International Consultations on the Establishment of the

South Pacific Regional Fisheries Management Organisation

1st Preparatory Conference

SCIENCE WORKING GROUP

JACK MACKEREL STOCK ASSESSMENT PROGRESS

Auckland, New Zealand, 19-23 July 2010



Jack Mackerel Assessment Process up to 2009

- JM Stock Structure Workshop held in Santiago, Chile, from 30 Jun – 4 Jul 2008.
- JM Assessment Methods Workshop held in Lima, Peru from 4 – 8 May 2009.
- An Assessment Simulation Task Team (ASTT) established under the Chairmanship of Dr Ad Corten.
- Stock status advice provided by SWG 8 based on a review of fishery indicators in Nov 2009.
- Preparation of simulated jack mackerel data sets by Dr James Ianelli of the NOAA Alaska Fisheries Science Centre. to be used in evaluation of performance of alternative stock assessment models.

Assessment Simulation Task Team Workshop

The ASTT workshop was hosted by Peru at IMARPE in Lima from 6 – 9 April 2010.

- To review results of jack mackerel assessment trials using simulated data; and
- To select preferred assessment methodologies and approaches for jack mackerel assessments to be conducted in 2010 using real data.

ASTT workshop report available on the SPRFMO website.

Assessment Simulation Task Team Workshop

Results were compared from five stock assessment methods:

- Reference Model: Statistical Catch-at-Age (SCA) model used for a number of Alaskan stocks (similar to the model used to generate simulated data).
- SCA model specifically designed for JM assessments and similar to that used in recent Chilean assessments.
- Integrated Catch Analysis (ICA): An extension of VPA, where recent years are fitted by a separable model.
- Triple Separable VPA (TISVPA) model: Similar to ICA, incorporating a robust penalty function for tuning.
- 'Evolutionary' model used for assessment of Peruvian anchovy stocks, incorporating size-based dynamics for selectivity and M.

ASTT Results: Spawning Stock Biomass Ratios

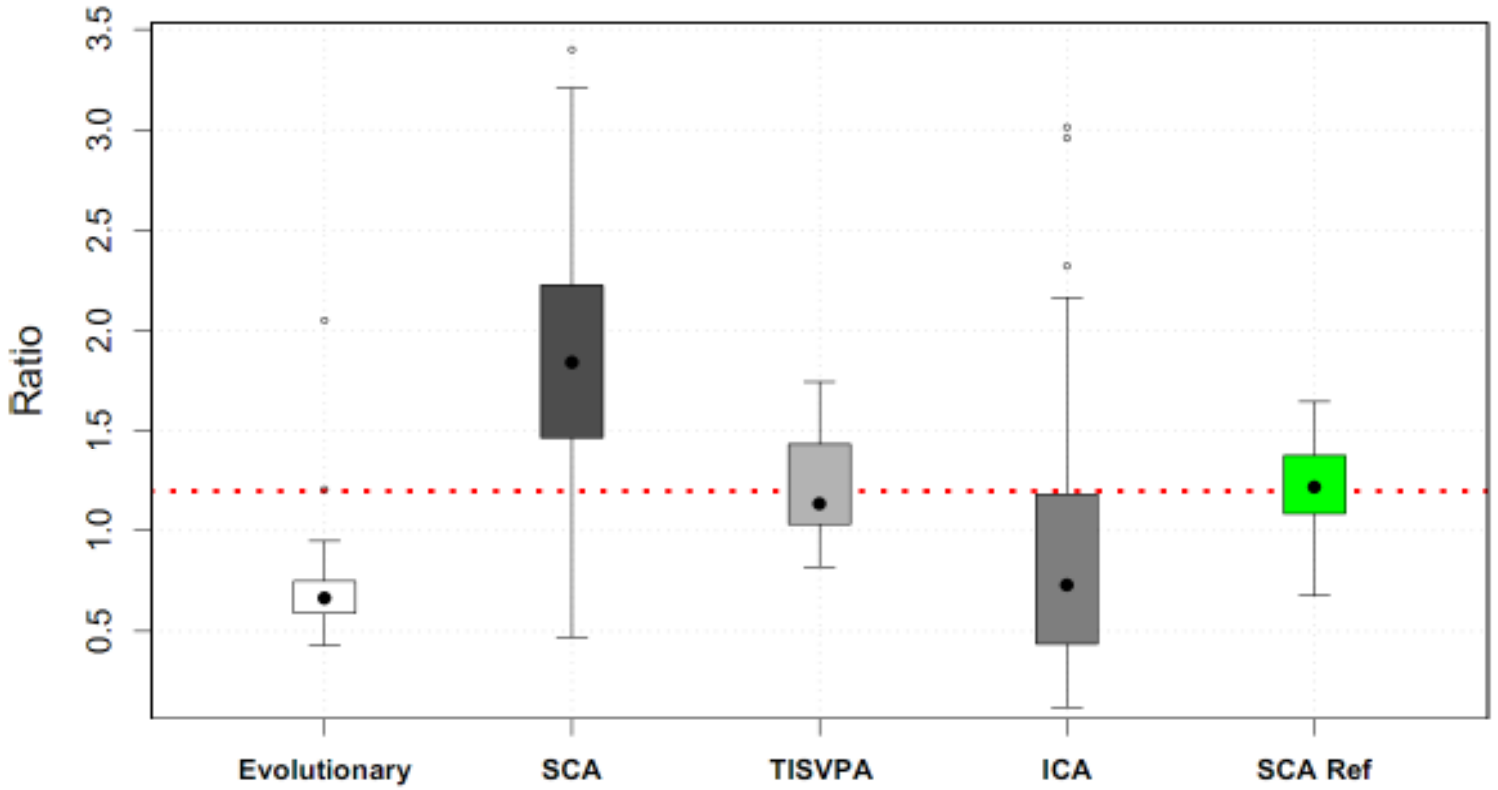

Figure 7. Recent trend in spawning stock size computed as the ratio of 2007 over 2000 relative to the true underlying population value (horizontal line). The first and third quantile of each dataset are represented by the shaded boxes, while minimum and maximum observations, not being outliers, are represented by the dotted vertical lines. Outlying results (more than 1.5 times the interquantile distance away from the 1st or 3rd quantile) are represented by open circles.

ASTT Results: 2007 Spawning Stock Biomass

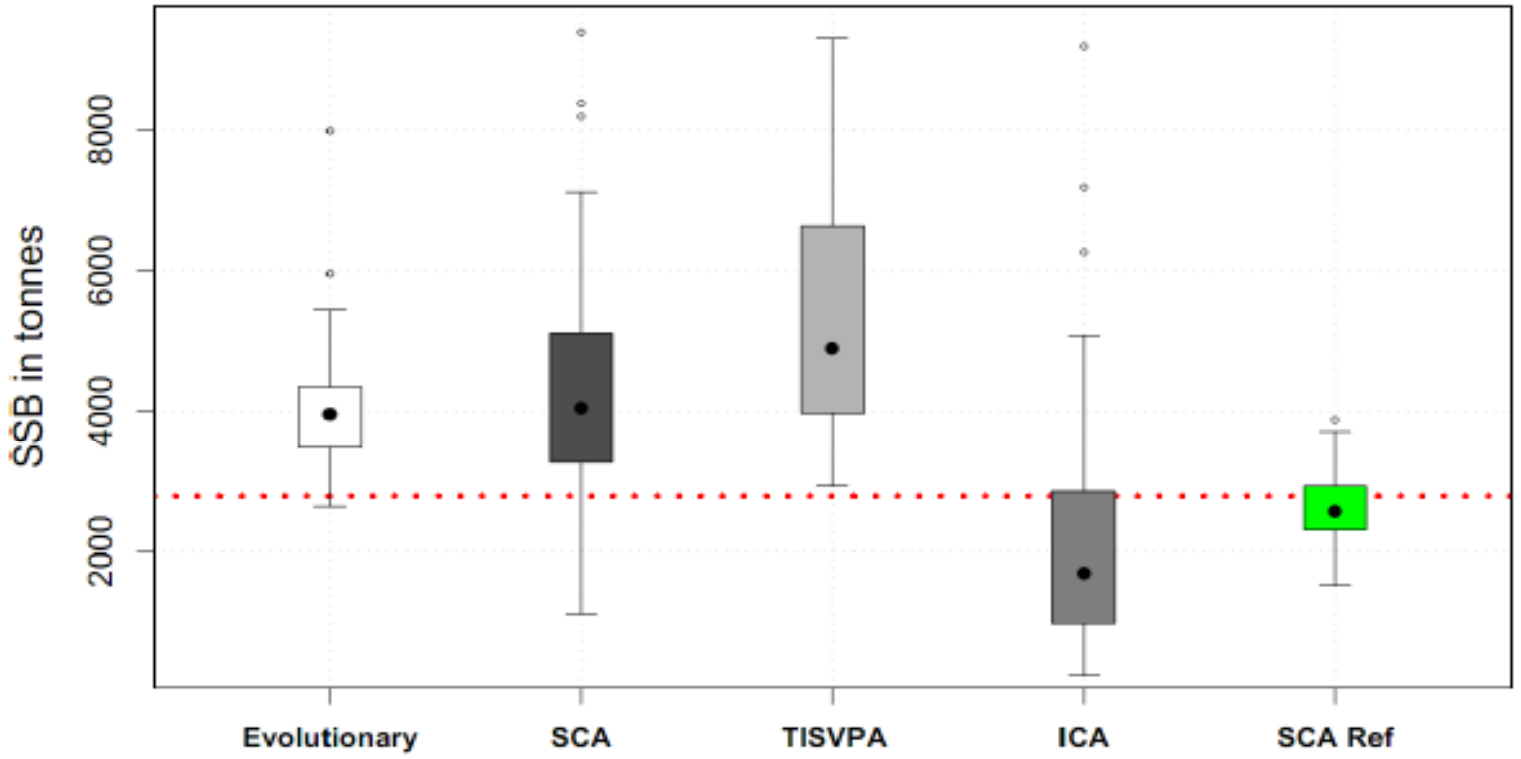

Figure 5. Spawning stock size estimates in 2007 compared to the true underlying population value (horizontal line). The first and third quantile of each dataset are represented by the shaded boxes, while minimum and maximum observations, not being outliers, are represented by the dotted vertical lines. Outlying results (more than 1.5 times the interquantile distance away from the 1st or 3rd quantile) are represented by open circles.

ASTT Results: Average F on Ages 4-11

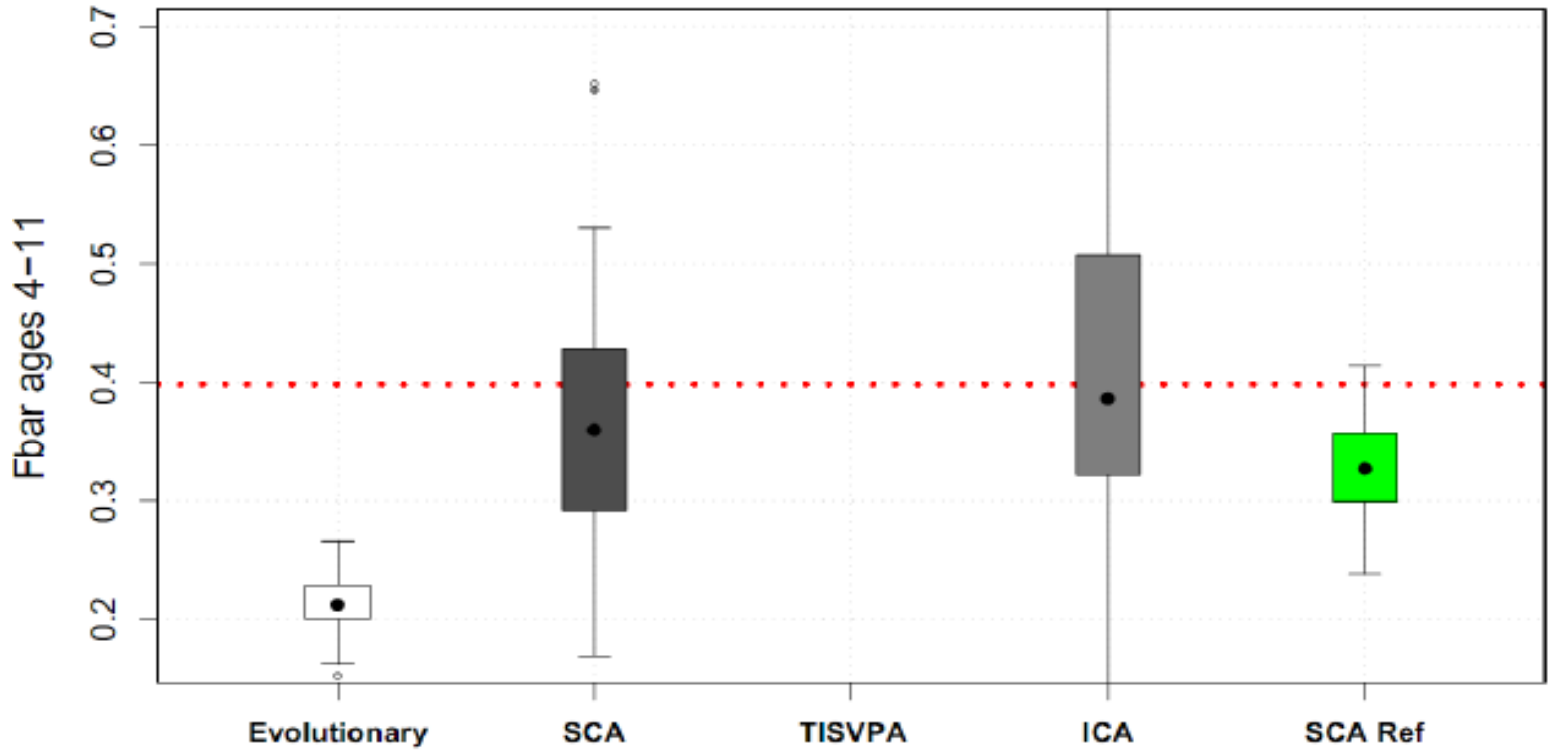

Figure 3. Average F in over ages 4-11, over 2003-2007 compared to the true underlying population value (horizontal line). The first and third quartile of each dataset are represented by the shaded boxes, while minimum and maximum observations, not being outliers, are represented by the dotted vertical lines. Outlying results (more than 1.5 times the inter-quantile distance away from the 1st or 3rd quantile) are represented by open circles.

ASTT Results: Recent Recruitment Ratios

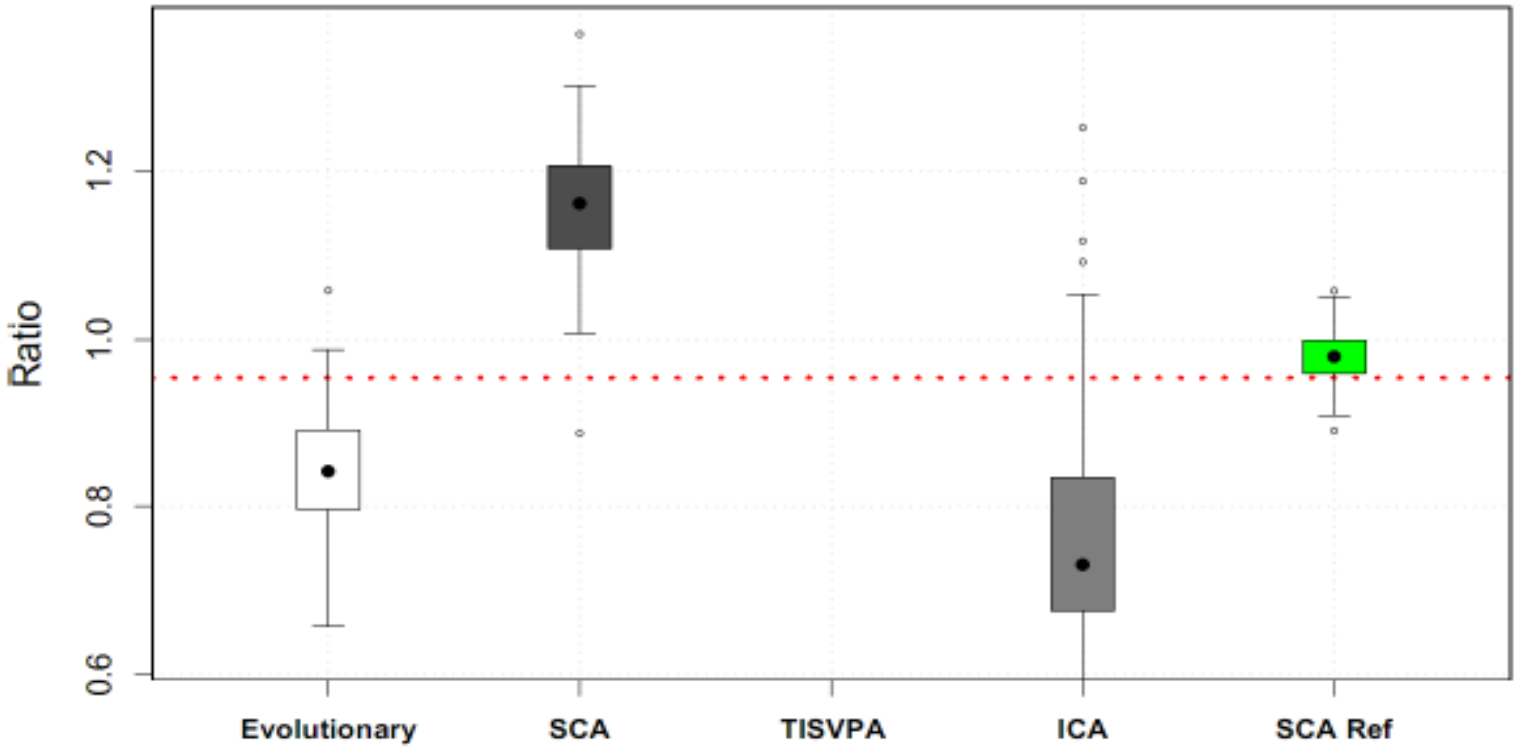

Figure 8. Recent age-2 recruitment (mean of 2003-2007) over the mean from 1990-2007 compared to the true underlying population value (horizontal line). The first and third quantile of each dataset are represented by the shaded boxes, while minimum and maximum observations, not being outliers, are represented by the dotted vertical lines. Outlying results (more than 1.5 times the interquantile distance away from the 1st or 3rd quantile) are represented by open circles.

ASTT Workshop Recommendations

- **The SCA approach was recommended as the preferred method for developing a standard assessment approach. An extra meeting prior to the SWG should be convened to implement an SCA application using real data.**
- The application of the ICA and TISVPA models is inappropriate for the main specification for assessment purposes. These don't use much of the detail in the available data, e.g. disaggregation to multiple fleets.
- Model specifications (particularly selectivity) are critical. The additional flexibility of the SCA reference model is beneficial, and this model should be pursued in future.

Jack Mackerel Data Provision & Exchange

- The question of which data are required, and how these data will be made available to conduct assessments, is critical.
- **The ASTT recommended that a formal procedure be established through the SPRFMO to facilitate the provision of data from all members.**

Jack Mackerel Assessment Data Requirements

		Chile	China	EU	Faroe Island	Korea	Peru	Russia (off Chile)	Russia (off Peru)	Vanuatu
Removals	Catch biomass	1970-2009	2001-2008	2005-2008	2007-?	2003-2008	1970-2009	1979-1992; 2003-2005	1979-1992	2003-2008
	Catch at age	1975-2009								
	Catch at length			2006-2009			1980-2009	1979-1992	1979-1992	
	By fleet (fisheries)	Yes								
	Weight at age	1975-2009								
	Weight at length						1993-2009			
	L-W relationship	1975-2009					1993-2009			
Abundance	CPUE	1981-2005					1997-2009			
	Acoustic Survey	1997-2009				??	1983-2009			
	Egg survey	1999-2008								
	Trawl survey									
Biology	Natural mortality	0.23					0.33			
	Growth function	Yes					Yes	Yes		
	Maturity at age/size	Yes					Yes			
	aging	Yes					Yes			

Main data provided for the simulations were landings by fleet, catch-at-age by fleet, weight-at-age data and various abundance indices (CPUE, acoustic and egg survey indices).

Assessment Process for the next SWG Meeting

- Another ASTT meeting is to be held from 16-27 August at the NOAA/NMFS Alaska Fisheries Science Centre, Seattle, USA:
  - to discuss data and data availability, and model structure / specification for the 2010 assessment, projection methods and reference points;
  - to train a selected group of modellers in the use of the SCA model, to be used from 2011 onwards.
- SPRFMO country scientists to conduct intersessional assessments using preferred (and alternative) models.
- Results to be reviewed at the next JMSG/SWG meetings.

Chairmanship of the Jack Mackerel Sub-Group

- Dr Sandy Morrison retired from the position of Chair of the Jack Mackerel Sub-group after the SPRFMO 7 meetings in May 2009.
- Since then, no nominations have been received for the position of Chair of the Jack Mackerel Sub-Group.
- Participants are therefore again reminded to consider nominations for this position.

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QUESTIONS ?



Jack Mackerel Catch Trends: 1970 - 2009