The Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean

Scientific Committee
Fourth Regular Session

Port Moresby, Papua New Guinea
11-22 August 2008

PROVISIONAL AGENDA FOR THE STOCK ASSESSMENT SPECIALIST WORKING GROUP

SC4-2008-SA-SWG-01

1. Opening of the meeting

2. Selection of rapporteurs

3. Adoption of agenda

4. Stock Assessment

4.1. Bigeye Assessment

SA WP−1: General structural sensitivity analysis for the bigeye tuna stock assessment
By Simon Hoyle, Adam Langley, and John Hampton (SPC)

Discussion and Conclusions

4.2. South Pacific Albacore Assessment

SA WP−2: Stock assessment of Albacore tuna in the south Pacific Ocean
By Simon Hoyle, Adam Langley, and John Hampton (SPC)

Discussion and Conclusions

4.3. South-West Pacific Swordfish Assessment

SA WP−3: A Multifan-CL Stock Assessment of Southern Western-Central Pacific Swordfish 1952-2007.
By Dale Kolody (CSIRO) Robert Campbell (CSIRO) and Nick Davies (SPC)

SA WP−4: CASAL Stock Assessment for South-West-Central Pacific Broadbill Swordfish 1952-2007. By Nick Davies (SPC/NIWA), R. Bian (NIWA), Dale Kolody (CSIRO) and Rob Campbell (CSIRO).

SA WP−5. Standardized catch rates in biomass for the south central and western Pacific swordfish (*Xiphias gladius*) from the Spanish longline fleet for the period 2004-2006. By J. Mejuto, B. García-Cortés, & A. Ramos-Cartelle. Instituto Español de Oceanografía. Spain

Discussion and Conclusions

SA IP−1: Report of the Southern WCPO Swordfish Assessment Workshop
By Anonymous

SA IP−2: Spatial structure in South Pacific Swordfish Stocks and Assessment Models.

SA IP−3: Data summary pertaining to the catch of swordfish by longline fleets operating in the southern WCPO.
By Campbell, R. 2008.

SA IP−4: Swordfish CPUE trends across the southern WCPO.
By Robert Campbell, M. Unwin, N. Davies and N. Miyabe. 2008.

Discussion and Conclusions

5. Responses to the Commission's Requests

5.1. Provide analysis on management options related with FAD closure.

5.2. Provide advice and recommendations that will support the development of the CMM, inter alia, consideration of the status of stocks, and the potential for technological solutions to minimize the impact of fishing gear for juvenile yellowfin and bigeye tuna while minimizing the loss of catch on skipjack.

6. Research Planning

6.1 Short- and Medium Term Research Plan

6.2 Detailed operational research plan for 2007/08 with budget

6.3 Work programme for 2009-2010 with indicative budget

7. Administrative matters

7.1 Terms of Reference

7.2 Other matters

8. Adoption of Report (including a one-page summary)

9. Close of the meeting

ABSTRACTS

WP−1) General structural sensitivity analysis for the bigeye tuna stock assessment

Simon Hoyle, Adam Langley, and John Hampton (SPC)

Many sources of uncertainty affect the results of stock assessment models. It is important to examine their influence, and to consider overall assessment results in the light of this uncertainty. Interactions among sources of uncertainty can be important. Integrating the uncertainties into the assessment, using multiple combinations of structural uncertainties, has advantages over the standard approach of using a base case and sensitivity runs. We examined the influence of 12 sources of structural uncertainty, using 2 options for each source (factor). Factors examined were: steepness of the SRR, mean natural mortality (M), juvenile M, effort deviate penalties, mixing rate, spawning biomass relationship, grouping of longline (LL) selectivities for CH & TW fisheries, iterative reweighting, catchability deviate flexibility, trend in catchability, inclusion of CH/TW LL size frequency data, and initial conditions. One problem with this approach is that each run of the bigeye model takes approximately 16 hours, and a full factorial design involves 2^12 = 4096 runs of the model. We dealt with this in two ways: first, an experimental design known as a partially confounded factorial design allowed us to reduce the number of runs from 4096 to 128. Secondly, with a parallel computing system (Condor) we shared the load across up to 16 computers, reducing the overall runtime from 85 to 6 days. Results, and their implications for the stock assessment, are presented.

WP−2) Stock assessment of Albacore tuna in the south Pacific Ocean

Simon Hoyle, Adam Langley, and John Hampton (SPC)

The 2006 south Pacific albacore stock assessment is updated to include more recent data. Structural changes are made to reflect recommendations documented in related working and information papers. Conclusions and recommendations are presented.

WP−3) A Multifan-CL Stock Assessment of Southern Western-Central Pacific Swordfish 1952-2007

Dale Kolody [1],Robert Campbell[2], Nick Davies [3]

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This paper describes a stock assessment for broadbill swordfish (Xiphias gladius) in the Southern region of the WCPFC convention area (0-50○S; 140○E -130○W) for the period 1952-2007 (including constant catch projections to 2017), that was conducted in line with the guidance provided by the South Pacific swordfish assessment workshop at the SPC in April 2008. There was a two-tiered approach to the assessment. The SW Pacific (SWP, 140○E-175○W) was given the highest priority as in the 2006 assessment, because the evidence strongly suggests that this stock unit has experienced a population decline due to fishing, and there is reasonable quality data with which to support a comprehensive stock assessment. We attempted to extend the stock assessment into the South-Central Pacific (SCP 175○W-130○W) region this year, in relation to the advice requested by the WCPFC in relation to Conservation and Management Measure 06-3. However, the extended region did not yield a convincing assessment because: i) there is limited size composition data available for the SCP, ii) there is limited operational level data available with which to conduct catch rate standardization, iii) the CPUE data that are available suggest that the SCP stock has been stable or increasing over the last 10-20 years (which may reflect abundance or targeting changes), and iv) the SCP population may be more closely linked with the South-Eastern (and/or North-Central) Pacific than the South-West Pacific. There was a considerable effort to quantify the stock status in relation to both the model selection uncertainty (sensitivity to assumptions) and the parameter estimation uncertainty.

We note that parallel assessment work was conducted using a different modeling framework (CASAL), and a separate paper has been submitted to describe this work (Davies et al). However, we expect that the two papers will be presented together, along with a synthesis of key results.

WP−4) CASAL Stock Assessment for South-West-Central Pacific Broadbill Swordfish 1952-2007

Nick Davies [1, 2], Richard Bian [1], Dale Kolody [3], Robert Campbell [4]

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A CASAL stock assessment of south-west Pacific swordfish was undertaken in 2006 and presented to WCPFC-SC 3. The consideration of model uncertainty was incomplete, in particular that relating to spatial processes. Under WCPFC-CMM 06-3, an updated assessment was requested for presentation

in 2008 that incorporates new tagging information to address spatial uncertainty, and extends the model domain to include the south-central Pacific Ocean. The assessment presented here updates the 2006 model, with substantial changes to structural assumptions for spatial disaggregation, movement, and fishery definitions. Two of the four model areas defined encompass the same domain assumed for the 2006 assessment. Areas 3 and 4 extend this domain eastwards to include the south-central Pacific. Models were developed under three alternative spatial options for area combinations:

1. areas 1 and 2
2. areas 3 and 4, and,
3. areas 1 to 4.

Option 3 produced implausible results due to data conflicts between western and eastern parts of the domain. Separate assessments are presented therefore for the western (option 1) and eastern (option 2) areas of the south Pacific swordfish stock. Structural and statistical uncertainty was estimated using a grid design for factors including: stock-recruitment steepness, growth, mortality, maturity, migration, and relative weight of catch-at-size and CPUE data. From a large number of models (384) a plausible set was chosen following the approach of Kolody et al. (2006), and performance indicators calculated. This assessment draws strongly from the advice from an Open Workshop held in April 2008 and supports a parallel assessment using Multifan-CL (Kolody et al. 2008). These assessments will be presented in a combined presentation to the Scientific Committee 4.

WP−5) Standardized catch rates in biomass for the south central and western Pacific swordfish (*Xiphias gladius*) from the Spanish longline fleet for the period 2004-2006.

J. Mejuto, B. García-Cortés, & A. Ramos-Cartelle. Instituto Español de Oceanografía. Spain

Standardized catch rates in weight were obtained using General Linear Modeling (GLM) from sets carried out by the Spanish surface longline fleet targeting swordfish in the South central and South western Pacific areas during the 2004-2006 period. Year, quarter, area, ratio between swordfish and blue shark species and gear were used for modeling. The model tested explained 75% of CPUE variability. As in the case of the Atlantic, most of the CPUE variability was attributed to the ratio between the two species and secondly, to the gear factor. Other significant, although less important factors were quarter and area and the interaction between the two, while the year was considered the least important of all the factors examined during this period. The time period covered is too short to be able to lead to any conclusions on the standardized CPUE trend, but the results suggest that activity was stable during the Spanish fleet's initial period of operation

in these regions.

IP−1) Report of the Southern WCPO Swordfish Assessment Workshop

Anon.

The Southern WCPO Swordfish Assessment Workshop was held at the Secretariat for the Pacific Community (SPC), Noumea, New Caledonia, April 16−18, 2008. The primary objectives of the meeting were to provide a technical review of data, analyses and stock assessment modelling assumptions underpinning the stock assessment of broadbill swordfish in the southern WCPO which is being undertaken by CSIRO (Australia) and NIWA (New Zealand) scientists during 2008. The report includes a summary of available fisheries data, relevant biological research, discussion of modelling assumptions and an agreed workplan for the assessment.

IP−2) Spatial structure in South Pacific Swordfish Stocks and Assessment Models

Dale Kolody and Nick Davies

This paper reviews the evidence used to define the spatial structure of the South-West Pacific swordfish stock assessment in 2006 (and reviews the arguments used in other swordfish fisheries), and proposes a new structure for the 2008 assessment. The 2006 spatial structure was based on observations from larval distributions, genetic connectivity studies, and fishery characteristics, including distributions and seasonal patterns in catch, CPUE, and size composition. Additional data has since been collected from PSAT tags deployed in Australia and New Zealand. The proposed new spatial structure is revised in relation to 1) the movements of individual fish observed from tagging, 2) the WCPFC request to encompass the broader South Pacific convention area in the assessment, and 3) simplification of the latitudinal structure used in 2006.