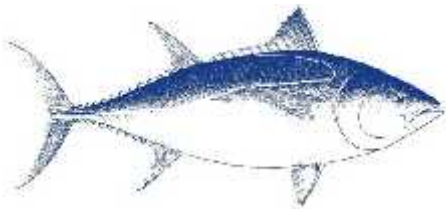
Development of SBT MPs/HCRs
WCPFC Harvest Strategy Workshop

Bali, Indonesia, 30 Nov – 1 Dec 2015



Outline of presentation

- Drivers behind development of the SBT MP/HCRs
- Operational management objectives
- Biological and economic indicators used in MP testing
- Development of MP/HCRs
- Meta-rule process
- Lessons learned

SBT stock status

- Before 2010, many years of competing and contentious stock assessments at SC
- No agreement on management actions to address stock status
- Agreed MP ("Bali" MP) and stock assessment in 2011
- Stock status in 2010

➢ Current (2010) Depletion	5.5% SSB_0 (3.5 – 7.7%)
➢ F/F_{msy}	77% (50 – 107%)
➢ Reported (2010) Catch	9547 t
➢ MSY	34,500 t (30,700–36,400 t)
➢ Current Replacement Yield	27,200 t (22,200–32,800 t)

Operational Management Objectives

- Determined by a pragmatic approach following extensive consultation
- Operational management objectives:
  - Rebuild stock to the interim TRP of 20% SB_0 by 2035 with a 70% probability
  - Minimum TAC change of 100 t
  - Maximum TAC change of 3000 t
  - TAC to be set for 3 year periods
  - National TAC allocation to Members set by resolution

Indicators evaluated in MP testing

- SSB/SSB_o ratios over time
- C/B ratios over time
- Average catch over various blocks of years
- Lower 10% of catch ever attained
- Inter-annual variation in catch
- Maximum TAC decrease from model
- Proportion of years with TAC changes up or down

Development of MPs/HCRs

- MSE was formally used to develop and test alternative HCRs
- HCRs have not yet been formally adopted by any other tuna RFMO
- Two candidates MPs (MP1 and MP2) developed in 2010
- Both evaluated against the reference set and 5 pessimistic robustness trials
- Neither failed the robustness trials

Development of MPs/HCRs

MP1

- Biomass model based, uses target for commercial CPUE and moving average of scientific aerial survey of juveniles to set TAC
- SSB estimated from recent 5 year trend in B (CPUE) and R (aerial survey), and the previous year's TAC, used to recommend current TAC
- TAC for implementation is weighted average (equal weighting) of previous year's TAC and that recommended by MP

Development of MPs/HCRs

MP2

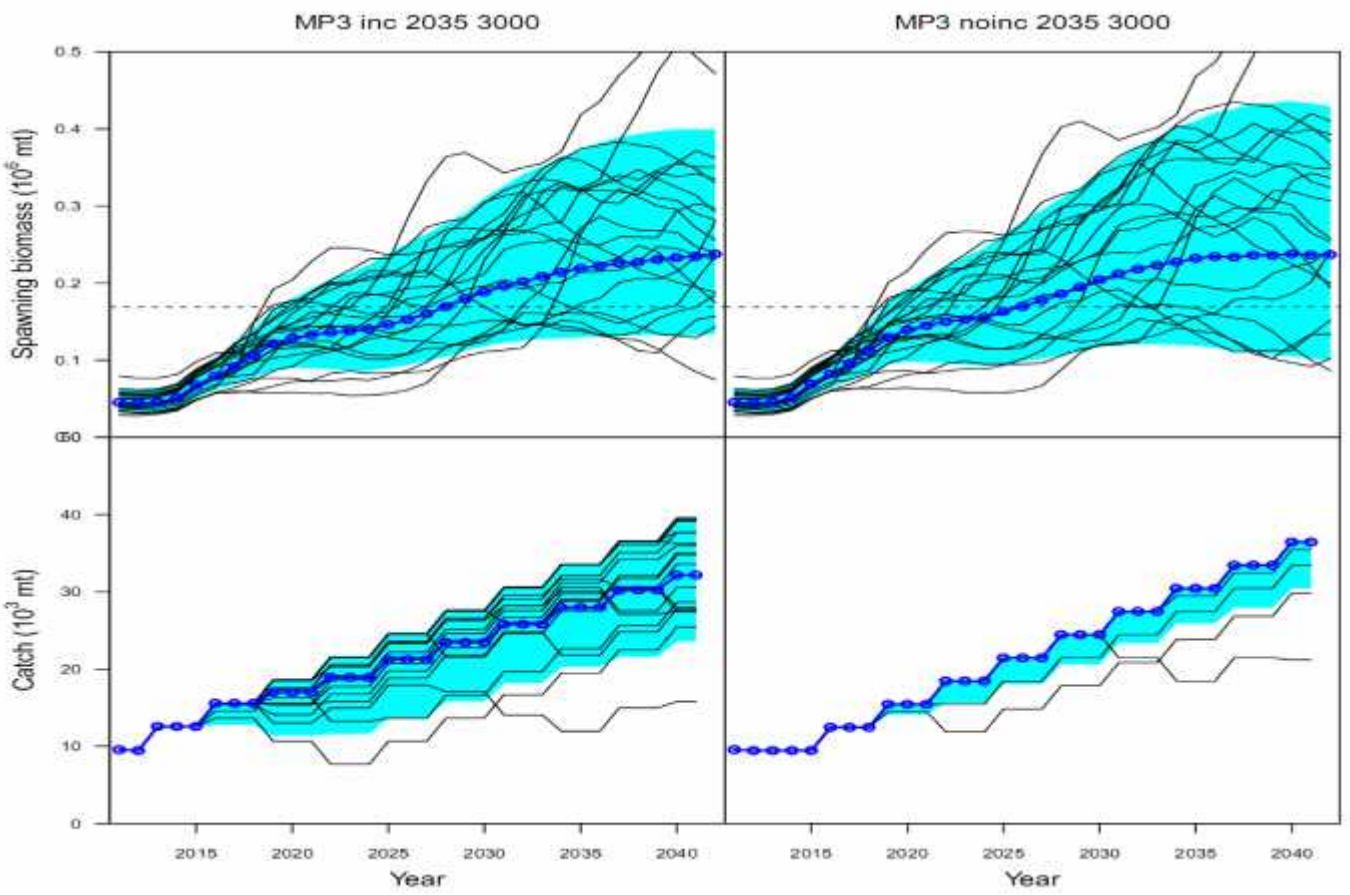
- Empirical MP, uses trend in CPUE, and aerial survey target to set TAC
- Determines TAC from two candidate TACs – one calculated from CPUE trends over 7 years, and the other calculated from aerial survey trends over 3 years
- TAC for implementation is adjustment of previous year's TAC by a factor determined by minimum trend (between that of CPUE and the aerial survey)

Development of MPs/HCRs

Combined MP ("Bali Procedure")

- Chose "best" characteristics of each of the MPs
- Intermediate behaviour between MP1 and MP2
- Two candidate TACs are calculated, based on key aspects of each of MP1 and MP2, and the (arithmetic) mean of the two TACs are taken
- Details can be found in Report of ESC18 (2013), Attachment 10

Bali Procedure results



Projected spawning biomass (top row) and catch (bottom row) by the Bali Procedure (referred to in this figure as MP3) tuned to achieve a 70% probability of rebuilding to 0.2 SSB_0 by 2035 under the reference set.

Meta-rule process

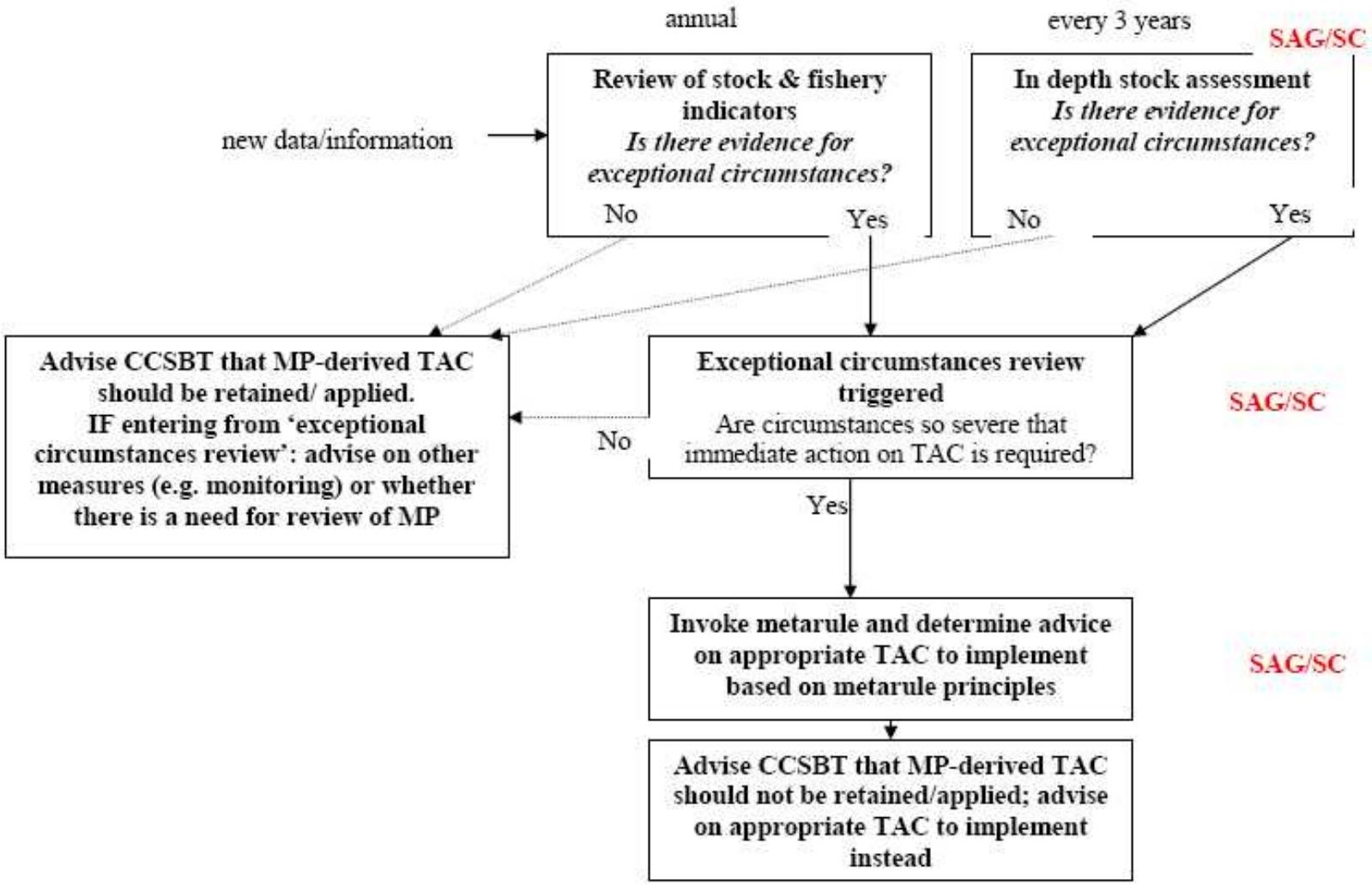
- In 2011 the CCSBT also adopted the meta-rule process as the method for dealing with exceptional circumstances in the SBT fishery (ESC 2013).
- The meta-rule process describes:
  1. the process to determine whether exceptional circumstances exist
  2. the process for action; and
  3. the principles for action

Meta-rule process

The following items were considered in the context of exceptional circumstances in 2015:

- Longline CPUE
- No 2015 aerial survey
- No other direct estimates of recruitment in 2015
- The scale of unaccounted mortality by Non-members
- Reported overcatch of the TAC by Members
- The shift in Indonesian size/age data (2013 - 2015)
- Possibility of no aerial survey after 2016

Meta-rule process



Management Recommendations

Year	TAC	Event
2010	9449 t	MP candidates evaluated – TAC reduced due to perceived poor stock status
2011	9449 t	MP agreed – TACs set for 2012-14 Stock assessment run
2012	10,449 t	
2013	10,949 t	MP run – TACs set for 2015-17
2014	12,449 t	Stock assessment updated
2015	14,647 t	
2016	14,647 t	New MP development begins
2017	14,647 t	Stock assessment updated

Lessons learned from SBT

- Lots of consultation – foster shared responsibility
- Responsive to bad things happening – robustness tests
- Good adult abundance and juvenile indices important
- Reduces contention in decision making
- MP allows an objective way of increasing the TAC for a depleted stock while it is rebuilding with very low risk of future stock decline
- Essential to have agreed process (meta-rule) to deal with exceptional circumstances

Key references

- Report of the Sixteenth Meeting of the Scientific Committee (September 2011) – Attachment 9
- Report of the Eighteenth Meeting of the Scientific Committee (September 2013) – Attachment 10

http://www.ccsbt.org/site/management_procedure.php