REPORT OF THE 21st MEETING OF THE SCIENTIFIC COMMITTEE

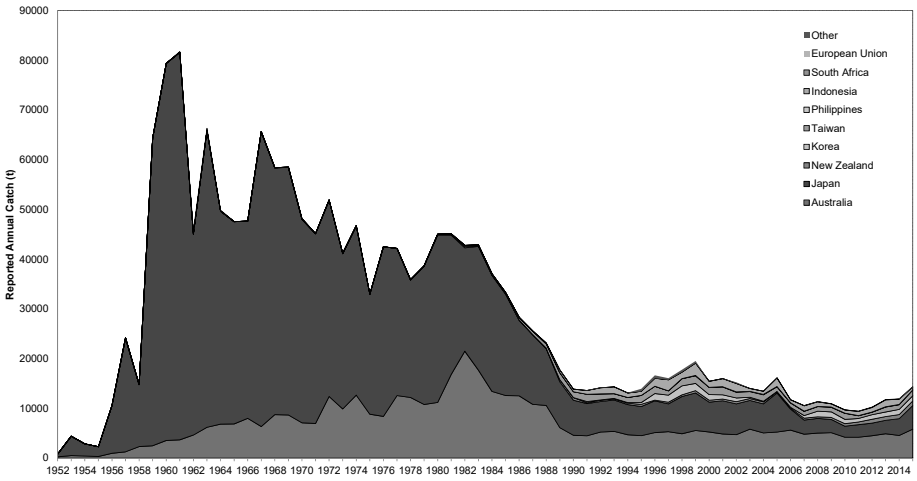
Kaohsiung, Taiwan, 5 - 10 Sep 2016

Main topics

- Review of SBT fisheries and fisheries indicators
- Updated estimates of unaccounted catch mortality
- Evaluation of exceptional circumstances
- Operation of MP to recommend TACs for 2018-20
- SBT stock status and management advice
- Development of new OM and MP in 2017
- Scientific Workplan

Review of SBT Fisheries and Fisheries Indicators

Reported SBT Global Catches 1952 – 2015



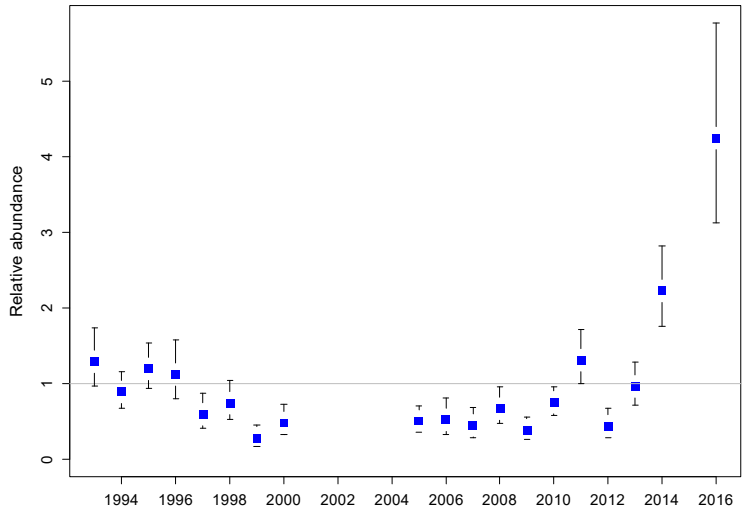
Reported southern bluefin tuna catches by flag, 1952 to 2015

Indicators

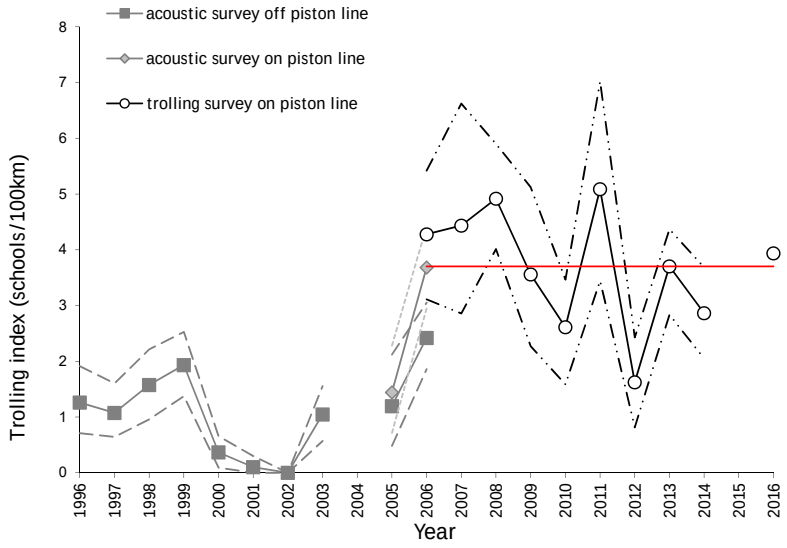
Juvenile indices in the GAB

- No information on juvenile recruitment in 2015
- 2016 AS index highest on record (due to substantial increase in patch size)
- 2016 trolling survey index higher than 2014 and slightly above 2006 – 2016 average
- Preliminary 2016 NZ CDS data shows strong mode of 20 kg fish and possibly reflects strong recruitment consistent with 2016 AS results

Aerial Survey Indicators



Trolling Survey Indicators

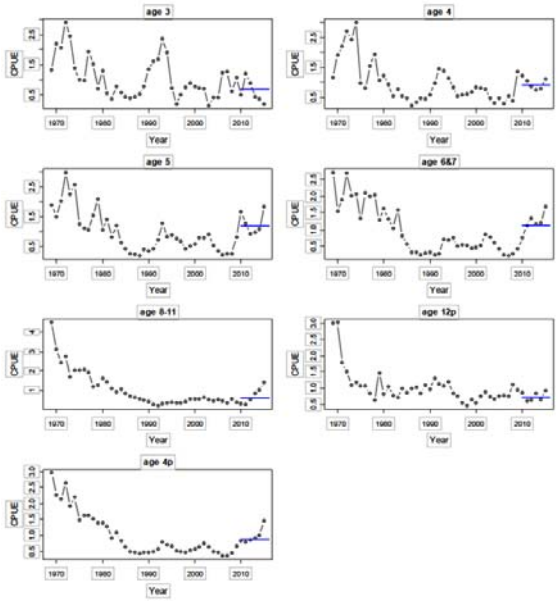


Indicators

Longline CPUE

- Longline CPUE indices for the Japanese fleet for age 5 to 7 are well above the historically lowest levels in the mid-2000s and have increased in recent years
- CPUE index for ages 8 – 11 has increased since 2011
- Index for age 12+ has fluctuated at a low level
- Korean standarised CPUE has also increased over recent years
- NZ direct aging indicates relatively strong cohorts about to enter fishery

Age 3+ Biomass Indicators



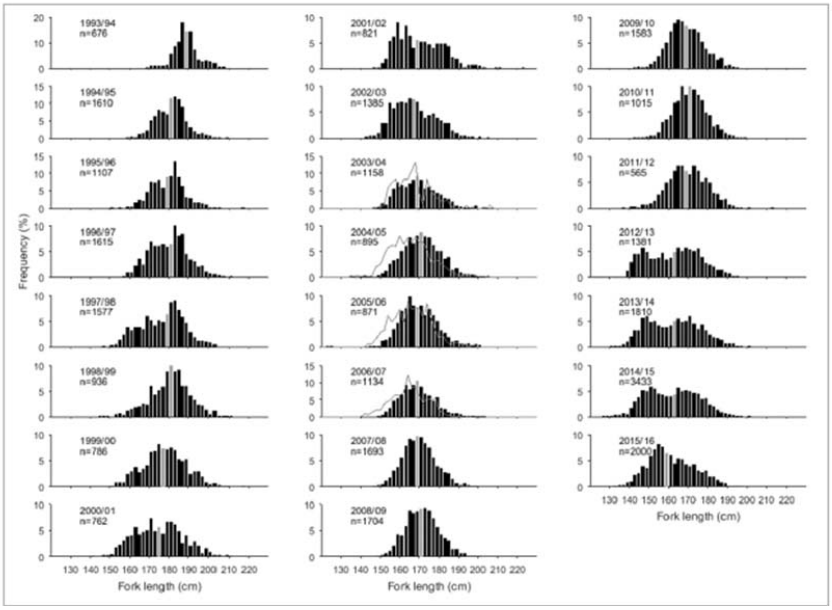
Nominal CPUE of ages 3 through 12+ SBT for Japanese longliners.
Horizontal line is mean of last 5 years.

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 and younger size and age classes since 2012
- Information indicates 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
- Once this is resolved the spawning ground indicator related to mean estimated age can be reconsidered

Lengths on the spawning ground



Length frequency of SBT caught on the spawning ground by spawning season

Summary of indicators

- There are signs of higher recruitment in recent years
- 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
- ESC noted that increased recruitment is of itself not necessarily indicative of increased spawning stock biomass

Unaccounted catch mortality

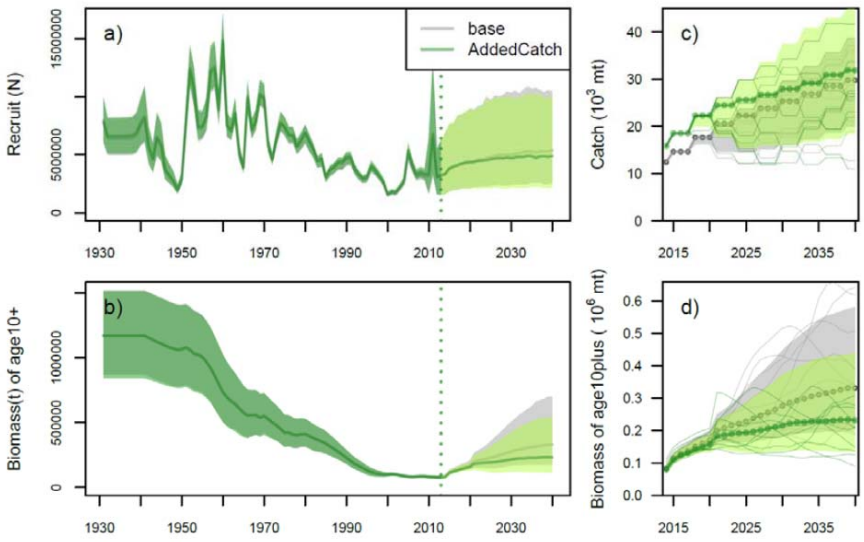
Unaccounted catch mortality - 2014

- In 2014 the ESC concluded that current stock status estimates appear to be unaffected by the unaccounted mortality scenarios tested
- There were impacts on the projections and rebuilding performance from the unaccounted mortality scenarios
- If total mortalities are as large as those considered in the added catch scenario (an added 1000t of large fish plus 1000t of small fish) then impacts on the rebuilding plan may be substantial (probability of rebuilding to 20% B_0 by 2035 drops from 70% to 49%)

Unaccounted catch mortality - 2014

- The probability of rebuilding for this scenario was similar to but not worse than the most pessimistic scenario tested in 2011
- Under the projections of the different scenarios the MP appeared to be working to reduce TACs when unaccounted mortality was occurring, but not enough to meet the rebuilding target

Unaccounted Catch Mortality-2014



Trajectories of a) recruitment, b) biomass of age 10+ fish, c) predicted catch, d) biomass for the “Added Catch” sensitivity scenario.

The green line with the greenish yellow region shows the median and 90% intervals of each scenario. The grey line and region shows the base case result.

Unaccounted catch mortality – from 2015 LL study

- In 2015, the ESC endorsed the views agreed in 2014
- The ESC also considered additional information that had become available since the 2014 meeting
- In 2015 total catch by Non-Members was estimated to be from 120 to 580 t annually for 2011-13, which represents 0.8% to 4% of the 2015 TAC using the two different approaches
- It was agreed that given the status of the stock the estimates were not trivial, and that there was a need to investigate why the estimates differed between methods
- The estimates also did not include potential catches in the South Atlantic or Eastern Pacific Oceans

Unaccounted catch mortality - from 2016 LL study

- The 2016 analyses addressed a number of issues identified in 2015 and provided an improved basis for estimation
- ESC agreed “adjusted effort” method best available to estimate catches of UAM of NCNMs in LL fisheries
- May be under-estimates due to non-reported effort to other tRFMOs and excluded strata due to the “3 vessel rule”
- Estimates from the 2 methods first used in 2015 were similar
- One of most influential factors was whether effort assumed to be target or by-catch
- Potential catches from NM effort, esp. for target effort (ave. 2011-14 = 306 t), requires further attention

Unaccounted catch mortality – 2016 Chinese market study

- Initial results of TRAFFIC/CSIRO trade analysis and genetic ID studies confirmed presence of SBT in Chinese sashimi market
- During period of study, SBT constituted ~ 25% of sashimi grade tuna sold in Shanghai sushi restaurants
- Info gathered insufficient to quantitatively estimate volume of SBT within the Chinese market or the amount of UAM
- Additional info required to put the results of the trade analysis in context
- Final reports to be submitted to CC and EC for their Oct 2016 meetings and should be considered

Accounting for UAM - Direct vs. MP Approach

- EC requested advice on the relative merits of the Direct vs. MP Approach especially as it might be affected by increasing NCNM catches as stock rebuilds
- The “Direct Approach” is to estimate the non-Member catch and then set aside an allowance to take account of non-Member catch before allocating the remainder of the global TAC to Members and CNMs.
- The “MP Approach” is to re-tune the MP to different scenarios that cover the plausible scenarios of catches from non-Members and have the MP recommend a TAC that takes into account the uncertainties in the non-Member catch.

Accounting for UAM - Direct vs. MP Approach

- ESC agreed MP Approach was preferred approach for accounting for impact of additional catches on MP performance for new MP development
- MP approach:
  - incorporates all historical and future mortality into testing and tuning new MP
  - is robust to levels of catch occurring in the fishery
  - likely to meet the rebuilding objective of the MP, and
  - provides greater certainty and stability to Members on future TACs

Accounting for UAM - Direct vs. MP Approach

- Direct Approach does not include NCNM catches in MP testing and tuning
- MP Approach could not be developed in time for recommending TACs for 2018–2020
- In terms of 2018-2020 quota block, Direct Approach is more pre-cautionary in implementing the recommended TAC than making no allowances for NCNM catches
- For future TAC setting the MP approach will be robust to the UAM incorporated in the OM if sufficiently broad

Accounting for UAM - Direct vs. MP Approach

- This requires that:
  - There is a basis for estimating or constructing scenarios for all sources of mortality in the conditioning and projections of OMs
  - There are agreed methods to monitor and estimate all sources of mortality for MP implementation
  - Estimates of all forms of mortality compared annually to those assumed during MP implementation
- The ESC reiterates its previous requests that relevant CDS and market data be made available to allow technical evaluation of catch assumptions to be used in the OM and MP testing process

Accounting for UAM - Direct vs. MP Approach

- ESC recommends that the MP approach should be used for future TAC recommendations beyond the 2018 – 2020 quota block
- There are two general ways in which the UAM can be accounted for in MP development and testing, and of these two, the ESC recommends that the first alternative be used to account for MP testing and in implementation in the MP approach
- This new MP would provide TAC advice to the EC for Members and CNMs attributable catches that would be robust to the additional catches included in MP testing and tuning

Meta-rules and Exceptional Circumstances

Meta-rules and Exceptional Circumstances

- 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

  (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 2016:

- The high 2016 scientific aerial survey index
- The small/young fish in Indonesian size/age data (2012/13 to 2014/15 seasons)
- The potential scale of unaccounted mortalities

Meta-rules and Exceptional Circumstances

2016 scientific aerial survey

- 2016 aerial survey index was outside the bounds of projections used in MP testing in a positive direction
- This may be indicative of high recruitment
- ESC concluded that the high AS point was not unduly influencing the TAC recommendation from the MP and therefore the MP could be operated as tested
- Therefore, ESC concluded there was no reason to take action to modify the 2017 TAC or the 2018-2020 TAC recommendation based on this exceptional circumstance

Meta-rules and Exceptional Circumstances

Indonesian size/age data

- This remains a priority issue to resolve for the monitoring of the spawning stock and conditioning of the OMs for the 2017 assessment
- However, it is not an issue for the operation of the MP because the MP does not use the data directly
- Therefore, ESC concluded there was no reason to take action to modify the 2017 TAC or the 2018-2020 TAC recommendations based on this exceptional circumstance

Meta-rules and Exceptional Circumstances

Unaccounted mortality

- ESC reaffirmed its views from 2014 and considered the additional info available from 2015 and 2016
- ESC considered the “Added Catch” sensitivity used in 2014 could not be ruled out as a plausible scenario for UAM
- ESC concluded there is no reason to modify the 2018-2020 TAC in relation to this exceptional circumstance given the EC’s decision to make a direct allowance for the NCNM catch by deducting this from the 2018-2020 TAC and that Members would account for attributable catches by 2018

Meta-rules and Exceptional Circumstances

Unaccounted mortality (cont.)

- With regard to the 2017 TAC recommendation, given:
  - The EC's intention to take account of NCNM catches and attributable catch in the 2018-2020 TAC block and longer
  - Intention to develop new MP robust to plausible UAM scenarios
  - Noting the 2014 analysis that indicates that following the MP leads to continued rebuilding even with hypothesized UAM
- There is no reason to modify the 2017 TAC for this exceptional circumstance
- ESC reiterated the urgent need to quantify all sources of UAM

SBT Assessment and Management

Stock assessment and projections in 2014

For the Base Case

- The stock remains at a very low level estimated to be 9% of the initial SSB, and below the level to produce maximum sustainable yield (MSY)
- However there has been some improvement since the 2011 stock assessment
- B10+ relative to initial is estimated to be 7% which is up from the estimate of 5% in 2011
- Probability of reaching rebuilding target of 20% B_0 by 2035 was 74%

Summary of stock status from 2014

Maximum Sustainable Yield	33,000t (30,000-36,000)
Reported (2013) Catch	11,726t
Current Replacement Yield	44,600t (35,500 – 53,600)
Current (2014) Spawner Biomass (B10+)	83,000t (75,000 – 96,000
Current depletion (current relative to initial)	
• SSB	0.09 (0.08 – 0.12)
• B10+	0.07 (0.06 – 0.09)
SSB (2014) Relative to SSB_{msy}	0.38 (0.26 – 0.70)
F(2013) Relative to F_{msy}	0.66 (0.39–1.00)

Stock assessment and projections planned for 2017

- The stock assessment is scheduled to be updated in 2017 and will provide estimates of recent trends in SSB and projections into the future

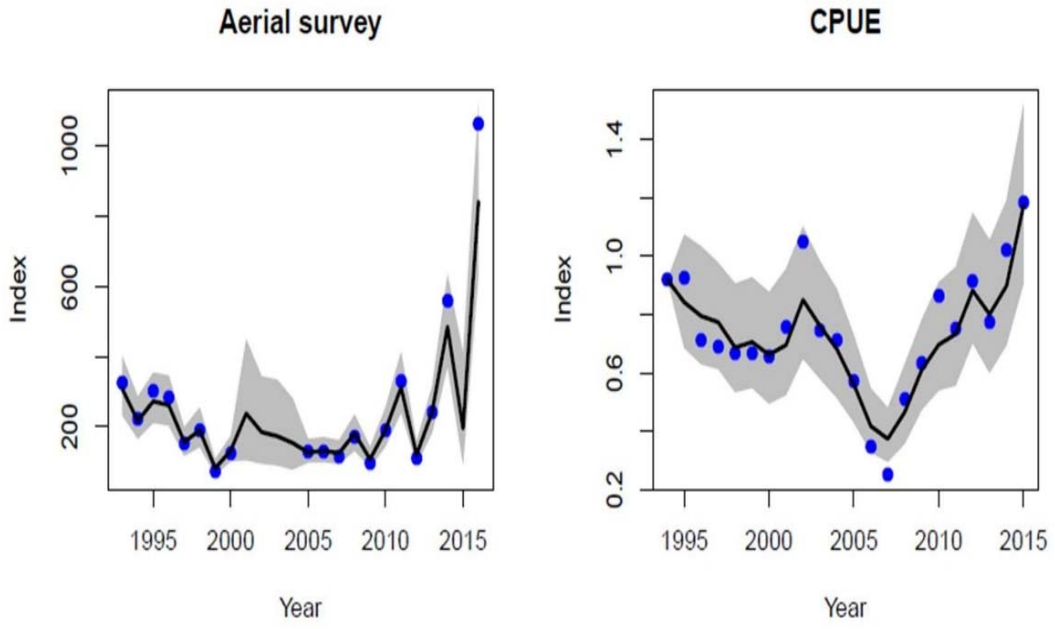
Operation of MP to recommend TACs for 2018-2020

- Current MP was run to recommend TACs for 2018-2020
- Recommended annual TAC for 2018-2020 is 17,647.4 t
- This is a 3000 t increase, the maximum allowed by the MP
- It is a result of the positive trend in CPUE since 2007 and higher aerial survey indices for past 5 years relative to the series average
- The CPUE component is primarily responsible for the increase in the recommended TAC

Operation of MP to recommend TACs for 2018-2020

- Aerial survey component is having a positive, but considerably smaller, effect
- This is because the MP has been designed to be conservative with respect to changes in recruitment by reacting slowly to recruitment levels higher than the historical average and reacting strongly to signals of low recruitment
- Estimation model fit both the AS and CPUE data sets well, but it was the CPUE data driving the TAC increase and not the last two AS data points

Operation of MP to recommend TACs for 2018-2020



Management Recommendations

Recommendations for 2017

- Based on the results of the MP operation for 2015-17 in 2013 and the outcome of the review of exceptional circumstances in 2016 the ESC recommended:
  - There is no need to revise the EC's 2013 TAC decision regarding the TAC for 2017
  - The recommended annual TAC for the year 2017 is 14,647.4 t
- The ESC recommends that an allocation of 5.7 t per year be made to cover mortality associated with approved research projects

Management Recommendations

Recommendations for 2018-2020

- The current MP 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

Scientific Research Program (SRP)

Gene tagging pilot

- The ESC reviewed the results of the pilot gene tagging project that began in 2016 and concluded the genetic “tag release” phase was successful
- The aim of the pilot was to test the logistics and feasibility of large scale gene tagging for recruitment monitoring and incorporation into the new MP and the results of the feasibility test will not be available until 2018
- A decision is required by the EC at this 2016 meeting to confirm the continued funding of the long-term gene tagging project contingent upon it’s continued success and subsequent recommendations from the ESC in 2017 and 2018

Gene tagging pilot

- The ESC noted there is no AS planned for 2018 and the first gene tagging abundance estimate (and test of the feasibility of the pilot gene tagging program) will not be available until 2018
- The ESC recommends that the EC:
  - Confirm continued funding for the long-term gene tagging work, contingent upon it's continued success and subsequent recommendations from the ESC in 2017 and 2018
  - Consider funding the AS in 2018 to mitigate the risk of stopping the aerial survey before the gene tagging method has been demonstrated to be successful as a form of "insurance"

Development of new OM and MP

- Proposed work program to provide re-conditioned OM in 2017 and subsequent development of new MP for 2018 is extremely demanding
- ESC recommended that EC consider dialogue between Commissioners and Scientists similar to what occurred in development of Bali MP as follows:
  - MP concepts and implications discussed with Commissioners prior to EC meeting in 2018
  - Engagement in 2018 between OMMP meeting in Jun and ESC in Sep would facilitate the process
  - This would lead to MP adoption at 2018 EC and TAC setting in 2019 and avoid doing both in same year

Development of new OM and MP

- If TAC setting is delayed for a year, it would require the EC's consideration of extending the 2018-2020 TAC to 2021 or there would be a reduced "lag" between TAC recommendation and implementation
- In order to have adequate resources allocated to achieve the proposed OM reconditioning for the 2017 stock assessment and MP as scheduled a detailed work program was developed (see Attachments 10-12 of ESC report)

Review of the 2016 Work Schedule

ESC Workplan for 2017

The proposed workplan has the following key elements:

- Scientific aerial survey
- Second year of pilot gene tagging project
- Continued collection and processing of close-kin samples
- Continued aging of Indonesian otoliths
- Evaluation of fishery indicators and exceptional circumstances
- Update OM and conduct stock assessment
- Continue development of new MP

2016-17 Proposed Workplan

Activity	Approximate Period	Resources or approximate budgetary implications
Continuation of tag recovery efforts	Tag recovery is continuous	$1,000 for tag rewards on the basis that few recaptures are expected to occur
Provide SBT Stock Status Report to the other tuna RFMOs	Aug – Nov 2016	No additional cost
Proposed SRP activities for 2017: 1. Scientific aerial survey 2. Gene tagging project 3. Continued collection and processing of close-kin samples 4. Continued aging of Indonesian otoliths 5. Maturity workshop 6. Age-validation workshop	Jan – Dec 2017	

2016 -17 Proposed Workplan
(continued)

Activity	Approximate Period	Resources or approximate budgetary implications
Routine OMMP code maintenance and development	Jan – Jul 2017 (Data inputs after data exchange)	Consultant 5 days
CPUE webinar to review progress of inter-sessional CPUE work	Apr? 2017	Members. Three panel days
Standard Scientific Data Exchange	Apr – Jul 2017	No additional cost
Inter-sessional OMMP meeting	5 day, Jun/Jul 2017	Two panel members, one consultant (+ 3 preparation days)
Informal OMMP technical workshop	1 day, immediately prior to ESC, 27 Aug 2017, Yogyakarta, Indonesia	Two panel members, one consultant (+ 3 preparation days), one Secretariat

2016 -17 Proposed Workplan
(continued)

Activity	Approximate Period	Resources or approximate budgetary implications[1]
Extended Scientific Committee for the 22nd 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 • New MP development in 2017 • Stock assessment and review of close-Kin estimates	28 Aug – 2 Sep 2017, Yogyakarta, Indonesia	ESC Chair, 3 panel, one consultant, full interpretation and 3 Secretariat staff.

END