan
Dale Kolody	CSIRO, Australia
Samasoni Sauni	FFA, Solomon Islands
John Hampton	SPC, New Caledonia
Shelton Harley	SPC, New Caledonia
Simon Hoyle	SPC, New Caledonia
Simon Nicol	SPC, New Caledonia
Nick Davies	SPC, New Caledonia
Ashley Williams	SPC, New Caledonia
Jesus Jurado-Molina	SPC, New Caledonia
Karine Briand	SPC, New Caledonia
Fabrice Bouyé	SPC, New Caledonia
Mike Batty	SPC, New Caledonia

Agenda

Monday, 6th April	
Morning (0830-1200)	**Introduction** • Welcome and Introductions • Discussion of anticipated outcomes from the meeting **Stock assessment methods** • Recent MFCL developments (WP-1) • Length-based selectivity (WP-1)
Afternoon (1300-1630)	**South Pacific Albacore** • Review of 2008 assessment (WP-2) • Standardised CPUE analysis (WP-3) • Trends in the size composition of LL catches (WP-4)
Tuesday	
Morning (0830-1200)	**South Pacific Albacore** • Structural sensitivity analysis (WP-5) • Discussion of approach for SC-5 assessment (WP-5b) • Pacific-wide developments **Yellowfin tuna** • Review of 2007 assessment (WP-6)
Afternoon (1300-1630)	**Yellowfin tuna** • Revised biological parameters (WP-7) • Standardised CPUE analysis ( ) • SS3 assessment ( ) • Structural sensitivity analysis (WP-9)
Wednesday	
Morning (0830-1200)	**Yellowfin tuna** • Discussion of approach for SC-5 assessment **Stock assessment methods** • Approaches for presenting uncertainty (WP-11)
Afternoon (1300-1630)	**Stock assessment methods** • MSY versus projections for evaluating management options ( )
Thursday	
Morning (0830-1200)	**Other issues (will select from below: time dependent)** • Purse seine catch composition (WP-12) • Indonesia / Philippine catch estimates • Analysis of tagging data
Afternoon (1300-1630)	**Other issues ......** • Bigeye tuna plans for 2009

List of documents

Working paper	"rough title"
WP-1	Recent MFCL developments
WP-2	2008 South Pacific albacore assessment
WP-3	Standardised CPUE for South Pacific albacore
WP-4	Examination of trends in size data for South Pacific albacore
WP-5	Structural sensitivity analysis for South Pacific albacore
WP-5b	Proposed approach for the 2009 South Pacific albacore assessment
WP-6	2007 yellowfin tuna assessment
WP-7	Revised biological parameters for yellowfin tuna
WP-8	-
WP-9	Structural sensitivity analysis for yellowfin tuna
WP-10	-
WP-11	Methods for describing uncertainty
WP-12	Purse seine species composition