CCSBT-ESC/2508/20
(ESC Agenda item 11.1)

Australia's National
Science Agency

Impacts of changes to the gene-tagging program

Prepared for the Thirtieth Meeting of the Extended Scientific Committee

25-30 August 2025 Virtual meeting

CCSBT-ESC/2508/20

Preece A[1], Davies C[1], Galeano D[2], Hillary R[1], Eveson P[1]

[1] Commonwealth Scientific and Industrial Research Organisation (CSIRO)

[2] Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)

Citation

Preece A, Davies C, Galeano D, Hillary R, Eveson P. (2025). Impacts of changes to the gene-tagging program. CCSBT-ESC/2508/20

Acknowledgment

This work is funded by the Australian Department of Agriculture Fisheries and Forestry and CSIRO.

Contents

1 Abstract

In 2024, the Extended Commission reduced funding for gene-tagging in 2025 and 2026, and an intersessional decision was subsequently made on how to the reduce the program of work for those years. The Commission decision alters the frequency, and potentially the scale, of the gene-tagging program, changing the specification adopted for the Cape Town Procedure from that tested during the Management Strategy Evaluation process, and represents exceptional circumstances. The Cape Town Procedure will need to be fully tested for small changes to the original gene-tagging design, and possibly re-designed if the changes are more substantial. Until further work is done to evaluate the impacts of different reduced programs on the Cape Town Procedure and the assessment models, we can't provide advice on which way to proceed. We propose that this work is specified as part of the preparation for the Management Procedure review in 2027. In this paper we have provided a brief review of the importance and use of an informative recruitment index in the annual review of indicators, the stock assessment and in the Management Procedure, as specified in the meta-rules. We have reviewed potential alternative configurations of the gene-tagging implementation (including logistics, impacts on the Management Procedure Framework and risks), that may be considered to meet the Commission's budget requirements, and we suggest a structured process for addressing the current situation.

2 Introduction

The southern bluefin tuna gene-tagging program was designed in 2015 to provide data on age 2 recruitment, following funding decisions by the Extended Commission and cancellation of the scientific aerial survey (Preece et al., 2015; Anon., 2015a). The estimates of absolute abundance of the age-2 cohort from the gene-tagging program are a prescribed component of the simulation tested CCSBT's Management Procedure (MP) used to recommend the global Total allowable Catch (TAC). The gene-tagging program was also identified as a key scientific monitoring series in the performance review (Sinan et al., 2021), rebuilding strategy and strategic plan (Anon., 2023a) adopted by the Commission. The gene-tagging data are used in the CCSBT's Cape Town MP and meta rules process that includes the review of fishery and stock indicators, assessments of stock status, TAC setting recommendations, MP reviews and a process for dealing with exceptional circumstances (Anon., 2020).

The gene-tagging program was fully specified in a design study (Preece et al., 2015) and integrated in the stock assessment (Hillary et al., 2020), simulated in projections for Management Strategy Evaluation (MSE) (Hillary et al., 2018), and implemented in the MP (Hillary et al., 2019). The performance of the MP was tested via MSE, including poor recruitment scenarios, when choosing the Cape Town MP (Anon., 2019). The design and testing specified the number of fish tagged (5000), number of harvest samples (10,000), the ability to add additional samples if number of fish tagged is low (or in projections if number of matches is low) and has specified target coefficient of variation (CV) of 0.25. The sample sizes were based on the median of abundance estimates of age 2 fish in the last 10 years from the 2014 stock assessment reference set of models (median 2 million fish and maximum cohort size of 3 million fish). GT estimates have generally (5 of 7 estimates) been below the median of 2 million fish (Preece et al., 2025).

In 2024, the Extended Commission reduced funding for gene-tagging in 2025 and 2026, and an intersessional decision was subsequently made on how to the reduce the program of work for those years: as a result, there will not be an estimate of abundance of the 2026 age 2 cohort. The Commission decision alters the frequency, and potentially the scale, of the gene-tagging program, changing the specification adopted for the Cape Town MP from that tested[1] during the MSE process, and represents exceptional circumstances (see ESC2508/0825/17).

In this paper we:

- briefly review the rationale and importance of including an informative recruitment index in the MP and MP framework (i.e., the meta-rules process) for SBT
- outline potential alternative configurations of the gene-tagging implementation that may be considered to meet the Commission's budget requirements; and
- suggest a potential plan of action for addressing the current situation.

[1] The design study (Preece et al., 2015) specifies an annual GT program, with 5000 fish tagged, 10,000 harvest samples, and target CV=0.25. The settings in the projections code used for testing the Cape Town Procedure included: (i) 5000 releases, (ii) 10,000 harvest samples, (iii) an additional 5000 harvest samples if needed (i.e., replicating the adaptive sampling method when too few fish are tagged additional harvest samples can be taken), and (iv) a minimum number of matches (5) which triggers the additional samples (Hillary et al., 2018). The MP uses 5 years of GT absolute abundance estimates, each year weighted by numbers of matches (inverse variance weighting) (Metarules: Anon., 2020).

The last dot point above is crucial because changing the implementation of gene-tagging is an Exceptional Circumstance (Preece et al., 2025), as it is outside what was tested in the MP selection phase. This process needs to be consistent with the meta-rules process and, to be efficient as possible, align with the scheduled review of the MP in 2027.

Recruitment information is essential for management of the SBT stock given that most of the catch is taken as juveniles and sub-adults before they reach maturity. This results in a substantial lag between catches being taken and the subsequent impacts being observed in the spawning stock. Recruitment information provides an early indication of poor/strong cohorts, future stock decline/increases, and future rebuilding. A wide variety of recruitment data collection methods have been explored, since the early 1990s when scientists from NRIFSF (Japan) and CSIRO (Australia) ran a joint Recruitment Monitoring Program 1993-2005 (e.g., Anon., 2005). Gene-tagging is the only current method that provides a precise, fishery-independent estimate of absolute abundance of recruiting cohorts for use in the MP and stock assessment models.

The gene-tagging data on juvenile abundance are used in several components of the management procedure framework as set out in the meta-rules for the CTP adopted in 2020 (Anon., 2020):

1. Recruitment monitoring: The gene-tagging data are used in the annual review of stock and fishery indicators and consideration of exceptional circumstances.
2. Operating models for stock assessments and management strategy evaluation: The index is an input data series for the CCSBT operating models in which it is integrated as an estimate of absolute abundance for the age-2 year class. The operating models are used for assessment of the status of the stock every three years, management strategy evaluation of candidate MPs (when needed), and will be central to the scheduled review of the MP in 2027.
3. Management procedure decision rule to recommend TACs: The fishery-independent gene-tagging dataset, one of three specified data series, is used in the MP decision rule adopted by the CCSBT for recommending TACs.

We currently have a short time series of 7 abundance estimates in 8 years: 2016-2019 and 2021-2023 (in 2020 the gene-tagging was cancelled because of covid and poor fishing). In addition to benefits from monitoring recruitment for use in management decisions and indicators review, these data can provide information on variability in recruitment, the stock recruitment relationship, and individual cohort strengths, which may be linked to environmental covariates or climate impacts.

If continuing the full gene-tagging program is not considered possible for budgetary reasons the Commission needs to either:

- continue the gene-tagging program in a reduced form (or cancel it altogether) knowing this would result in exceptional circumstances and mean CCSBT is effectively deciding to operate outside the MP framework; or
- review the MP, via MSE testing of a revised or new MP, to ensure it will deliver on the Commission's objective to reach 30% by 2035 with 50% confidence.

This is very similar to the situation in 2015 when the aerial survey was cancelled (Anon., 2105b), which led to both the proposal for the gene tagging program and the development of the Cape Town MP. Given this situation, we propose a structured process, similar to the work completed in

2015, for review of the Cape Town MP and discussion of what a revised, or new, MP would need to incorporate to address the Commission's objectives (current and/or updated) and current and future budget circumstances.

3 Background

The ESC has previously prioritised the importance of recruitment monitoring and development of indicators that are fishery independent and unaffected by historical over-catch scenarios that continue to affect CPUE indices (Anon., 2008). Noting the substantial time-lags between initial recruitment and a) the first reliable observations from the longline fisheries (4 yrs old), and b) late maturation (~17 years for average maximum fecundity (from Close-Kin Mark-Recapture)), the ESC has considered it essential that abundance of juveniles is monitored to provide information about potential low year classes as early as possible. To a large degree, the strong recommendation from the ESC for meaningful reductions in the TAC in 2006 and 2009 were due to the strong, but uncertain and lagged, signals of historically low recruitments at the turn of the millennium, combined with the depleted state of the spawning stock (Anon., 2009).

Recruitment data that identifies small cohorts will provide an early warning of recent reduced spawning success and future reduced spawning stock size. Recent reduced spawning success may reflect environmental variability and/or low stock size or potentially climate change impacts on spawning behaviour and/or success (e.g., poor spawning or fertilisation success, poor larval or juvenile survival, or modified spatial and temporal behaviour and ecosystems affecting spawning). In the absence of informative recruitment monitoring data, poor cohorts may not be detected until they start to impact on spawning stock size, 10-15+ years in the future.

At the time of the decision to cancel the aerial survey (that provided an index of relative abundance of ages 2-4) in 2015, the Commission made explicit requests to the ESC for advice on changing the frequency or precision of aerial survey, advice, cancellation and alternative sources of data. A Strategy and Fisheries Management Working Group (SFMWG) meeting of commissioners, scientists and members of the independent panel was scheduled in 2015 to make urgent decisions on funding in relation to both the scientific aerial survey and the Extended Scientific Committee's (ESC) three-year work plan (SFMWG: Anon., 2015).

The 2015 OMMP working group and ESC held dedicated technical meetings to evaluate the importance of recruitment data on scientific advice (Anon., 2015a,b), using management strategy evaluation (MSE) simulation testing and the Bali Procedure. The results of the intersessional work on low recruitment scenarios showed that rebuilding of the SBT stock would likely be delayed, and average catches reduced, without a recruitment index in the MP (Anon., 2015b). This is because the recruitment index provides both a clear signal of future spawning stock size and informs the underlying level of inter-annual recruitment variability, which is a crucial parameter in both the stock assessment and MSE work. Informative recruitment information provides time for a MP to anticipate impacts on the spawning stock and adjust recommended catches accordingly to mitigate the impacts before they reach the spawning stock and affect the rebuilding program.

The Commission and ESC 2015 also noted that: Changing frequency of the aerial survey would require a new MP and MSE testing (ESC Chair report to SFMWG: Anon., 2015c); MP development and MSE testing takes time and funding to complete (ESC: Anon., 2015a); and from the extensive review of alternative recruitment indices the OMMP (Anon., 2015b) recommended gene-tagging as the most appropriate method for future recruitment monitoring. The 2021 CCSBT Performance Review recommended (PR2021-12) that the CCSBT "Continue to develop and embed innovative methods such as gene tagging and close-kin mark-recapture to improve scientific processes" (Sinan et al., 2021).

Given this background, a clear request from the Commission detailing their expectation and objectives for the change to the gene-tagging program is required so that the OMMP technical group and ESC can revise its work program and schedule meetings, as needed, in order to provide the best scientific advice consistent with the current rebuilding plan and MP, and/or updated objectives from the Commission.

4 Consideration of ways to reduce costs and implications

Request from the Commission?

There was no specified request from the Commission for information, however, the ESC agenda has asked for advice on the potential implications of reducing the scope of the gene-tagging and Close-Kin Mark-Recapture programs to realise cost savings.

Below we outline, in principle, three alternative variations in the gene-tagging program that could be considered to reduce the cost of the program. We have considered the logistics impacts, change to MP and MP framework, missing data and the associated risks. The alternatives considered include: 1) Reduced frequency of tagging and abundance estimates, 2) reduced sample sizes and decrease precision of the estimates, and 3) reduced number of field-work days. These alternatives are provided to encourage an informed discussion of practically feasible proposals that may still have the potential to provide both the Cape Town MP and the stock assessment with a sufficiently precise and frequent estimate of 2-year-old abundance at a level of risk that the Commission is prepared to accept. The actual impact of any of these alternatives considered by the ESC would need to be evaluated by MSE to provide advice on the impact on the performance of a "modified MP" on the rebuilding objectives of the Commission for the cost saving achieved.

4.1 Reduce frequency of tagging and abundance estimates

In this first option, we consider the implications of changing the frequency of gene-tagging to every other year, as opposed to the annual cycle that was evaluated for the Cape Town MP (Anon., 2019). Another alternative would be to consider gene-tagging in 2 out of 3 years, which would aligning with the 3-year ESC workplan and provision of data for stock assessment and MP (to ensure that the most recent estimate is available in the year that the MP is run).

Logistics: Less frequent tagging is logistically possible. There are risks and inefficiencies from having a 24-month break between tagging trips (e.g., loss of continuity, efficiency and expertise on charter vessel and for CSIRO field and project staff, and loss of expertise and continuity for harvest sampling).

Change to MP and MP framework: Changing the frequency of the gene-tagging program changes the operation of the MP and therefore this triggers exceptional circumstances as part of the adopted metarule process. Deciding to not collect data is different to missing data, as it represents an explicit decision to change the design of the MP and tested performance. The weighted average recruitment information used in the MP decision rule was intended (and MSE tested) to capture a recent (last 5 years) trend in recruitment information and down weight the estimates with lower precision. Gaps in the data increase uncertainty in this moving average, which increases the stochastic variability of the MP and the resulting TAC recommendations. In any retuning of the MP this (increased variance in recruitment estimates) almost always results in

reductions in mean TAC, given the risk criteria required of the MP. The ESC will need to consider whether the MP should be redesigned and MSE tested if this alternative was chosen.

Missing data: Changes to the frequency of tagging will result in lack of recruitment information in "non-tagging" years, which will affect the annual review of indicators, and there will be missing data in the MP. Both of these are exceptional circumstances under the current MP. Both strong and poor cohorts may be missed from changes to frequency of tagging; it also decreases our ability to detect important trends in recruitment and corroborate early year classes with other data sources. It is worth noting that the first cessation of the scientific aerial survey (to undertake a formal review of the survey), in the late 1990's under the Recruitment Monitoring Program coincided with the period of historically low recruitments between 1999 and 2002 (Anon., 2009). This lack of alternative sources of recruitment information contributed to the uncertainty in the relative and absolute abundance of these year classes and their impact on future stock status. The missing data point from gene-tagging in 2020 (the 2018 cohort) also coincided with a very high CPUE estimate in 2022, which was difficult to verify with other data sources (Anon., 2023b).

Risks: There are existing risks with the original program of failing to obtain an abundance estimate in a tagging year (i.e., from tagging too few fish, or poor-quality DNA or processing accidents/losses, or staff-crew-vessel issues). Changing the frequency of tagging exacerbates these risks, because failure in one year preceded and followed by a break in tagging will result in multiple years without an estimate of recruitment, e.g., as much as a 3-year gap between estimates. This raises the real potential of no recent estimates for the MP, indicator analysis or stock assessment. The last 3 years demonstrates the real potential for this eventuality, in that we have tagged less than the target number of fish in each of these years. The 2023 estimate of abundance is more uncertain and has a CV greater than the target level from the design study (Preece et al, 2025a).

Tests: We could test the operation of the MP with less frequent years of tagging; noting, this is a new MP (and requires code changes) that will require full MSE testing and review.

Conclusion: This alternative is possible, but a new MP would be required and there would be no reliable recruitment information in some years for the indicators review and stock assessment. It would have additional impacts on the ESC's ability to provide timely advice on impacts of individual cohorts.

4.2 Reduce sample sizes, decrease precision of estimates

The gene-tagging design study (Preece et al, 2015) recommended sample sizes for tagging and harvest sampling (5000 and 10,000 fish, respectively) that were optimised to reduce costs and meet a minimum level of precision of the estimate of abundance. The optimal sample-sizes model included the estimated costs of tagging (per fish) and harvest sampling (per fish), the number of fish that could be tagged each day (based on conventional tagging data and history of days of bad weather), estimates of median age-2 cohort-size in the last 10 years from the 2014 stock assessment, and a target for precision for the estimates of abundance. The coefficient of variation (CV) of 0.25 was based on relative precision used for other data in the assessment models, e.g., CPUE. We included an overdispersion factor in the range of scenarios considered in the design study to account for additional potential sources of uncertainty (Preece et al, 2015).

In practice, we tag as many fish as possible while at sea (up to 10,000) and can adjust harvest sampling up or down to maintain the precision of the abundance estimate (via a sample size optimisation model). We have tagged a broader range of sizes classes in some years because of uncertainty in length at age, and some of these sizes classes are subsequently excluded from the final analysis. If less than the target number of tagging samples are collected, we have increased the numbers collected during harvest to maintain the precision of the estimate. In most years the CV has been well below the target level, which is a result of the cohort size being smaller than the average we used in the sample size optimisation model. These estimates with low CV are providing highly informative data for the MP and stock assessment. We considered here the impacts of reducing the planned sample sizes to reduce cost and, as a result, obtain a less precise estimate.

Logistics: There are no logistics issues with reducing sample sizes.

Change to MP and MP framework: Smaller sample sizes will affect precision of the abundance estimates. If fewer samples are collected, then this is a change to the design principles and specification of the MP and therefore would trigger exceptional circumstances. Changing the sampling intensity of the program departs from what was tested in the MSE evaluation process. The inclusion of the gene-tagging was done on specific and pre-agreed assumed sample sizes (release and recapture phases of the program). There will also be a loss of information (greater uncertainty on the actual abundance) for individual cohorts for the stock assessment and for indicators review.

Risks: Reducing sample sizes can result in a larger CV of the estimate of abundance (as seen in 2024 abundance estimate, it is the first time we have gone over the target CV). We will be constrained in our ability to increase harvest samples to maintain the precision of estimates in years of poor tagging sample sizes. As the adult population increases so does the number of 2-year-old fish, on average, and so the number of samples required may need to slowly increase to maintain precision in the estimates. If there is uncertainty in the size range of fish that should be tagged, we will be constrained in the extent to which we can broaden the size range, relative to the original design. Reducing the number of samples also increases the risks of failure of the program in a year from a combination of issues that may co-occur (e.g., lab and/or sequencing errors, size errors, poor fishing).

Conclusion: This alternative is possible, but a new MP would be required due to the change in the specifications of the data. The larger concern is that there are increased risks of failure of the program, as it reduces the original flexibility to transfer sample sizes to harvesting, if releases are low and/or accommodate an increase in the length range released. There would also be a loss of information on individual cohorts in the stock assessment and for indicators review.

4.3 Reduce field-work days

Fieldwork includes vessel charter (29.6m vessel), 7 crew, 2 CSIRO scientists, fuel, aerial spotter, plane, pilot, and supplies and equipment. Based on the SBT conventional tagging programs in the 1990s and 2000s, we estimated that 20 days of sea-time, on average, would be needed to tag ~5000 fish in the age 2 cohort, allowing for bad weather, search time and steaming to the fishing grounds from Port Lincoln. It takes approximately 10 hours to steam to the nearest fishing ground

in the Great Australian Bight, and about 20 hours to steam to the main grounds. On the gene-tagging field trips (2016-2025), fish have been tagged in 109 out of 172 days, and 21 days have had no fishing because of bad weather (notorious in the Great Australian Bight, one of the highest mean wave energy regions in the world). The charter operator advised that they have been operating at a very small profit and more as a cost recovery service provider.

Logistics: It is possible to reduce the available sea-days, however, there is an increased risk of not tagging sufficient fish for an informative estimate. In 2025 we reduced field time to 12 days and caught under the target number of fish. On shorter trips there are proportionally more non-fishing days (transiting time) relative to fishing days. The current charter operator has indicated fewer total charter days is not viable under current charter arrangements and costs may increase (a new procurement request for tender must be completed before the next field work season).

Change to MP and MP framework: There are no changes to the MP if the target number of fish can be tagged in fewer days. If the target number of fish are not tagged, then the changes to the MP, stock assessment and indicators review are the same as for changing precision of the estimate (4.2 above).

Risks: There are increased risks of poor fishing (i.e., fewer fish tagged) and less flexibility around bad weather.

Conclusion: This alternative is possible, but a new MP would be required if precision of the estimate is not met in successive years and there would be a loss of information on individual cohorts in the stock assessment and for indicators review. There are increased risks of failure of the field program. Depending on the overall resource constraints, there may be the lack of ability to compensate for low release numbers by increasing the harvest sampling.

5 The contracted gene-tagging program for 2025 and 2026 and implications

The Commission agreed to a reduced gene-tagging budget for the years 2025 and 2026. Three alternative plans were provided inter-sessionally to the CCSBT Executive Secretary, ESC Chair and Advisory Panel member to consider. The contracted plan for 2025 and 2026 (Table 1) involves:

- Harvest sampling (reduced) in June-Aug 2025 – i.e., this will be sampling the 3 years olds that were tagged as 2 years olds in 2024. Reduced sampling is implemented as a hard limit of 10,000 fish, with no flexibility to collect or process additional samples to include in analysis. The estimate of absolute abundance will be available to the CCSBT data exchange in April 2026.
- Tagging in March 2025 (reduced) and harvest sampling in the following year, 2026 (reduced). The estimate of the abundance of the age 2 cohort in 2025 will be available to the 2027 CCSBT scientific data exchange. The reduced sampling is implemented as a hard limit of 15,000 samples collected and processed: tagging (5000) and harvest sampling (10,000).
- No tagging in 2026, no new estimate of abundance for the 2028 data exchange.

Table 1 The agreed schedule for running the MP, gene-tagging and data exchange 2025-2028.

Activity	2025	2026	2027	2028
Run MP	Y	N	N	Y
Tagging age 2	Y[1]	N	?	?
Harvest sampling age 3	Y[2]	Y[2]	N	?
Data exchange Abundance estimate	2023 age 2 abundance	2024 age2 abundance	2025 age 2 abundance	missing data

Notes: [1.] reduced number of days at sea (from 20 days down to 12days), [2] reduced to max 10,000 harvest samples.

5.1 Risks

1. Reduced sea days: Risk of poor weather and fishing resulting in not tagging enough fish. In 2025, 3700 fish were tagged (under the target of 5000 fish). This is the third year in a row under the target. The current charter operator has indicated fewer days is not viable under current charter arrangements. Finding a suitable vessel with an experienced skipper (with aerial support) is a challenge. The limited availability of experienced pole and line fishers is an additional risk in the potential case that the current provider does not tender in the call for tenders.

2. Reduced number of samples: Having fewer samples results in larger CV of the estimate of abundance (as seen in 2024 abundance estimate, it is the first time we have gone over the target CV). There is also no ability to compensate under the current arrangement for low numbers tagged by increasing the number of harvest samples (above 15,000 samples in total). As the population increases, the number of samples may need to slowly increase to maintain the specified CV.

In summary, the combination of these reductions in the gene-tagging program means there is a real risk of a failure to deliver an estimate of abundance consistent with the specification of the current MP and the design and MSE work that underpins it. The 2025 tagging is the third year in a row under the target number of fish tagged. A succession of failures would undermine the confidence in the current MP and potentially make it unworkable.

5.2 Impacts of the 2025-2026 reduced gene-tagging program on the ESC workplan

Impacts of the changes to the 2025 and 2026 gene-tagging program on the ESC workplan are outlined in Table 2.

Table 2 Impacts of changes to the gene-tagging program in 2025 and 2026 on the ESC workplan 2025-2028.

Activity	2025	2026	2027	2028
ESC workplan	• Change to MP inputs – exceptional circumstance. • Consider development of a new MSE and candidate MPs over next 3+ years?			• No estimate of recruitment for review of indicators – exceptional circumstance • Missing data for MP, no recent estimate - and exceptional circumstance

6 Structured process for evaluation of MP and future needs

Here we suggest a structured process to proceed with re-evaluation of the MP, given the decision of the Commission on the 2025 and 2026 gene-tagging program and to progress beyond the current rebuilding phase.

We have considered the risks to the MP and MP framework to inform the ESC and Extended Commission of the impacts of changes to the gene-tagging program. Changing the gene-tagging

program triggers exceptional circumstances as it involves a substantive change to the MP. This requires considering amendments to the MP to take account of the changed circumstances. Any changes to the MP should at least be MSE tested or potentially undergo a full redesign to be consistent with the adopted meta-rules for the MP. If this is to happen, ideally it would be scheduled (and funded) as part of the preparation for the review of the MP. Given the scheduled review of the MP in 2027, it would seem appropriate and efficient to continue the gene-tagging program until the review work is completed, so that the Commission can assess the impact on its current and any future objectives/performance measures from these results (as recommended by the ESC 2024).

A structured process, that is linked to the MP review, and meta-rule process might consider some of the following activities for the ESC, OMMP, Strategy and Fisheries Management Working Group (SFMWG) and Extended Commission (EC) workplans (Table 3):

Table 3 Draft workplan – for review of Cape Town MP

Draft work plan for review of Cape Town MP		
2025		
August	ESC Meeting	ESC draft technical TOR for the MP review scheduled for 2027. For example, include the following items: i) Progress to date under the existing MP, whether MP is on track to reach target ii) Review current target in light of the 2026 stock assessment. iii) Consider implications of changes to gene-tagging program, including work required to MSE test current/proposed changes in 2026. iv) Draft work program to complete technical review by 2027
October	EC meeting	EC consider: i) The draft of technical TOR and work program for MP review ii) Appropriateness of objectives and related performance measures for MP review and rebuilding program beyond 2030. iii) Guidance to ESC on budget position beyond 2027, and implications for gene-tagging program, for the purposes of MP review and ongoing implementation. iv) Scheduling a SFMWG meeting in 2027 for science-policy dialogue on a) review of MP, b) implementation beyond 2030, particularly in relation to gene-tagging.

2026		
March?	OMMP webinar	i) Detailed consideration of impacts of change in gene-tagging program and specification of work and resources required to test implications
June	OMMP (in person)	i) Preparation for scheduled stock assessment with new software ii) Review progress on consideration of impacts of change in gene-tagging program and update specification of work required to test implications iii) Complete priority MSE tasks (subject to resourcing) iv) Provide Technical specification of runs required to inform review of Cape Town MP in 2027
September	ESC (in person)	i) Scheduled update of stock status ii) Review of impacts of changes to gene-tagging on performance of Cape Town MP iii) Initial review of MP performance in light of updated stock assessment, including the impact of using an improved representation of uncertainty through MCMC iv) Detailed specification of MP performance review criteria and work plan for 2027.
October	EC	i) Consider outcomes of technical review of impacts of changes to gene-tagging on MP. ii) Consider ESC recommendations on detailed work plan for review of MP in 2027
2027		
March	SFMWG	Science and Commissioner dialogue on a) performance measures for review of MP, b) implementation beyond 2030, particularly in relation to gene-tagging, c) desirable performance measures beyond 2030.
June	OMMP (in person)	Review EC and SFMWG advice Preparatory work on review of MP
September	ESC (in person)	Review of performance of MP Define future workplan and resourcing requirements for continued use of the Cape Town MP or workplan for development of new candidate MPs and MSE (usually a 4+ year process).
October	EC	Review MP performance outcomes, workplan and resourcing.

7 Summary

Changes made to the gene-tagging program represents Exceptional Circumstances for the Cape Town MP.

There are limited options for further cost reductions without considerable increase in risk of compromising data quality and/or continuity of the program.

Any substantive change to the MP needs to be MSE tested.

In light of the Commissions 2024 decision, we recommend the ESC in 2025:

- prepare a proposal (including schedule and funding), for consideration by the Commission in 2025, for initial MSE testing of the impacts of current/ESC proposed changes to the gene-tagging program on the performance of the Cape Town MP, consistent with the meta-rule process. The outcomes of this initial MSE testing should be reported to ESC and Commission in 2026 and inform the next steps required in the process for action, consistent with the meta-rules for the MP.

Depending on the outcomes of the above, if the changes to the gene-tagging program have a substantive impact on the performance of the MP, and therefore the Commission's rebuilding program for the stock, then the ESC should provide the Commission with an updated work program that includes consideration of the MSE testing of a revised MP that could be combined with technical and consultative activities associated with the scheduled review of the current MP in 2027.

The above step should include consultation with the commission and stakeholders on objectives and associated performance measures for the MP beyond the current rebuilding objective and key considerations (e.g., scenarios for potential impacts of climate change, spatial management of high seas areas and impacts of climate change) that may impact on the SBT stock or operation of the fisheries in the foreseeable future.

8 References

Anon 2005. SBT Recruitment Monitoring Review Workshop: The role and constraints of scientific monitoring for stock management – brain storming using southern bluefin tuna experiences as an example. CCSBT-ESC/0509/Info-04

Anon. 2008. Report of the Extended Scientific Committee for the Thirteenth Meeting of the Scientific Committee. 5-12 September 2008, Rotorua, New Zealand.

Anon. 2009. Report of the Fourteenth Meeting of the Scientific Committee. 5-11 September 2009, Busan, Korea

Anon. 2015a. Extended Scientific Committee for the Twentieth Meeting of the Scientific Committee. 1 - 5 September 2015, Incheon, South Korea

Anon. 2015b. Report of the Sixth Operating Model and Management Procedure Technical Meeting. 30 – 31 August 2015, Incheon, South Korea

Anon. 2015c. Report of the Fourth Meeting of the Strategy and Fisheries Management Working Group. 28-30 July 2015, Canberra, Australia

Anon. 2019. Report of the Tenth Operating Model and Management Procedure Technical Meeting. 24 - 28 June 2019, Seattle, USA.

Anon. 2020. Specifications of the CCSBT Management Procedure. Attachment 8 of the Report of the 25th Meeting of the Scientific Committee.

Anon. 2023a. Strategic Plan for the Commission for the Conservation of Southern Bluefin Tuna 2023-2028. https://www.ccsbt.org/sites/default/files/userfiles/file/docs_english/operational_resolutions/CCSBT_Strategic_Plan.pdf

Anon. 2023b. Report of the Thirteenth Operating Model and Management Procedure Technical Group. 26 – 30 June 2023, Seattle, USA

Hillary R, Preece A, Davies C. 2018. Data generation & changes to SBT OM. CCSBT-ESC/1809/19

Hillary R, Preece A, Davies C. 2019. Performance of a revised candidate MP using all 3 input data sources. CCSBT-ESC/1909/16

Hillary R, Preece A, Davies C, Takahashi N, Itoh T. 2020. The assessment of stock status in 2020. CCSBT-ESC/2008/12 (Rev.2)

Sinan H, Huang H, Jaya I, Vallières D. 2021. 2021 CCSBT Performance Review. https://www.ccsbt.org/sites/default/files/userfiles/file/docs_english/operational_resolutions/2021_CCSBT_Performance_Review.pdf

Preece A, Eveson P, Davies C, Grewe P, Hillary R, Bravington M. 2015. Report on gene-tagging design study. CCSBT-ESC/1509/18

Preece AL, Eveson JP, Hartog JR, Dell J, Aulich J, Potter N, Cooper S, Grewe P. 2025a. Update on the SBT gene-tagging recruitment monitoring program 2025. CSIRO, Australia. CCSBT-ESC/2508/09.

Preece AL, Davies CR, Hillary RM. (2025b) Evaluation of exceptional circumstances – SBT 2025. CSIRO, Australia. CCSBT-ESC/2508/17

As Australia's national science agency, CSIRO is solving the greatest challenges through innovative science and technology.

CSIRO. Creating a better future for everyone.

Contact us

1300 363 400
+61 3 9545 2176
csiro.au/contact
csiro.au

For further information

E**nvironment** Research Unit
Ann Preece
+61 3 6**232** 5**336**
A**nn.Preece**@csiro.au
csiro.au
https://www.csiro.au/en/research/animals/Fisheries/Southern-bluefin-tuna