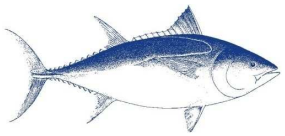
CCSBT-EC/2010/17
(EC Agenda item 6)

REPORT OF THE 25th MEETING OF THE EXTENDED SCIENTIFIC COMMITTEE

Video Conference, 31 Aug - 7 Sept 2020



Main topics

- Process 2020
- Review of SBT fisheries and fisheries indicators
- Non-member catches
- Farm and Market update
- Stock Assessment
- Meta Rules, Exceptional Circumstances, & TAC Calculation
- SBT stock status and management advice
- Results of Scientific Research Plan
- Update of Scientific Workplan
- Other issues

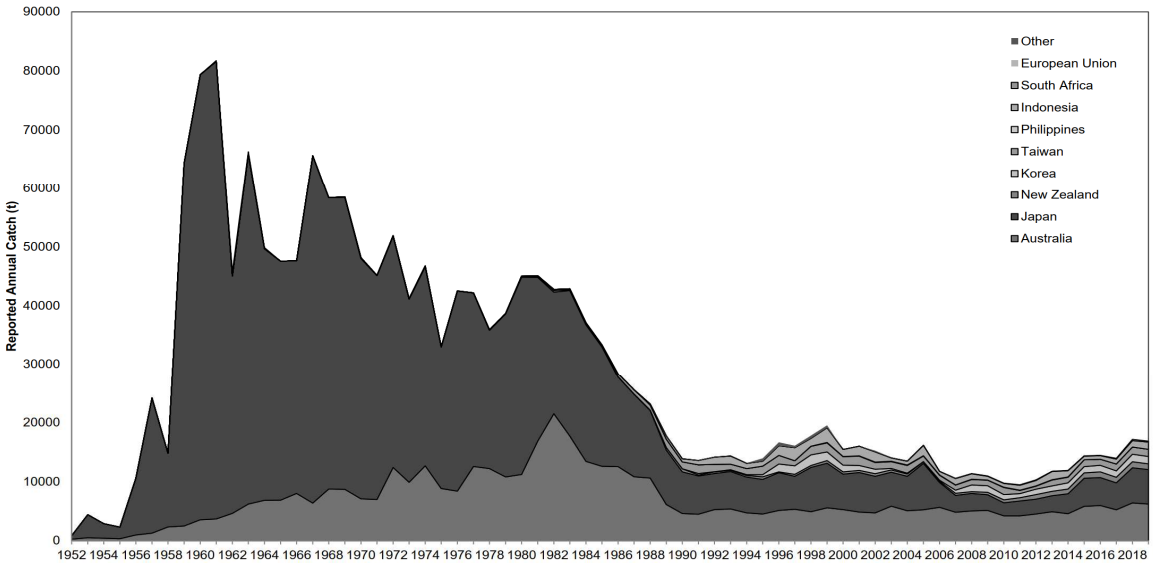
ESC25 Process

2020 Process

- Intersessional activities and WGs were severely disrupted by the COVID-19 pandemic but the Secretariat provided practical support and key issues were progressed
- The ESC25 process relied on much pre-meeting activity with support from the Secretariat. Huge efforts by all concerned and being here, able to provide key advice to the CCSBT, is testament to the commitment and stamina of all

Review of SBT Fisheries and Fisheries Indicators

Reported SBT Global Catches 1952 - 2019

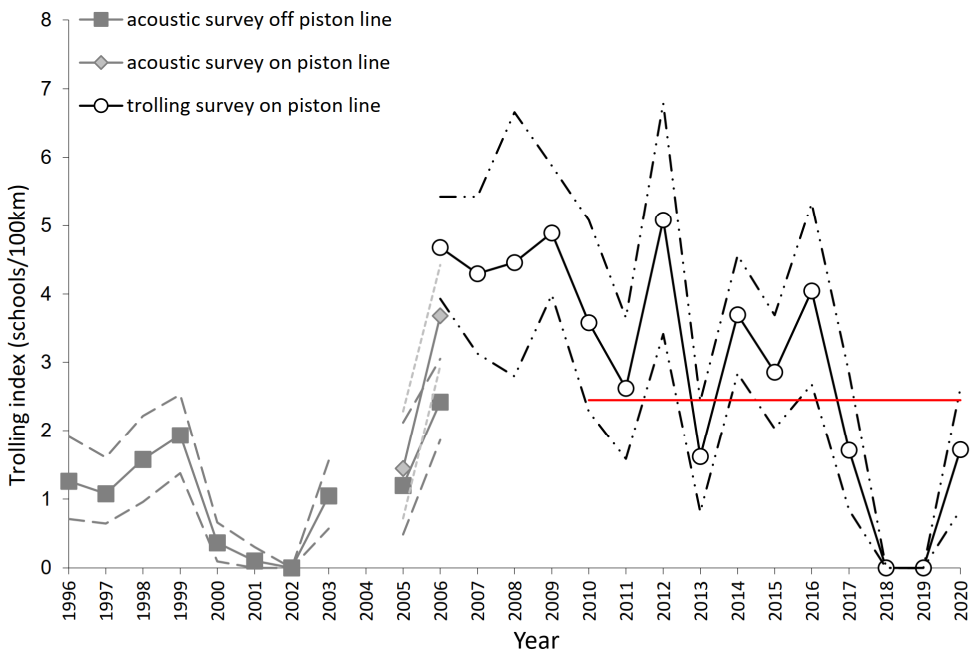


Indicators

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 onwards (replaced by gene tagging)
- Gene tagging indicates age 2 in 2016 similar to that estimated in the 2017 stock assessment. Second and third gene tagging data points indicate recruitment at age 2 in 2017 and 2018 is half that in 2016
- 2017 trolling survey indices (age 1) below 2006-2016 average, 2018 and 2019 indices are zero as no fish caught, 2020 index similar to 2017

Indicators

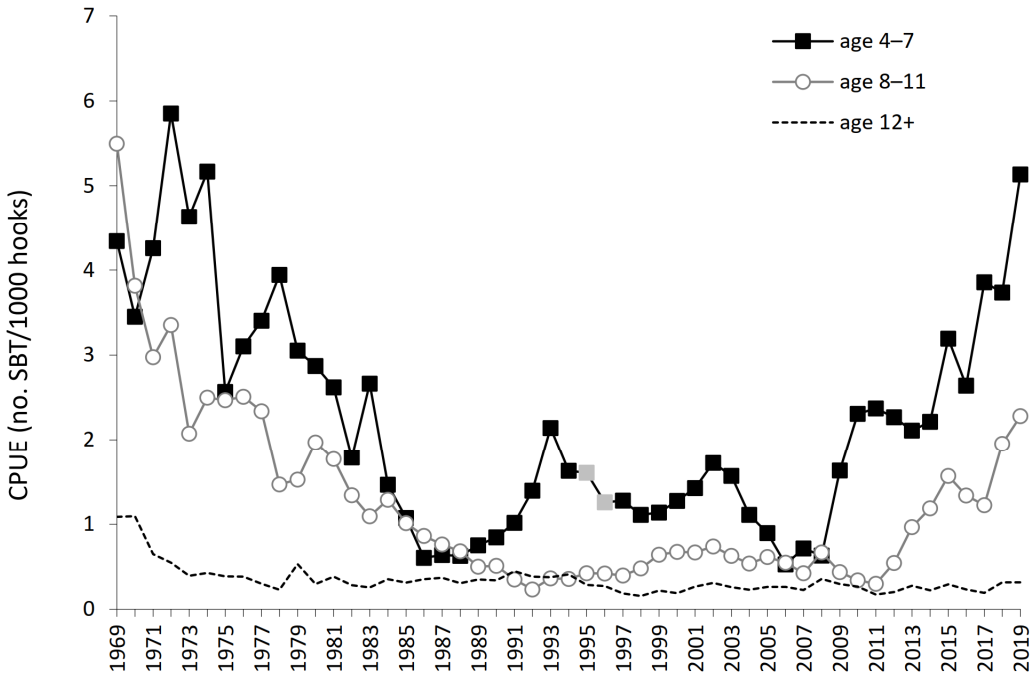


CPUE Indicators

Longline CPUE

- LL CPUE indices for the Japanese fleet for age 4-7 and 8-11 age groups are well above the historically lowest levels in the late 1980s or mid-2000s
- CPUE index for ages 8–11 has increased from 2011
- Index for age 12+ has declined gradually since
- Taiwanese eastern CPUE has increased from 2015 with 2019 slightly higher than in 2018
- Korean CPUE has increased since 2005 with 2019 slightly higher than in 2018

CPUE Indicators



Summary of indicators 2019

- No major change in conclusions from recent years:
- There are signs of higher recruitment in recent years to 2016 though there are still mixed signals for 2018, 2019, and 2020
- 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 in 2019 noted a consistent increase in the CKMR empirical index of spawning stock abundance from 2008 to 2014; in 2015 the index decreased slightly.

Non-member catches

Non-member catches

- New analyses in 2019 suggested past non-member catches could be higher (double) than previous estimates and higher still in 2016 and 2017
- The ESC, noting a lack of supporting evidence and 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
- Revised non-member UAM estimates were developed for use in the stock assessment

Non-member catches

- The new estimates are still uncertain, with multiple potential biases, and ESC agreed there is need for further work (in the workplan for 2022)
- The new estimates affect the stock assessment but do not impact on use of the CTP to calculate a recommended TAC (slide 30)

Farm and Market Update

Farm and Market Progress

Farm Uncertainties

- Australia Advised it would not seek ESC advice but would provide an update to CCSBT27, including a "roadmap"

Market Uncertainties

- Japan hosted a pre-meeting VC to consider proposed actions aimed at improving the existing methodology for monitoring of SBT product distribution in Japan
- Positive response pre-meeting and at ESC25, extensive Q&A and understand will be considered also at FAC and will be here (EC)

Stock Assessment 2020

Stock Assessment 1

- The 2020 stock assessment uses a reference grid of 432 operating models (OM) that capture key uncertainties related to stock productivity and data interpretation. All OMs are fit to a wide range of data with extensive model conditioning and testing.
- In 2017, the ESC agreed to use a new measure of the reproductive population called the Total Reproductive Output (TRO)
- In recent years there has been some confusion with TRO, SSB and B10+ notation. This year the ESC has consolidated the use of TRO
- TRO is defined as the total reproductive output of the adult population, reflecting not only fecundity, but also frequency of spawning and spawning success

Stock Assessment 2

The 2020 Stock Assessment differs from the 2019 OM used to test Candidate MPs in that amongst other things it uses:

- Updated data, including from GT and CKMR programmes
- CPUE estimated using improved models that take account of spatio-temporal variation (though need further work), contributing to a downward revision of the 2013 cohort strength
- A grid allowing for some probability of slightly lower steepness (productivity)

The 2020 assessment remains reasonably consistent with the 2017 one and the 2019 OMs used to test the CMPs

Stock Assessment 3

- The 2019 OM was used for tuning CMPs to reach 30% TRO by 2035
- With slightly lower recruitment now estimated, the reference set of OMs in 2020 result in a relative TRO estimate of 29% in 2035, but with a range of 19-43%
- Sensitivity tests varying UAM, CPUE and grid parameters all result in 28-29% TRO by 2035
- While the rebuild expectation is slightly below that in 2019, all 2020 assessment estimates have wide ranges and are consistent with past assessments

Stock Assessment 4

- The ESC accepted the new stock assessment as a basis for providing robust advice on stock status
- Status estimates are summarised under “Stock status and Management advice”

Meta Rules, Exceptional Circumstances, & TAC Recommendation

Implementing the CTP 1

Specification of the meta-rules process

- In 2019 the CCSBT adopted the Cape Town Procedure (CTP) as the guide for setting global TAC
- The resolution includes at operative para 1 the need for the ESC to develop an updated meta-rules process to be endorsed by the EC
- The ESC has developed the meta-rules process at attachment 8 of its report – this is 23pp and largely a tidied version of that for the Bali Procedure
- The EC is invited to endorse the meta-rules as required by the 2019 resolution

Implementing the CTP 2

Exceptional Circumstances Testing

- In 2011 the CCSBT adopted the meta-rule process as the method for dealing with exceptional circumstances in the SBT fishery – now updated for the adopted CTP (last slide)
- The meta-rule process describes:
  - The process to determine whether exceptional circumstances exist
  - The process for action
  - The principles for action

Implementing the CTP 3

Based on the review of indicators and submitted papers, the ESC considered four issues:

- Inputs to the CTP
- Updated estimates of population dynamics
- Unaccounted mortality
- Indonesian age/size data

Implementing the CTP 4

Inputs to the CTP

- Gene tagging and close-kin data: no issues were identified
- CPUE: A very high CPUE value for 2018 was estimated in 2019, which is in the OMs used to test CMPs. The CPUE method used is also that used for estimating the values of CPUE that are used by the adopted CTP. The ESC agreed this is appropriate
- NOTE: Because of issues identified with CPUE standardization, work is underway which is expected to require re-tuning of the CTP in 2022 before recommending a 2024-2026 TAC

Implementing the CTP 5

Updated estimates of population dynamics

- The ESC agreed that there were no substantial changes in understanding of the SBT population dynamics or the projected rebuilding relative to the OM conditioning used to test and tune the CTP in 2019

Implementing the CTP 6

Unaccounted mortality

- Revised non-member UAM estimates were made available for the 2020 stock assessment. These are lower than the estimates used in the 2019 OM conditioning and CMP testing.
- Given the CMP testing used higher estimated UAM than is now estimated, the CTP-recommended TAC for 2021-2023 should be robust and does not need to be modified.

Implementing the CTP 7

Indonesian size/age data

- These data are not used by the CTP to calculate a recommended TAC
- Possible misspecification off small fish catch in spawning grounds has been identified previously as a potential modelling issue
- The ESC is satisfied that the potential issue has been addressed in recent years and updated data are now being used for OM conditioning
- The ESC agreed this need not be considered in future

Implementing the CTP 8

Overall assessment of Exceptional Circumstances

- The ESC concluded that there was no reason to take action to modify the 2021-2023 TAC recommendations in relation to possible Exceptional Circumstances

Implementing the CTP 9

Calculating the recommended TAC for 2021-2023

- The Cape Town procedure uses i) recent gene-tagging abundance estimates, ii) CPUE, and ii) CKMR data in a sub-model
- The CTP calculates a TAC by modifying the existing TAC based on some CTP design criteria and on parameters tuned to achieve the CCSBT's objectives
- Depending on how the input data suggest the stock is rebuilding towards the target of 30% TRO in 2035, surplus production may be given to ensure rebuild remains on track or provide for extra catch

Implementing the CTP 10

Calculating the recommended TAC for 2021-2023

- Application of the CTP to the input data results in a TAC of 17,647 t, the same as the current TAC
- The ESC did not declare any Exceptional Circumstances and the TAC recommended by the ESC for 2021-2023 is therefore 17,647 t

SBT Stock Status and Management

Stock status

Stock status estimates are available from a new stock assessment completed in 2020

- The stock is estimated in 2020 to be 20% of the initial TRO, and below the level estimated to produce maximum sustainable yield (MSY)
- Fishing mortality is about half that associated with MSY
- There has been steady improvement with rebuilding of approximately 5% per year since 2009

Summary of stock status

Table 6: Summary of stock status variables from SBT assessments (2014, 2017 and 2020) and the estimates from the OM update for MP testing in 2019. The TRO and B10+ estimates are for the start of final year+1 in the assessments (e.g. 2020 in 2020 stock assessment), and F estimates are for the final year of the assessment (e.g. 2019 in 2020 stock assessment).

Variable	2014 Status	2017 Status	2019 Status	2020 Status
Relative TRO	0.09 (0.08-0.12)	0.13 (0.11-0.17)	0.17 (0.15-0.21)	0.20 (0.16-0.24)
Relative B10+	0.07 (0.06-0.09)	0.11 (0.09-0.13)	0.14 (0.12-0.17)	0.17 (0.14-0.21)
F relative to F_{MSY}	0.66 (0.39-1.00)	0.50 (0.38-0.66)	0.55 (0.41-0.74)	0.52 (0.37-0.73)
TRO relative to TRO_{MSY}	0.38 (0.26-0.70)	0.49 (0.38-0.69)	0.64 (0.47-0.91)	0.69 (0.49-1.03)
TRO relative to TRO_{min} in 2009	n/a	n/a	1.79 (1.63-1.93)	1.91 (1.78-2.10)
B10+ relative to $B10+_{min}$ in 2009	n/a	n/a	1.57 (1.45-1.72)	1.73 (1.63-1.94)

Management Recommendations 1

Recommendations for 2021-2023

- The Cape Town Procedure adopted in 2019 was run to recommend TACs for 2021-2023
- The Recommended TAC for 2021-2023 is 17,647 t
- The ESC concluded there is no reason to modify the 2021-2023 TAC recommendation on the basis of Exceptional Circumstances
- The ESC noted that the recommended TAC already accounts for the latest non-member UAM estimates and no deduction is therefore required
- The ESC recommends that an allocation of 3.0 t in 2021 be made to cover mortality associated with approved research projects

Management Recommendations 2

Response to request for advice

- The CCSBT inn 2019 asked the ESC for advice on how long it would take to reach SSBmsy at the current TAC of 17,647 t
- This is not straightforward, with SSBmsy estimated for relatively few stocks globally due to lack of ability to estimate key productivity parameters and to define stock-recruitment relationships
- The current stock assessment reference grid spans a wide range of productivity and the median estimate of TROmsy is 30% of initial TRO, which is also coincidentally the CCSBT target TRO for 2035
- With the current model and assumptions, the year at which 30% of initial TRO would be reached with a constant annual TAC of 17,647 t, is 2033

Scientific Research programme

Scientific Research Programme

- All CCSBT-funded activities (gene tagging, close-kin mark recapture, aging of Indonesian otolith) are progressing well, providing inputs to the stock assessment and used for TAC calculation in the CTP
- Member-funded surveys and analyses of catch per unit effort data are all providing useful indicators and/or data used in the stock assessment
- Collaborative approaches to CPUE and UAM estimation have provided improved estimates for use in stock assessment and have led to specific items in the Workplan (see following slides)

Update of Scientific Research Plan

Updating the Scientific Research Plan

- For last two ESC have made little progress on updating the SRP
- Planned activity at OMMP WG June 2020 but dropped due to travel restrictions

ESC25 made good progress:

In addition to continued gene tagging, CKMR, and other activities, the ESC identified key areas which are included in the Workplan:

1. Further development (2021 and 2022) of CPUE analyses to deal with spatio-temporal changes in stock/fishery distributions
2. Further work (in 2022) on estimating non-member UAM
3. E-tagging design study (2021) with future e-tagging programmes ex 2022

Other Issues

Other Issues

One item only in the report:

- Japan requested that the next ESC meeting consider how best information might be provided on a probability distribution for the size of the next TAC change for the period following 2023.

Proposed 2021 Work Schedule

ESC Workplan for 2021

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
- Maturity study – complete data analysis
- Evaluation of fishery indicators and exceptional circumstances
- Development of new CPUE for use in stock assessment and MP
- Undertake e-tagging design study
- Update the Scientific Research Plan

2021 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 2021	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 2021:	Jan – Dec 2021	
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	55k ($50k funding carried over from 2020)
E-tagging design phase	Jan-Dec 2021	$100,000

2021 Proposed Workplan (continued)

Activity	Approximate Period	Resources or approximate budgetary implications
Stock Assessment and OMMP code maintenance	Jan – Dec 2021	Panel member/Consultant: 10 days Shiny App: 6 months
Inter-sessional CPUE development (also in 2022) for 2022 CTP retuning and 2023 stock assessment	Jan – Dec 2021	Panel members: 6 days Consultant: 28 days
Extended Scientific Committee for the 26th meeting of the Scientific Committee. The meeting will focus on the following: Regular review of indicators; Review progress on and development of CPUE; Evaluation of meta-rules and exceptional circumstances; Review results of SRP activities; Update the SRP	Sept 2021, Australia	ESC Chair, 3 panel members, one consultant, full interpretation and 3 Secretariat staff.

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