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SPC-OFP response to the CIE review of the 2009 yellowfin tuna assessment

WCPFC-SC7-2011/IP-05

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Secretariat of the Pacific Community - Oceanic Fisheries Programme

Summary

During 2010 the US contracted two independent reviews of the 2009 yellowfin tuna stock assessment undertaken by SPC-OFP. This report outlines the response of SPC-OFP to the contents of those reviews. For the most part, the recommendations in the reviews relate to improved data collection and rather than the stock assessment methods used. For future CIE reviews, we recommend that SPC-OFP be consulted over the list of documents to be provided to the reviews to ensure that they have access to all necessary material.

Background

The US routinely obtains independent reviews of stock assessments relating to fisheries that they are involved – both domestically and internationally. One way that these reviews are conducted is via the Center for Independent Experts² (CIE). The CIE contracts fisheries stock assessment experts worldwide to participate in the reviews. During 2010 the US contracted two independent reviews of the 2009 yellowfin tuna stock assessment undertaken by SPC-OFP (Langley et al. 2009). The reviews were undertaken by Dr's Malcolm Haddon (Australia) and Jean-Jacques Maguire (Canada). The reviews were undertaken 'desktop-style', in which the reviewers are provided with the stock assessment documents and selected background materials.

SPC-OFP were not aware that the reviews were occurring and were not contacted by either CIE or any of the reviewers. While this independence is important, it appears that the reviewers were not provided access to all the necessary background documents for the review. This is reflected in some of the reviewer's comments.

In the remainder of this report we summarize the reviewer's comments under each of the terms of reference (ToRs) that were assigned to them by the CIE and then the SPC-OFP response. We include only those comments that require a response from SPC-OFP – not those that do not, e.g. any that suggest that current approaches are sufficient etc. Not all ToRs resulted in specific comments of recommendations. The review of Maguire was harder to follow than that of Haddon so it is possible that we may have missed or miss-interpreted some of his comments.

² <u>http://www.ciereviews.org/</u>

Review comments and responses

1. Comment on the adequacy and appropriateness of data sources for stock assessment.				
н	There would be value in reviewing the	Research plans for further examination of longline CPUE		
	various data series, as has been done	and size frequency data were discussed at the Pre-		
	for the purse seine fishery catches, to	assessment workshop. Work, for example, in terms of		
	increase confidence that all that can be	fisheries definitions is ongoing.		
	one has been done.			
н	Initiatives aimed at improving the detail	Many DWFN WCPFC members have still not yet		
	and resolution of data as it is currently	overcome their domestic constraints for operational		
	collected should be pursued.	data provision. Some collaborative arrangement for joint		
		research exist, but are not ideal due to travel costs and		
		the short time periods to complete analyses. This is is		
		outside the control of SPC-OFP.		
М	It is difficult to evaluate their (catch,	SPC-OFP notes that the stock assessment data files are		
	effort, and size data) relevance /	publically available		
	usefulness / reliability as the basic data	(<u>http://www.spc.int/oceanfish/en/ofpsection/sam/sam</u>),		
	are not presented in a way that is	as is a MFCL viewer (from the MFCL website		
	amenable to evaluation. Show in the	http://www.multifan-cl.org/) to examine data inputs		
	first few tables total catch by year and	and results. So many of the outputs and inputs are		
	area, by gear, by country, etc.	already available to interested parties. Further, a set of		
		R-functions are also available for interrogating the data		
M	The most important results (yearly	and output objects to extract quantities of interest		
	estimates by age of population	(<u>http://code.google.com/p/r4mfcl/</u>).		
	numbers, fishing mortality, and			
	biomass) are normally also provided in	The PAW recommended not increasing the length of the		
	a tabular form, not only in figures.	assessment reports to address these comments, but		
	It would also be useful to snow the	reinforced the current approaches for dissemination of		
	actual length / weight frequencies by	model results. It did recommend that production of		
	year for each fishery.	extention for those who were upphie to use P		
NA	There appear to remain important	Posoarch is angoing to reduce uncortainty in purso soing		
	uncertainties however about the most	(through the spill sample trials) and Indonesia (
	basis of those data catch. This should	Chilipping domostic catch estimates (GEE M/DEA		
	busic of these duta - cutch. This should be rectified	project)		
м	What was the basis for the exclusion of	This was described in detail in both the 2007 and 2009		
1.11	key size data from the assessment	VET assessments – it relates to ensuring that the		
	(WPCEC SC5 2009 paragraph 39	length/weight samples are coming from the same areas		
	attachment L)	as the bulk of the catches.		
м	Should nominal effort levels be used in	This assumption is no longer required in MULTIFAN-CL –		
	situations where only catch data are	either catch or effort can be set to missing as required.		
	available?	but we do need to have some effort information if		
		future projections of other than catch are required.		
М	How are quarterly length frequencies	These data are submitted by DWFN's to the Commission		
	derived for the principal lonaline	so SPC-OFP are not able to comment.		
	fisheries?			

2. Review the assessment methods: determine if they are reliable, properly applied, and adequate and appropriate for the species, fisheries, and available data.

M	It would be useful to ground truth the	SPC-OFP would be happy to collaborate with interested
	results with simpler methods, e.g.	parties wishing to use MULTIFAN-CL inputs (or outputs)
	production models, or simple tests like	to run alternative models. But, we note that some of the
	plotting total catch versus an index of	assumptions of these simpler approaches are likely to be
	total effort (if one can be calculated).	seriously compromised. Further there are some
		potential philosophical questions around using the
	" estimate of total catch at age and	outputs from one assessment as inputs for another as a
	use it in a VPA to back-calculate	method to test the first.
	historical population and mortality	
	estimates it would provide an easy	
	ground-truthing of the absolute	
	estimates of stock size and stock size	
	trends."	
3. I	Evaluate the assessment model configu	ration, assumptions, and input data and parameters
(fish	nery, life history, and spawner recruit re	lationships): determine if data are properly used, input
par	ameters seem reasonable, models are	appropriately configured, assumptions are reasonably
sati	sfied, and primary sources of uncertainty of	accounted for.
Н	The assessment exhibited weaknesses	Growth estimation is an important area of development
	with respect to how growth is	in the assessment. The estimation of age composition of
	estimated this is a significant	catches (through direct ageing) will be important to
	problem that needs attention.	reducing any uncertainty. Other scope for analysis
		include the tagging data and fine scale analysis of modal
		progression in surface fisheries. In terms of MULTIFAN-
		CL development – progress to develop a two-sex model
		will also allow greater scope for growth estimation.
		The proposed research plan for size data was presented
		to the PAW and includes relevant activities
Ц	The new method of calculating	SPC OED can only assume that the reviewer was not
П	reproductive potential appears to be a	made aware of the detailed SC papers on this topic
	marked improvement : however this	Three papers have been written on this new approach
	is an area that also needs further	for SP ALB RET and VET. The most thorough sensitivity
	exploration and its implications for the	analyses were described in the BET namer (SCA_ME_WD-
	model outcomes particularly in	
	nerformance measures involving	01).
	snawnina hiomass	
М	The influence of using a growth curve in	This is planned under the size research plan presented to
	agreement with the tagging results	the PAW
	should be investigated.	
М	Knowledge may exist however to	MULTIFAN-CL is currently under development to allow
	crudely estimate different miarations by	the assignment of priors to the movement parameters
	age / size outside the modelling	to allow more flexible estimation
	framework which would be an	
	improvement over the current	
	assumptions.	

Μ	The reason for the changes [to	See previous response		
	explained more fully and the effect on			
	the stock recruitment relationship or on			
	CR trands should be discussed			
	SSB trends should be discussed.	This is included in the CDUE was such also discussed at		
IVI	Further investigation of possible	This is included in the CPUE research plan discussed at		
	changes in catchability should look at	the PAW, but with respect to longline this is currently		
	the fishing practices and methods over	hampered by the lack of operational catch and effort		
	time to identify major events.	data for many important fleets and the very low levels of		
	Catchability may in fact change in a	observer coverage. Hopefully the 5% levels of longline		
	stepped manner from time to time	observer coverage agreed by WCPFC will allow for more		
	rather than being a continuous process.	information in the future.		
4. E	valuate the adequacy of the sensitivity o	nalyses in regard to completeness and incorporation of		
resu	ılts.			
5. C	omment on the proposed population ben	chmarks and management parameters (e.g., MSY, Fmsy,		
Bms	sy, MSST, MFMT); if necessary, recommer	nded values for alternative management benchmarks (or		
арр	ropriate proxies) and clear statements of	stock status.		
Н	It appears that decisions still need to be	The Commission and its SC are embarking on a process		
	made over what performance measures	to determine appropriate target and limit reference		
	to use as a summary of stock status and	points. The former will require considerable input from		
	to provide management advice.	managers.		
Н	If a decision has to be made about	This is mostly covered in the terms of reference for the		
	which measures to adopt or to move to,	reference point work. The use of this in formal		
	then it is recommended that the	retrospective analyses will be considered, but time		
	management decisions that might	constraints may be a problem in 2011 as the WCPFC		
	derive from using the alternatives be	requested that the 2011 assessment be used for		
	considered retrospectively for a number	projection analysis for SC7.		
	of vears so that an informed decision			
	can be made that can be gareed to by			
	all members of the WCPFC.			
м	While there is no objective basis to	SPC-OFP does not agree that there is no objective basis		
	choose a value for steepness within that	to choose a single value of steepness. Incorporation of		
	range using a hockey-stick approach	"Hockey-stick / broken-stick" curve for snawner		
	rather than a B&H relationship might	recruitment relationships may be considered for		
	prove a pragmatic solution to this	inclusion in MULTIEAN-CL. The implications of this		
	dilamma	functional form for reference point estimation will be		
	unemmu.	important consideration		
N.4	Pathor than he based on MSV	The key stack status advice provided by the SC to the		
IVI	actimator management advice sould	Commission is tunically in terms of hismass and fishing		
	estimates, management advice could	commission is typically in terms of biomass and jisting		
	set bused on surplus production	Nevertheless if recourses allow SDC OFD and the		
	estimates.	ivevertheless, if resources allow SPC-OFP can provide		
		estimates of annual surplus production for the three		
		tropical tuna assessments in 2011.		
b. Evaluate the adequacy, appropriateness, and application of the methods used to project future				
population status.				
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7. Suggest research priorities to improve our understanding of essential population and fishery dynamics necessary to formulate best management practices.

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н	Of immediate value and concern is the	SPC-OFP has little present scope for validating historical
	consideration of the integrity and	longline catches, but catch estimates from purse seine
	accuracy of the various catch series.	and the fisheries of Indonesia and the Philippines are
		currently under evaluation.
н	Methods used to standardize the	A key component of the SC research plan
	longline catch rate data and the	
	relationship between longline catch	
	rates and yellowfin tuna abundance	
н	Work is needed to characterize the	Discussed under the "model configuration"
	growth of the younger age classes	
	across the regions and the means for	
	including that in the assessment.	
М	Reliable estimates of total catch,	Agree
	increased sampling of the most	
	important gear and areas, and well –	
	designed large scale tagging program	
	to better define stock structure and	
	understand migration pattern.	

Conclusions

SPC-OFP also noted the following comments Dr Malcolm Haddon:

"The authors of the 2009 assessment have made a real effort to pre-empt critical review by including diagnostics and their own critical review of the strengths and weaknesses of the assessment. They identified where the data were weakest, where the model fits were poorest, and which assumptions and structural decisions were most influential. With this list in mind they were also able to include a list of the most valuable future research and extra data gathering that could be conducted to improve the assessment. This is an excellent assessment that provides a fine example of how to present a complex assessment to a wide audience.

The data sources for the assessment were appropriate and, although there can always be more data at a better resolution and with more detail, it proved adequate to provide an assessment that can be used to assess the status of the yellowfin stock in the western and central Pacific Ocean."

And comments from Dr Jean-Jacques Maguire

"Having been developed specifically for tuna species in the Pacific Ocean, the assessment method is clearly adequate and appropriate for yellowfin tuna and the fisheries exploiting it, and it is well suited to the data available for this assessment. The method seems to have been properly applied. The results can be assumed to be reasonably reliable, but relatively large changes in important fisheries management parameters in successive assessments suggest that the results should be used with care. All model assumptions seem reasonable, but it is also clear that none of the assumptions is fully satisfied. Similarly, the data seemed to have been properly used, but data are variable and seem relatively scarce. The fact that all model runs presented show more or less the same trends may give a false sense of security. Exploring what changes would be required to produce radically different results might give a sense of the robustness of the results.

The sensitivity analyses of the base case adequately cover the range of possibilities of the model used.

The determination that yellowfin tuna in the Western and Central Pacific is not overfished and that overfishing is not occurring is consistent with the data and seems reasonable, in a relative sense, based on the analyses and sensitivities. This does not mean, however, that the absolute values of BMSY, SSBMSY, and FMSY are estimated precisely."

References

- Langley, A., Harley, S., Hoyle, S., Davies, N., Hampton, J. and Kleiber, P. 2009. Stock assessment of yellowfin tuna in the western and central Pacific Ocean. WCPFC-SC5-2009/SA-WP-03.
- SPC-OFP. 2011. Report from the SPC pre-assessment workshop, Noumea, April 2011. WCPFC-SC7-2009/SA-IP-01.