MINIMUM TRPS FOR WCPFC YELLOWFIN CONSISTENT WITH ALTERNATIVE LRP RISK LEVELS

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INTRODUCTION

- With reference to Paragraph 188 and Attachment L (Work plan for the adoption of harvest strategies under CMM 2014-06) in the WCPFC14 Summary Report, SC14 shall dedicate sufficient time to develop advice for WCPFC15 on candidate target reference points for bigeye and yellowfin tuna.
- This working paper computes median levels of spawning biomass depletion ($SB/SB_{F=0}$) and fishing mortality relative to the fishing mortality at maximum sustainable yield (F/F_{MSY}) that are consistent with specified risk levels of breaching the limit reference point (LRP) of $0.2SB_{F=0}$.
- Equivalent to a TRP based on a sole objective of 'stock sustainability'

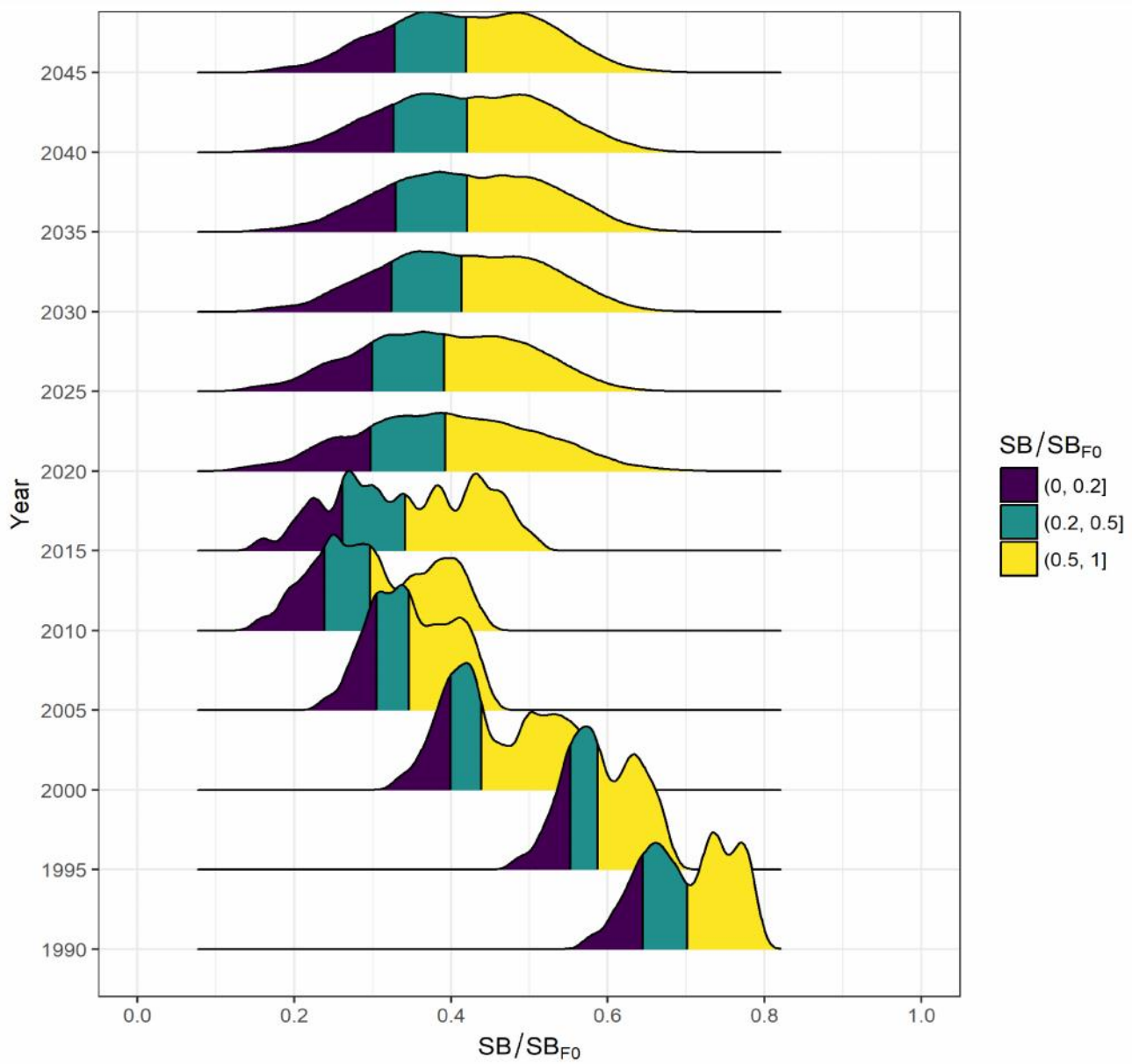
INPUTS

- 2017 YFT assessment (Tremblay-Boyer *et al.* 2017)
  - A grid of 48 model runs
  - five axes – regional structures (2), steepness (3), tag over-dispersion (2), tag mixing (2) and size composition weighting (2)

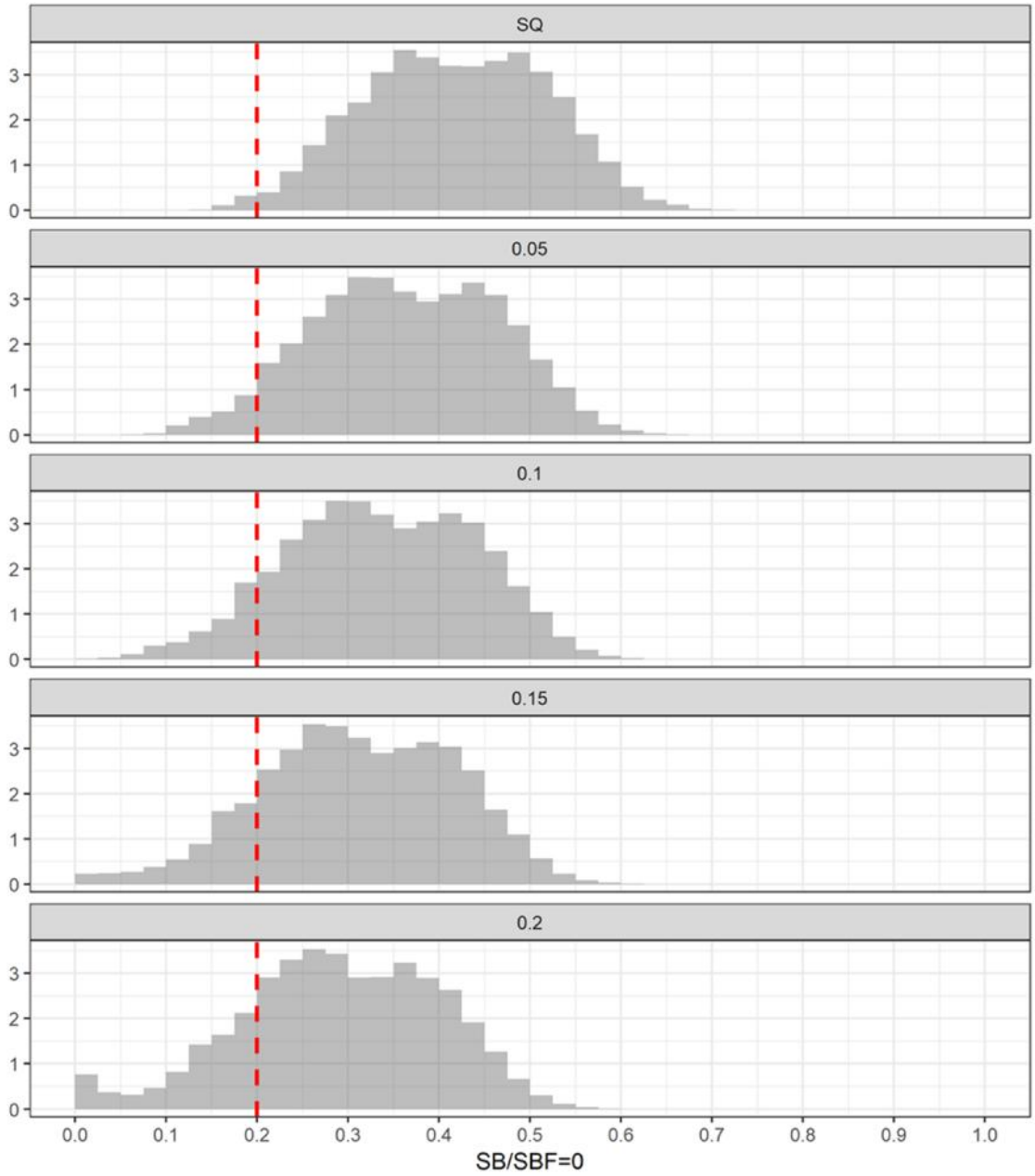
ALGORITHM

- Run 200 projections for 30 years (2016-2045) for each model in the grid
- Future rec= mean rec from SRR + rec devs randomly sampled from the last 10 years of the assessment (2005-2014)
  - Distributed to seasons and regions according to the historical average distribution
- Combine the results across model runs and calculate
  - the % of projections that had a terminal (final year) biomass that was below the agreed LRP (20%$SB_{F=0}$ of 2035-2044).
  - the median $SB_{2045}/SB_{F=0}$
  - the median $F_{2042\text{-}2045}/F_{MSY}$
- Repeat the above step with different scalars of effort/catch until the future fishing levels that resulted in risk levels of 5, 10, 15, and 20% were identified
- Note scalars applied equally across all fisheries

TIME EVOLUTIONS OF DISTRIBUTION OF $SB/SB_{F=0}$ FROM SQ PROJECTION



DISTRIBUTIONS OF $SB/SB_{F=0}$ FOR NOMINATED RISK LEVELS BREACHING LRP



RESULTS

Risk level	Scalar relative to 2013-2015	$SB_{2045}/SB_{F=0}$	$F_{2042-2045}/F_{MSY}$
5%	1.180	0.36	0.58
10%	1.285	0.34	0.63
15%	1.380	0.31	0.67
20%	1.465	0.29	0.70

CONCLUSIONS

- The method used here to estimate ‘limiting’ TRPs is consistent with that used in the past (MOW3-WP-02) and seems to be generally accepted by WCPFC.
- However, the results are conditioned on the uncertainty framework used.
  - This analysis -> 2017 YFT assessment + future recruitment
  - Generally speaking, more uncertainty =more risk

Conclusion

- The median values of $SB_{2045}/SB_{F=0}$ and $F_{2042\text{-}2045}/F_{MSY}$ estimated here can be interpreted as 'limiting' TRP's for yellowfin tuna, consistent with the nominated levels of risk of breaching the LRP. In order to recommend a specific level of $SB/SB_{F=0}$ (or F/F_{MSY}) as a TRP for yellowfin tuna, it is therefore necessary to:
  - Agree on an acceptable level of risk of breaching the LRP in order to define the minimum TRP in terms of $SB/SB_{F=0}$, (or maximum TRP in terms of F/F_{MSY}).
  - Consider other ecological and socio-economic factors that might be relevant in recommending specific TRPs that may be more conservative than the risk-based 'limiting' levels described in this paper.

CONCLUSION

- SC14 is therefore invited to:

1. Note the results of the analysis conducted and consider providing advice to WCPFC on minimum levels of $SB/SB_{F=0}$ (or maximum levels of F/F_{MSY}) that would be consistent with specific levels of risk of breaching the LRP;
2. Encourage WCPFC to further consider the matter of acceptable level of risk of breaching the LRP; and
3. Consider if there are relevant ecological and/or socio-economic factors that WCPFC should consider in choosing a specific TRP for yellowfin tuna.

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