



## REPORT OF THE 24th MEETING OF THE SCIENTIFIC COMMITTEE

Cape Town, South Africa, 2-7 Sept 2019



### Main topics

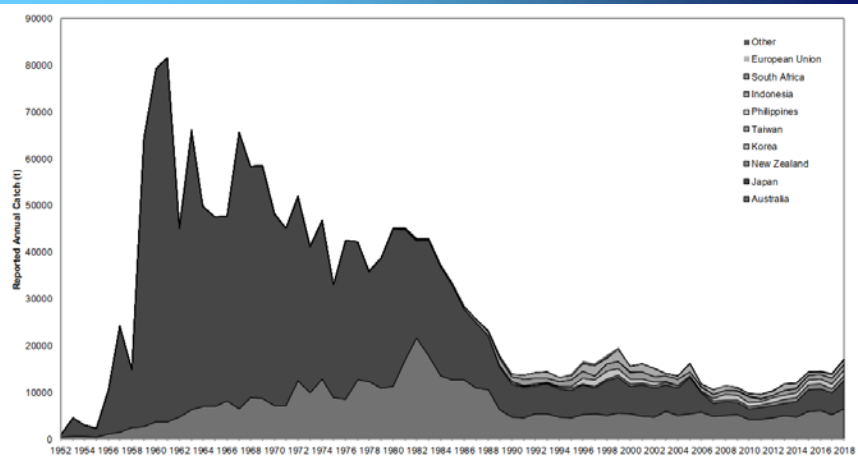
- Review of SBT fisheries and fisheries indicators
- Non-member catches
- Evaluation of exceptional circumstances
- SBT stock status and management advice
- **Farm and Market analyses**
- Results of Scientific Research Programme
- Update of Scientific Workplan
- Other issues
- **Development of new MP**



## Review of SBT Fisheries and Fisheries Indicators



## Reported SBT Global Catches 1952 - 2018



Reported southern bluefin tuna catches by flag, 1952 to 2018



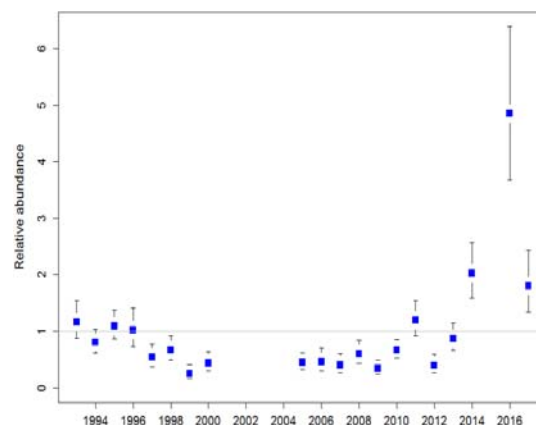
## Indicators

### Juvenile indices in the GAB

- 2016 Aerial survey index (age 2) highest on record and 2017 index higher than average - but no survey for 2018 (replaced by gene tagging)
- First data point from gene tagging indicates age 2 in 2016 similar to that estimated in 2017 stock assessment. Second gene tagging data point indicates recruitment at age 2 in 2017 is half that in 2016.
- 2017 -2019 trolling survey indices (age 1) below 2006 - 2016 average and 2018 and 2019 indices are zero as no fish caught.

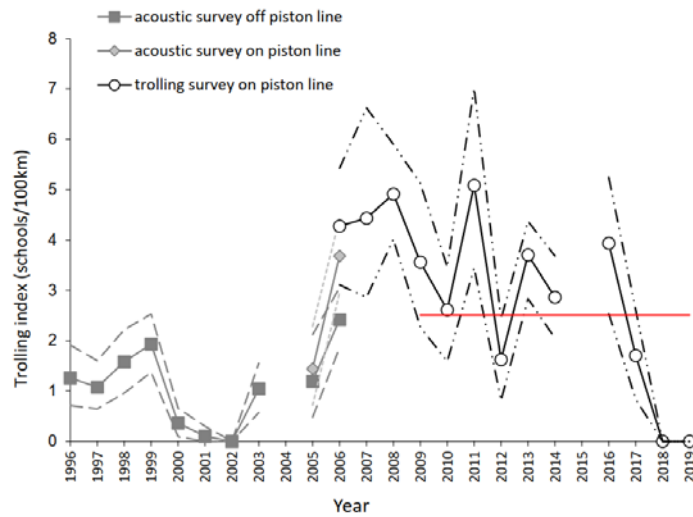


## Aerial Survey Indicators





## Trolling Survey Indicators



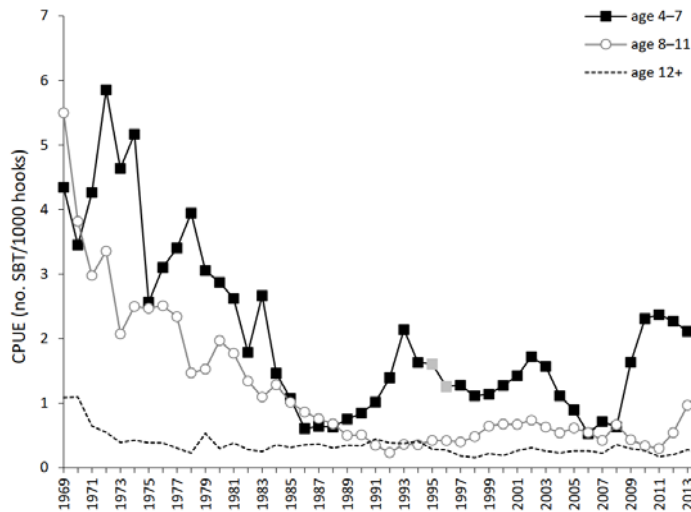
## CPUE Indicators

### Longline CPUE

- Longline CPUE indices for the Japanese fleet for age 4 to 7 are well above the historically lowest levels in the late 1980s or mid-2000s
- CPUE index for ages 8 - 11 has increased from 2011-2015
- Index for age 12+ has fluctuated at a low level
- Taiwanese eastern CPUE has increased from 2015
- Korean CPUE has increased since 2005



## Age 4+ Japanese CPUE



## Lengths on the spawning ground

### Indonesian length frequencies

- Monitoring of length and age of Indonesian catches on the spawning ground indicate a substantial increase in the frequency of smaller size and younger age classes since 2012
- 2019 analyses suggest that the unusually small size classes may have been caught away from the spawning ground (areas 2 and 8) and that, if this is the case, these fish be excluded from the monitoring series



## Summary of indicators 2019

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- No major change in conclusions from 2017 and 2018:
- There are signs of higher recruitment in recent years to 2016 though 2018 and 2019 unclear (mixed signals)
- There are consistent positive trends in longline CPUE
- There are suggestions that relatively strong cohorts are moving through the fishery, although these have not yet contributed to the spawning stock
- The ESC also noted a consistent increase in the CKMR empirical index of spawning stock abundance from 2008 to 2014.



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Non-member catches



## Non-member catches

- New analyses in 2019 suggest past non-member catches could be higher (double) than previous estimates and higher still in 2016 and 2017
- ESC noted there is no supporting evidence (as in 2016)
- ESC noted a number of problems with the estimates which are highly uncertain - requested further analyses by May 2020 to improve non-member catch inputs to the 2020 stock assessment
- ESC agreed the current UAM1 scenario in the MP testing is sufficient to account for the 2019 range of estimates



## Meta-rules and Exceptional Circumstances



## Meta-rules and Exceptional Circumstances

- In 2011 the CCSBT 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
  - (3) the principles for action



## Meta-rules and Exceptional Circumstances

The ESC noted the following items to be considered in the context of exceptional circumstances in 2018:

- High longline CPUE estimate in 2018 (new in 2019)
- Total fishing mortalities exceeding the TAC
- Changes in population dynamics and productivity
- Potential changes in the Indonesian fishery selectivity
- Absence of scientific aerial survey data





## High CPUE estimate in 2018

### High 2018 Longline CPUE

- The high value is not outside of the range against which the MP was tested, and therefore it would not trigger exceptional circumstances.
- The 2018 data point and the CPUE trend are positive indicators for the fishery
- The 2018 CPUE has no direct impact on the calculation of the 2020 TAC advice as the TAC was set back in 2016.
- There is no reason to the 2020 TAC



## Meta-rules and Exceptional Circumstances

### Unaccounted mortality

- ESC noted EC-set reduction of 306t in annual TAC for 2018-20 block aims to mitigate the impact of UAM on performance of current MP
- ESC considered new, larger but uncertain estimates of UAM and reaffirmed advice that "*... to achieve the objectives of the current MP, there is no requirement for the EC to change the amount of the TAC that it has set aside to account for IUU catch by Non-Members.*"
- NB UAM allowances included in the base set of OM for testing/tuning MPs to ensure any new MP will be robust to uncertainty in total mortality are larger than the new estimates



## Meta-rules and Exceptional Circumstances

### Updated estimates of population dynamics

- The full stock assessment in 2017 resulted in a more optimistic outlook in terms of current stock status, recent recruitment trends, and prospects for rebuilding
- The OM model used for developing new MPs also provides a more optimistic estimate of current stock status
- Given that the updated estimates of stock rebuilding are positive and do not impact on the operation of the current MP, the ESC concluded that there was no reason to modify the current TAC [same as ESC22 and ESC23]



## Meta-rules and Exceptional Circumstances

### Indonesian size/age data

- Progress has been made by Indonesia with an indication that observed increasing numbers of small fish in the catch are likely due to changes in fishing distribution away from spawning grounds
- In any case, it is not an issue for the operation of the MP because the MP does not use the data directly
- The ESC concluded there was no reason to take action to modify the 2018-2020 TAC recommendations



## Meta-rules and Exceptional Circumstances

### Changes to input data in the current MP

#### Cessation of AS survey in 2017:

- 2014, 2016 and 2017 AS estimates all higher than average
- Increasing trend in recruitment estimates since 2002
- Inferred 2018 AS index within bounds tested in 2011
- Gene-tagging programme established & first estimate made
- First gene tagging estimate similar to 2017 SA estimate

#### Revised data used for Japanese LL CPUE:

- Little impact on CPUE used in the MP



## Meta-rules and Exceptional Circumstances

### Overall assessment of Exceptional Circumstances

- Overall, ESC concluded that there was no reason to take action to modify the 2020 TAC or the 2018-2020 TAC recommendations in relation to these possible Exceptional Circumstances



## SBT Stock Status and Management



### Stock status

Stock status estimates are available for 2016 from the 2017 stock assessment and for 2018 from the reconditioned OM used for testing CMP (see next slide).

- 2017 Stock assessment: The stock is estimated in 2016 to be 13% of the initial SSB, and below the level to produce maximum sustainable yield (MSY)
- Fishing mortality is about half that associated with MSY
- However, there has been improvement since the 2010 (5% of initial) and 2013 (9% of initial) stock assessments
- 2019 OM: The stock is estimated in 2018 to be 17% of the initial SSB and to have increased 79% since 2009



## Summary of stock status

Variable	2016 Status	2018 Status
SSB (TRO) depletion	0.13 (0.11-0.17)	0.17 (0.15-0.21)
B10+ depletion	0.11(0.09-0.13)	0.14 (0.12-0.17)
F relative to $F_{MSY}$	0.50 (0.38-0.66)	0.55 (0.41-0.74)
SSB relative to $SSB_{MSY}$	0.49 (0.38-0.69)	0.64 (0.47-0.91)
SSB relative to $SSB_{min}$ in 2009		1.79 (1.63–1.93)
B10+ relative to B10+ in 2009		1.57 (1.45-1.72)



## Management Recommendations

### Recommendations for 2018-2020

- The current MP (The Bali Procedure) was run to recommend TACs for 2018-2020
- Recommended annual TAC for 2018-2020 is 17,647.4 t
- ESC concluded there is no reason to modify the 2018-2020 TAC recommendation in relation to its review of exceptional circumstances



## Management Recommendations

### Recommendations for 2020

- Based on the results of the MP operation for 2018 -2020 in 2016, and the outcome of the review of exceptional circumstances in 2019, the ESC recommended:
  - There is no need to revise the EC's 2016 TAC decision regarding the TAC for 2020
  - The recommended annual TAC for the year 2020 is 17,647.4 t
- The ESC recommends that an allocation of 3.1 t in 2020 be made to cover mortality associated with approved research projects



Farm and Market analyses



## Farm and Market Experts

- In 2018 the EC developed ToR for discussion on Australian farm analysis and Japanese market analysis at the 2019 ESC
- ESC expected to review history of discussion and develop methodologies for estimating possible UAM
- To facilitate discussion, two independent experts were appointed to assist the ESC in developing methodologies
- Experts to: review historical reports and information; advise on technical matters; contribute ideas and ways forward
- Limited papers presented at ESC24 but good discussion and clear recommendations emerged



## Report by Farm Expert (1)

- Highlighted issue of 40/100 sampling as perennial issue of debate and suggested a specific study to resolve the debate but noted sampling biases (size selection) could undermine this
- The Farm Expert advised that stereo video measurements could be used to obtain a reliable LF and to estimate the potential bias of past sampling.
- Noted differences between reported growth rates in SBT farms and reported growth rates elsewhere
- The Farm Expert therefore recommended carrying out a tagging program to re-estimate SBT growth in farms but also pointed out that this may not resolve the issue

Continued...



## Report by Farm Expert (2)

- The Farm Expert concluded that there is a need to optimize estimation of input to farms (i.e. reported catch) and output from farms (i.e. harvested weight)
- The Farm Expert noted any indirect methods of estimation should be avoided as require assumptions that can always be challenged - direct methods are needed
- The Farm Expert recommended that stereo video is the only direct method available and is the best way to estimate the weight of SBT transferred to farms
- The Independent Advisory Panel noted this is consistent with its recommendation in 2009.
- The ESC agreed to the recommendation & noted a pilot study to detect bias in measurements may be required



## Report by Farm Expert (3)

- The Farm Expert made a secondary recommendation to explore methods in the absence of stereo video implementation
- These include use of CDS and tagging studies but the Farm Expert again pointed out that these indirect methods would not provide the accuracy of measurements possible using stereo video
- The ESC agreed the secondary recommendation





## Report by Market Expert (1)

- Noted current market estimation methodology (from 2006)
- Many parameters outdated and/or poorly estimated and current methodology does not reflect uncertainty associated with estimates
- If uncertainty incorporated in to estimates then given low market volumes in recent years there would be no clear signal of over-catch
- Therefore recommended that IF continue with 2006 methodology as means of catch verification for all Members, there is a need for update key parameters and to incorporate uncertainty - BUT see next slide
- The ESC discussed and accepted the recommendation



## Report by Market Expert (2)

- Noted the CDS is designed to track all catches, landings and trade of all Members, and is used by the Secretariat to provide annual summaries of Members' reported catch against CDS-reported quantities
- There may be value in identifying how quantities reported in, or derived from, Japanese market data could assist in further validating the CDS (examples given in report)
- It was recommended that the Secretariat, with input from Members, should identify potential correspondences between Japanese market data and CDS quantities, and trial comparison of the market and CDS data series as a means of flagging discrepancies for further investigation. The results of the trial should be reported to the Compliance Committee to evaluate the practicality and usefulness of the comparisons
- The ESC discussed and accepted the recommendation



## Report by Market Expert (3)

- Noted some concerns about ways SBT mortalities may not be captured by the CDS (examples given)
- Market data would not be expected to inform about discarding and mislabeling, but it might record catch by non-Members and SBT caught or traded by Members outside the CDS.
- It may be practical to rely on the requirement under the CDS to tag all legally caught SBT to identify unaccounted SBT mortalities that appear in the market.
- It was recommended that CCSBT Members establish programs to identify instances of illegal (untagged fish for which legal provenance cannot be established) SBT in markets and trade and report on the scope and results of the programmes to the Secretariat to inform estimates of unaccounted mortalities. To support this work, CCSBT Members should consider requiring tags to be retained on all SBT until the fish is no longer whole. Any barriers to this requirement, as well as ways of overcoming them, should be reported to the Secretariat
- The ESC discussed and accepted the recommendation



Scientific Research programme



## Scientific Research Programme

### Gene tagging estimates of juvenile abundance

- A pilot gene tagging programme (funded by CCSBT, CSIRO and Australia) was conducted during 2016. The long-term gene tagging programme commenced in 2017 (with initial funding from CCSBT, CSIRO and the EU) and is on track to produce annual estimates of age 2 SBT. Estimates for age 2 fish in 2016 and 2017 are now available and gene tagging estimates are key inputs to all CMP and future stock assessments

### Close-kin genetic estimates of adult abundance

- Close-kin genetic sampling to estimate absolute abundance of adults continued during 2016-17-18-19 and is planned for future years
- Estimates have been (2017) and will be used in stock assessments and are used in a stand-alone CKMR model used by 3 CMPs



Other Issues



## Other Issues

1. Shortfin mako shark listed on CITES Appendix II
  - ESC requested EC to advise whether it wished ESC or ERSWG to progress any specific work in relation to mako sharks to facilitate Non Detriment Finding evaluations
2. SBT currently classified by IUCN as Critically Endangered and IUCN classification is due for review
  - Given potential impact of IUCN Red List review outcome, ESC concerned it should be based on best possible information
  - ESC requested Secretariat to write to IUCN to offer assistance with data, quantitative analyses and technical advice



## Review of the 2020 Work Schedule



## ESC Workplan for 2020

The proposed workplan has the following key elements:

- Continuation of gene tagging project
- Continued collection and processing of close-kin samples
- Continued aging of Indonesian otoliths
- Evaluation of fishery indicators and exceptional circumstances
- Maturity study - complete data analysis
- Development of meta rules for new MP/implement agreed MP to advise on 2021-2024 TAC
- Update the Scientific Research Plan
- Carry out a new stock assessment



## 2020 Proposed Workplan

Activity	Approximate Period	Resources or approximate budgetary implications
1. Continuation of tag recovery efforts	Tag recovery is continuous	\$1,000; few tags expected
2. Provide SBT Stock Status Report to the other tuna RFMOs	Aug - Nov 2020	No additional cost
3. Update length/weight for wild SBT		No additional cost
4. Standard Scientific Data Exchange	By mid May	No additional cost
Proposed SRP activities for 2020:	Jan - Dec 2020	
1. Gene tagging project		Contracted
2. Continued collection and processing of close-kin samples		Contracted
3. Close-kin identification and exchange		Contracted
4. Continued aging of Indonesian otoliths		Contracted
5. Maturity Study/analysis	To be completed	Contracted
		\$0 (as \$50k funding carried over from 2019)



## 2020 Proposed Workplan (continued)

Activity	Approximate Period	Resources or approximate budgetary implications
Routine OMMP code maintenance and development	Jan - Dec 2020	Panel member: 5 days Shiny App: 6 months
Inter-sessional OMMP meeting (Stock assessment; Meta rules; implement new MP; develop Strategic Research Plan)	5 day, Jun 2020	Three panel members, ESC chair, one consultant (+ 3 preparation days)
Extended Scientific Committee for the 25th meeting of the Scientific Committee. The meeting will focus on the following: Regular review of indicators Evaluation of meta-rules and exceptional circumstances Review results of SRP activities Implement new MP and provide advice to the EC Finalise stock assessment and provide advice to the EC	Sept 2020, Tokyo, Japan	ESC Chair, 3 panel members, one consultant, full interpretation and 3 Secretariat staff.



Development of new MP



## Development of new MP

- The EC has approved the development of a new management procedure (MP) to replace the Bali Procedure
- Need to adopt this year (or early next year) to apply in 2020 and set 2021-2023 TAC
- In March 2018 the Fifth Meeting of the Strategy and Fisheries Management WG (SFMWG) met in Canberra
- Provided valuable guidance on long-term goals and desirable features of a new MP
- 2018: OMMP9 and ESC23 -> EC for FEEDBACK
- 2019: OMMP10 and ESC24 -> **ADVICE ON MP SELECTION**



## Development of new MP

SFMWG 2018:

- Tuning biomass level of 0.25, 0.30, 0.35, 0.40 of  $SSB_0$
- Tuning to 50% probability of achieving the biomass level
- Tuning year set to 2035 but could extend to 2045
- All candidate MPs (CMP) to achieve at least 70% probability of 20% $SSB_0$  by 2035 and high probability of remaining above that level after 2035
- SFMWG emphasised none of the above is final



## Development of new MP

SFMWG 2018:

- TAC to be set in 3-year blocks
- First block to be 2021-2023
- Set maximum TAC changes of 2,000t, 3,000t and 4,000t (and perhaps 5,000t) with OMMP group to decide on initial scenarios
- List of recommended performance statistics



## Development of new MP

In 2018 at EC25, ESC REPORTED PROGRESS AND SOUGHT UPDATED ADVICE OR AGREEMENT TO:

- Focus on tuning to i) 0.30 SSB<sub>0</sub> by 2035 and ii) 0.35 SSB<sub>0</sub> by 2040 (but may need flexibility depending on reconditioning of OM)
- Continue to test to ensure 70% probability of SSB<sub>0</sub> by 2035 and beyond
- Consider maximum TAC changes (likely 3,000t)
- Consider "AAV" and "P(2Up1Down)" as key performance statistics
- **USED THIS AS BASIS GOING FORWARD IN 2019**





## Development of new MP (2019)

- The OM was reconditioned using the latest data
- Four (previously 3) developers/groups worked on CMPs that use Japanese LL CPUE, gene-tagging data and close kin mark recapture (CKMR) via model or data
- The CMPs are evaluated using the reconditioned OM and Performance Statistics related to CCSBT requirements and guidance (SFMWG and ESC25)
- CMPs are tuned to achieve specified biomass levels with given probability by given years but are tested for robustness to uncertainties



## Development of new MP (2019)

- Development has been collaborative
- Four (previously 3) developers/groups worked with support of independent advisors and consultant
- Four final CMPs are all tuned to achieve specified biomass levels with given probability by given years but are tested for robustness to uncertainties
- All four CMPs are good and potentially could be used
- Selection involved very detailed scrutiny of comparative performance by developers, advisory panel, and ESC (ESC report section 13.1 and Attachment 10, OMMP10 report)



## Development of new MP (2019)

### Reducing the dimensions to consider

From EC25: Focus on tuning to i) 0.30 SSB<sub>0</sub> by 2035 and ii) 0.35 SSB<sub>0</sub> by 2040

- Median catch loss from 2021-2035 of 30,000-36,000 t for 2% gain in SSB% if target 35%SSB by 2040 > to reduce complexity\_ESC considers only 30%SSB by 2035
- (NB Figure in next slide)

From EC25: Consider maximum TAC changes (likely 3,000t)

- No gain by using 2,000 t TAC maximum change and some trade-off with AAV and P(2Up1Down) at 4,000 t > to reduce complexity\_ESC considers only 3,000 t maxim TAC change (as Bali Procedure)

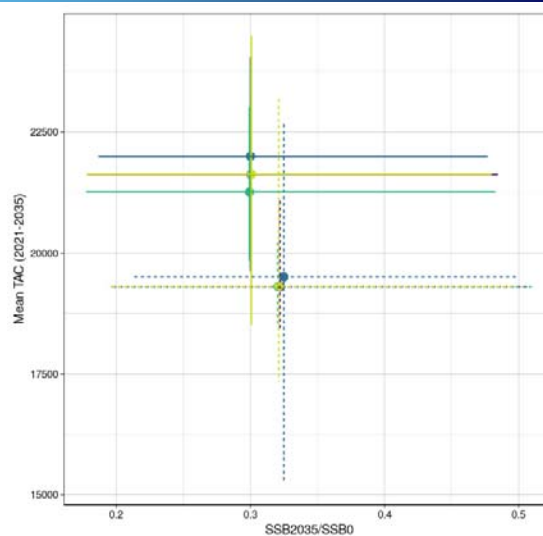


## Development of new MP (2019)

### Tuning to

- i) 0.30 SSB<sub>0</sub> by 2035
- ii) ii) 0.35 SSB<sub>0</sub> by 2040

(ESC Report Fig 1)





## Development of new MP (2019)

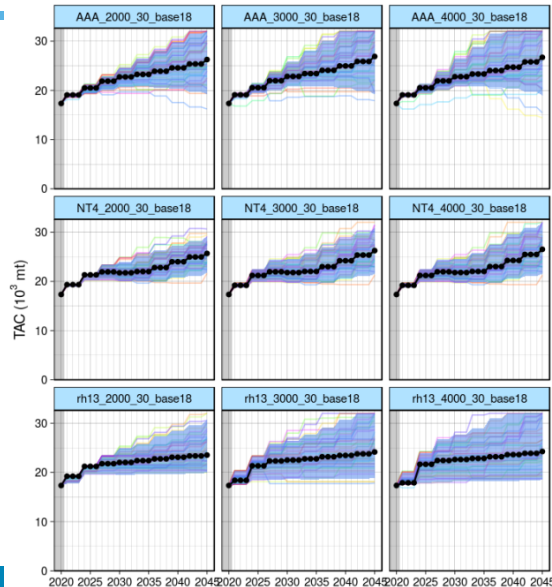
Different maximum

TAC changes

(ESC report

Attachment 10

Fig. 16)



## Development of new MP (2019)

- By reducing dimensions by adopting i) a single tuning level and ii) a maximum TAC change of 3,000 t, the ESC needed to select from “just” 4 CMPs to advise the EC
- In the baseline tests and most robustness cases, all 4 CMPs perform reasonably well
- Some differences emerge in performance at:
  - Continue to test to ensure 70% probability of SSB0 by 2035 and beyond
  - Consider AAV and the probability of “2 up/1 down” as key performance statistics
  - New performance statistics ex ESC24 (not EC) re trajectory shape and width



## Development of new MP (2019)

- The ESC considered a number of other issues related to CMP selection, including:
  - Data availability
  - Data cost
  - Dealing with missing data
- All are important but did not affect final selection
- The advisory panel played a key role in helping the ESC determine a best performing CMP to advise
- One CMP was best (just) or equal best performing on 6/7 criteria, including risk and P(2Up1Down) as advised by SFMWG - RH13



## Development of new MP (2019)

- Therefore (ESC24 Para 157) the ESC advised:
  - Based on this consideration of overall performance, which is underpinned by the more detailed analysis summarised in 13.1, the ESC recommends the RH13 CMP to the EC for the 30% SSB0 by 2035 tuning.
- The ESC noted meta-rules developed for the Bali Procedure had proved effective and are a suitable basis, with review, for implementation of a new MP
- If the EC adopts RH13 or another CMP as a core for “The Cape Town Procedure”, modification to current meta-rules should be done at OMMP11 and ESC25.



END

