Report of the 2025 Bluefin Tuna Species Group ICCAT Intersessional Meeting
(hybrid/ Sète, France, 8-11 April 2025)

The results, conclusions and recommendations contained in this report only reflect the view of the Atlantic Bluefin Tuna Species Group (BFTSG). Therefore, these should be considered preliminary until the SCRS adopts them at its annual Plenary meeting and the Commission revises them at its annual meeting. Accordingly, ICCAT reserves the right to comment, object and endorse this report, until it is finally adopted by the Commission.

1. Opening, adoption of agenda, meeting arrangements, and assignment of rapporteurs

The hybrid meeting was held in person at Palais Consulaire in Sète (France) and online, from 8 to 11 April 2025. Drs. Tristan Rouyer (EU-France) and John Walter (U.S.), the Species Group ("the Group") rapporteurs and meeting Chairs, opened the meeting and welcomed participants. Mr. Camille Jean Pierre Manel, ICCAT Executive Secretary, welcomed the participants and wished them success in their meeting.

The Chair proceeded to review the Agenda which was adopted with some changes (**Appendix 1**). The List of Participants is included in **Appendix 2**. The List of papers and presentations presented at the meeting is attached as **Appendix 3**. The abstracts of all SCRS documents and presentations presented at the meeting are included in **Appendix 4**. The following participants served as rapporteurs:

Sections	*Rapporteur*
Items 1, 14	A. Kimoto, M. Neves dos Santos
Item 2	C. Fernández, M. Lauretta
Item 3	C. Peterson
Item 4	Y. Tsukahara, P. Lino
Item 5	A. Hanke, N. Rodríguez-Ezpeleta
Item 6	N. Duprey
Item 7	M. Lauretta, N. Rodríguez-Ezpeleta
Item 8	C. Fernandez
Item 9	E. Andonegi, A. Gordoa
Item 10	C. Peterson
Item 11	F. Alemany, M. Neves dos Santos
Item 12	J. Walter, T. Rouyer
Item 13	M. Neves dos Santos, C. Brown, G. Melvin

2. Presentation of Close-Kin Mark-Recapture (CKMR) estimate of the western bluefin tuna (BFT-W) spawning stock biomass (SSB)

Document SCRS/2025/070 was presented, explaining the process, methodology and results of the western bluefin tuna (BFT-W) Close-Kin Mark-Recapture (CKMR) work. Overall, the BFT-W CKMR study analyzed approximately 9000 adults from the West Atlantic mixed fisheries paired with ~4000 larvae from the Gulf of Mexico western spawning area, and found 56 parent-offspring matches, which provided estimates of spawner detection probability in the US and Canadian fisheries, and in turn, an estimate of the absolute abundance of the western spawning population for 2018.

The analysts explained that the BFT-W CKMR analysis provided an abundance estimate of adults age 8+ potentially spawning in the West Atlantic, either Gulf of Mexico (GOM) or other areas, including the Slope Sea. More discussion on this issue took place after the subsequent presentation (see below).

Clarification was sought on the methodology used to deal with the fact that adult fisheries in the West Atlantic take a mixture of western and eastern fish. The analysts explained that CKMR probabilities were adjusted to take this mixture into account. However, the statistical details are technical, and it was agreed to discuss those further offline. It was also agreed that the analyst will follow up on evaluating the possible impacts of these assumptions.

The CKMR model formally estimates a quantity known as Total Reproductive Output (TRO), which is not strictly comparable to estimates from the operating models (OMs). The TRO was converted to a comparable metric of spawning stock biomass (SSB) using known age structure and the total biomass of all fish age 8+.

The Group initially saw a comparison of CKMR SSB with the actual spawning biomass from the OMs. During the meeting the actual biomass of age 8+ fish was extracted from the OMs. The Group discussed the comparison shown between the estimate of SSB in 2018 obtained from the CKMR analysis (21 kt with a CV=0.19) and the 48 values of SSB in 2018 corresponding to the OMs used in the Management Strategy Evaluation (MSE) (**Figure 1**). Although the SSB estimate from BFT-W CKMR is inside the range of values from the OMs, its value is larger than the majority of values from the OMs. Despite this difference, the Group noted that a major benefit is that the CKMR results can considerably reduce the spread of uncertainty in population scale (the most influential axis of uncertainty in the MSE) with respect to what was assumed in the OMs.

The question then arose of how one would fit a data point like the CKMR estimate in the OMs used in the MSE. This was discussed in Section 6.

To a question concerning the reliability of the calculated CV (0.19), the analysts responded that, on the whole, they trust the CV calculated, although some question remains around the shape of the fecundity-at-length curve estimated from the CKMR analysis, which is rather flat at low lengths and then rises very steeply for larger lengths, resulting in a steeper curve than would normally be expected for a population. This could be a consequence of the fact that larval sampling may be concentrating on larvae that originate from large adults (i.e. those spawning in the GOM and, particularly in 2017 and 2018, when larval sampling targeted aggregations which might be larger or more frequent for large spawners). Therefore, the estimated fecundity-at-length should be interpreted as referring to the sampled GOM larvae and not to population-level fecundity. However, the estimate of TRO was not sensitive to the estimates of fecundity-at-length curve. The Group also asked if the very steep fecundity-at-length curve estimated may be affected by the possibility that supersibship gets worse for larger parents (if they spawn larger larval batches), to which the analysts responded that supersibship affects only variance and that the negative binomial distribution used for the Parent-Offspring Pairs (POPs) should account for that. The CKMR statistical framework was reformulated to explicitly account for supersibship in the larval collections so as to produce an unbiased estimate and variance around the estimate.

In response to a question of whether the CKMR analysis is able to take into account skip spawners, the analysts explained that the analysis is robust for POPs and that the effect of skip spawners gets reflected in the estimated fecundity. However, for Half-Sibling Pairs (HSPs) this issue is more subtle and some adjustments to the equations may be necessary. It was also noted that the cross-cohort half-siblings can identify when skip-spawning occurs, and an example for southern bluefin tuna was explained. In the case of western Atlantic bluefin tuna fish, several half-sibling matches were observed in consecutive years, indicating that at least some of the tuna do not skip spawn.

Presentation SCRS/P/2025/025 focused on explaining the validity of CKMR estimates of the western stock adult abundance in relation to multiple spawning areas. Questions had been raised about the possibility of bias in the CKMR estimates given that the larval sampling took place only in the GOM, whereas other spawning areas (in particular, the Slope Sea) are known to exist, and the adult fish were taken from fisheries in the Northwest Atlantic which catch a mixture of different stocks. Furthermore, it has been noted that the proportion of western/eastern fish in the West area fisheries is not the same every year. The presentation explained the main arguments and gave simplified equations to provide insights on the matter, concluding that the main important assumption that has to be satisfied for the estimates to be valid is that all western adult fish (of the same length) are equally likely to appear in the Northwest Atlantic fisheries irrespective of whether they have spawned in the GOM or elsewhere. This seems likely to be the case based on the available information on movement from electronic tagging.

In any case, larval and adult sampling is scheduled to occur in the Slope Sea in 2025, and this will provide more opportunity to learn about stock structure.

The assumption that western adult fish are well-mixed in Northwest Atlantic fisheries was further discussed by the Group. The analysts clarified that what well-mixed means in the CKMR analysis context is that the behaviour of GOM spawners outside the spawning season is the same as that of other western fish that spawned on other grounds, that is, they mix after spawning in the foraging area. It was again emphasized that synthesis of tagging data collected over the last 30 years suggests this is the case. The analysts also again noted that the fact that fish of different lengths may behave differently does not matter because the CKMR analysis has accounted for this by conditioning on the length of the fish being compared for kinship.

In relation to eastern bluefin tuna (BFT-E), it was noted that the initial assumption made in last year's design work that Atlantic fisheries are well-mixed also for eastern fish, may be a bit more difficult to justify, but as an initial working assumption it seems good based on the (limited) information available from tagging data.

Some in the Group expressed the view that it would be beneficial to develop a single CKMR analysis for the entire Atlantic. It was, nonetheless, also commented that, whereas this might be desirable, it does not invalidate the analysis done and the results obtained for the West, which accounted for stock mixing and were fairly robust to model structure (complex versus simple models give similar results) and other tested assumptions (i.e. regarding fecundity and spawning site fidelity).

3. Evaluation of the influence on the existing BR MP of the following:

The following agenda items were discussed together.

3.1 CKMR estimate of the BFT-W SSB
3.2 A 2-year cycle for the Atlantic-Wide Research Programme for Bluefin Tuna (GBYP)aerial survey
3.3 Removal of GBYP aerial survey for BR Management procedure (MP)

Document SCRS/2025/049 was presented by first distinguishing between two types of weighting: (1) the objective process of statistical likelihood weighting in fitting an OM to data, and (2) the comparatively subjective process of OM plausibility weighting. This paper outlines an approach to merge both categories of weighting to generate an updated OM plausibility weighting scheme that incorporates the western BFT CKMR SSB (BFT-W CKMR) estimate.

Authors clarified that the approach scales the relative importance of OM weight using the 2018 simulated western BFT SSB compared to the CKMR estimate; this new OM weighting scheme is labeled Original*BFT-W CKMR weights. The influence of Original*BFT-W CKMR OM weighting on performance metrics for both the eastern and western stocks was presented. Given the impact that the BFT-W CKMR estimate was indicated to have on both western MP performance, the authors went on to demonstrate the plausible impact that an eastern CKMR estimate, if it was available in the future, could have on both eastern and western performance. A key caveat of the analysis was no OM reconditioning was done, e.g. the OMs were not refit to the BFT-W CKMR and this is an essential step to actually determining the true impact of having a BFT-W CKMR estimate. Analysts expressed caution in over-interpreting the results until such time as a reconditioning occurred. Lastly, the study presented the impact that a GBYP survey conducted every 2 years or removed after 2026 had on MP performance, namely through a slight deterioration of conservation-based performance statistics in the eastern stock.

The Group discussed these results, highlighting that the impact of the BFT-W CKMR estimate does matter for the BR MP in regard to performance for the western stock and the West area. The Group agreed that the approach used did not provide reliable results regarding the eastern stock and the East area. In response to concerns that this *post hoc* weighting approach essentially ignored many OMs and the associated strategic development of the original OM grid, the Group clarified that this paper was primarily for indicative purposes regarding broad effects on performance statistics, but did not provide definitive (i.e. quantitatively reliable) results for either stock. In that last regard, a more thorough OM reconditioning would be necessary to fully evaluate the impact of this new data in practice. Additional guidance for OM reconditioning is considered and reported in Section 6.

The Group considered the influence of reduced frequency of the GBYP aerial survey index, noting that the impact on BR performance was relatively minor and could probably be overcome by retuning of the MP should such reduced frequency be recommended in the future. The Group highlighted that one purpose of the MSE framework is to demonstrate the management value of various data sources, and that the BFT MSE should be used to address this Commission request.

3.4 Request from Panel 2 to consider underage and subsequent carryover provisions

The Chairs presented a proposal in response to a request from Panel 2 in March 2025 to consider underage and carryover provisions (**Appendix 5**). The proposal will involve testing the performance of the BR MP with an allowable carryover of 20% or another appropriate percentage. The Group clarified that this request was specifically for the eastern stock.

The Group discussed including the existing western carryover allowance but did not consider that this was part of the request from Panel 2. The Group noted a previous robustness OM that considered total allowable catch (TAC) overages of 20%, suggesting that this may help to inform this exercise. The Group also noted that, in practice, the carryover could be reallocated to different fleets or CPCs that could result in a change in selectivity, which may alter the impact of allowing for carryover. However, for logistical purposes the Group considered that any reallocation of uncaught quota would be reallocated using the existing allocation scheme, absent information to alter this assumption. Performance of the BR MP subjected to proposed carryover provisions should be measured by the performance statistics previously agreed. The logistics of the proposal were considered briefly, before deciding that a small group be appointed to draft a detailed proposal for simulation testing; this proposal is intended to be run past the Panel 2 Chair to ensure it satisfies the request.

- Panel 2 made a specific request at the 2025 PA2 intersessional meeting for the SCRS to provide an analysis on the impact of allowing more carryforwards in the BFTE fishery (**Appendix 5**). The Group concluded that the simplest approach that could be achieved to address this request in time to incorporate in the 2025 SCRS annual report would be to do the following:
  - Re-run the BR-MP using the existing MSE code with no changes nor updates to the data used when the BFT MSE analysis was presented to the Commission in 2022.
  - When re-running the BR-MP apply the following modification to catches/removals in each year:
    - First year in simulations (2023) modify the BFTE removals to be 20% lower than the calculated BFTE TAC;
    - In the second year add the tonnage underage from the previous year to the current year's MP-based BFTE TAC. Assume this entire TAC+carryforward will be removed in its entirety; and
    - Then repeat this 2-yearly pattern for the remaining 28 years: underage then TAC+carryforward, underage then TAC+carryforward, etc.

4. Evaluation of updated and/or revised indices in the Operating Models (OMs)

4.1 Presentation of the indices (strict updates)

The ICCAT Secretariat showed compiled catch per unit effort (CPUE) tables (**Tables 1** and **2**) including the strict updates of Morocco-Portugal (MOR-POR) trap, Japan longline (JPN LL) for the northeast and West Atlantic, and the U.S. Rod and Reel (RR) 66-144 cm indices up to 2024 and western Mediterranean (W-Med) larval index up to 2023 (**Figures 2** and **3**). The Chair clarified that all of the indices up to 2024 must be submitted by the 1 September 2025 for the Management Procedure (MP) TAC calculation and the exceptional circumstance (EC) evaluation for this year. The detailed discussion on each index is recorded in Sections 4.2 and 4.3 of this report.

4.2 Evaluation of strict updated indices

SCRS/P/2025/024 presented the strict update for MOR-POR trap index up to 2024. At the 2024 Bluefin tuna Species Group meeting a strict update to the MOR-POR trap index up to 2023 was presented for use in determining if ECs existed. The results of that update revealed that there were significant changes to the pattern of catches exerted in catching the MOR/POR trap quotas in 2023; the quota in Portugal was exhausted in a very short period of time and much earlier in the season than had ever occurred previously. This large change in temporal distribution of the catches created unsolvable problems for the existing index standardization. As a result, the 2023 data were not used for the MOR-POR trap index and the index was not updated, nor was it used in determining ECs in 2024.

The update version of SCRS/P/2025/024 was provided that included the data up to 2024 with and without the 2023 data. Catch data for 2024 returned to its usual temporal distribution, being spread across several months. It was therefore determined that it was possible to update the MOR-POR trap index up to and including 2024. Since the model could not handle the unusual temporal catches registered in 2023, the Group agreed to use the standardization excluding the 2023 data from the strict update (**Table 1**).

The Group also discussed the likelihood that the temporal distribution of the catch could be contracted in the future, as in 2023, necessitating alternative treatments. It was recognized that this risk remains.

Document SCRS/2025/067 presented the strict update and some revised standardized CPUEs, data splitting and a Vector Autoregressive Spatio-Temporal model (VAST) model for JPN LL indices for both west and northeast Atlantic up to 2024 fishing year. The VAST model results generally seem to be sensitive to the drastic change of fishing ground. Although the VAST model should be reviewed when being incorporated into any new assessment model or a re-conditioning of the MSE, the retrospective analysis could provide a good diagnostic to check robustness to the change of fishing ground.

The Group inferred that a new cohort observed since the 2024 fishing year in the catch at size data for this fishery might not be as strong as implied by the degree of increase of index.

The Group discussed the potential for inconsistent signal in the index caused by the changing size composition of the catch and suggested basing the index standardization on a size group that appears in the catch each year in a large proportion. The analyst responded that this would be the focus of future work.

Document SCRS/2025/072 presented the update of the bluefin tuna larval abundance index from the Balearic Archipelago (W-Med) with new data from 2023. The document included a section with the historical changes in the index due to errors found in the update presented in Alvarez-Berastegui *et al*. (2023) and corrected in Alvarez-Berastegui *et al*. (2024).

The authors emphasized the high interannual variability in this index. The Group noted that the trend and variability aligned closely to those in the French Aerial Survey. The authors proposed exploring alternative back-calculation methods for the response variables to mitigate this pronounced variability. If these methods prove effective, they will be presented to the Group for further discussion. The strict update index up to 2024 will be available by September 2025.

The values of the strict update of the U.S. RR 66-144 cm index for 2024 were provided to the Secretariat and updated in the CPUE table (**Table 2**). It was noted that a formal review did not occur and that, at a minimum, a comparison of the update to the previous index was made.

In summary, conditional on passing the ECs review, the Group agreed to adopt the strict update to the MOR-POR trap index up to and including 2024 and continue excluding the 2023 data, the strict update to the JPN LL northeast and West indices up to and including 2024, and the strict update to the U.S. RR 66-144 cm index up to and including 2024 once the diagnostics have been reviewed.

4.3 Evaluation of revised indices

Document SCRS/2025/062 presented the alternative standardization method of French aerial survey data using the environmental data and state-space modelling with Bayesian estimation. The new method showed improvement in terms of the lower interannual variability due to the incorporation of wind effects in the observation model. The impact of sea surface temperature (SST) on the bluefin tuna vertical behavior was discussed, which would cause the difference of detectability in aerial surveys and be a possible cause for the remaining interannual variability. The coefficients of variation (CV) of the estimation error were also improved by this new standardization method. The fit of the new index will be evaluated in a future OM reconditioning.

Document SCRS/2025/064 presented an alternative standardization method for the MOR-POR trap index using spatial and temporal modelling and including a factor that accounts for the direction fish were migrating prior to capture.

The Group noted that the new model fitted adequately to the data and used an appropriate measure of effort. The model could be improved by using day 105 (15 April) rather than day 100 as the standard day of trap setting in each year for the Moroccan traps. Furthermore, an explanation was provided that Moroccan traps finish or close on 31 July based on the domestic regulation. It was also noted that all fish caught by the Moroccan traps are caught on entry to the Mediterranean Sea. Lastly, the Group discussed how the fishing practices of the Moroccan traps had changed before 2018. Prior to 2018 fish were provided both for immediate harvest and fattening, while after 2018 all fish caught by this fishery have been used for the fattening. This resulted in fewer records post-2018. This change in management affects the temporal resolution of the data as the number of records decreases and the catch and effort are only associated with the closing of the trap. As a result, a query was raised whether the increase of CPUEs since 2018 actually represent the trend of the abundance.

Document SCRS/2025/069 presented the alternative index for Canada handline (CAN HL) indices both in the Atlantic and Gulf of St. Lawrence fisheries using a VAST model. The revised index was based on the dominant size class appearing in each year of the fishery for the respective regions. The previous index up to 2023 showed a plateau in the trend after the 2010s. The new index with three size categories revealed that this was a function of decreasing abundance of the large fish offset by an increasing trend in the small fish. This issue was resolved by developing an index for the majority class. It was noted that because there is considerable mixing occurring in both areas, the proposed indices reflect the mixed stock in the West area. Although the current assessment framework was not stock based, but area based, the stock-specific index would be valuable. Due to the change of logbook format for this fishery and consequent change of data quality, it is hard to conduct the strict update as well as the VAST index update to 2024. If the strict update is unavailable in September 2025, this will be treated as a missing index.

A number of revisions were presented at this meeting. Those basically showed improvements in the indices, and did not indicate that the current indices were inappropriate for the TAC calculation by the current MP. Each index provider continues refining the indices for the future reconditioning and health checks. Unless any special situations occur, e.g., ECs, the strict update indices will be used for the TAC calculation by MP in September 2025. The revised indices will be for the future reconditioning and '*Status assessments*'.

5. Evaluation of stock mixing information (BFT Technical Sub-group on Stock Mixing)

The Group reviewed Document SCRS/2025/063, a summary of stock mixing data sources, that could be used to condition bluefin tuna OMs in future MSE processes. Preliminary time series of bluefin tuna mixing were estimated for each MSE area using the otolith microchemistry data and contrasted with mixing proportions derived from the BFT MSE OMs.

The Group considered the coverage of the sampling with respect to the size and date of fish landed in regions where gaps in sampling appeared to exist and suggested that confirmation which size class and quarter combinations are valid for each MSE area be pursued.

The Group also discussed reducing the number of MSE areas to align with where there is support in the data, noting that the OMs will hide fish in areas where there is sparse or no information on mixing by age group and quarter. It was suggested that future reconditioning of the OMs could also include a reduction of the areas to the West Atlantic (WATL), East Atlantic (EATL), Mediterranean (MED) and Gulf of Mexico (GOM) by aggregating the existing areas.

Discussion on the use of genetic and otolith based mixing proportions recognized that the genetic data identified fish with eastern or western ancestry while the otolith data identified the area in which a fish spent early life stages. Given the assumed strong spawning fidelity of bluefin tuna, the ancestry of a fish is often linked with the respective spawning ground; however, partly due to poor separation in the otolith baselines, mismatches in spawning ground/ancestry occur which may be interpreted in different ways. Furthermore, given that the assignment is based on water chemistry, there is the potential for spawning in areas with chemistry similar to one of the two known spawning grounds, which complicates the origin assignment and estimation of mixing proportions. The Group suggested retaining the otolith-based assignments until it was clearer how to incorporate them into the models.

The Group asked why the mixing data was presented for age groups rather than fish length; in response it was indicated that this was in order to conform with the characterization used within the OMs. The Group recommended that future MSE modeling could use observed lengths, recognizing that age data were usually available. Noting that a large number of WATL genetic data records were not assigned to a quarter nor had an age group assigned, the Group suggested that the missing meta data could be recovered from the data owner. However, the Group noted that in the future, advancements in epigenetic ageing would provide a direct age estimate. Furthermore, with respect to the data, the Group noted that the likelihood weight given to the mixing data was lower than that for the tagging data in the OMs, and that higher weighting should be considered given the large number of samples now available.

Lastly, the Group discussed whether mixing proportions provided by model based and machine learning methods are equivalent. A comparative study of the methods using common data sets was recommended in order to judge their equivalency.

Document SCRS/2025/057 presented the results of a study investigating the natal origins of Atlantic bluefin tuna caught in the Norwegian Sea by analyzing carbon and oxygen stable isotopes in their otoliths. A comparison of these isotope values with reference samples from known spawning areas in the Mediterranean Sea and GOM, predicted that all bluefin tuna captured by the Norwegian fishery originated from spawning grounds within the Mediterranean Sea.

The Group discussed the merits and shortcomings of relying on individual assignment as opposed to methods that produce population estimates of mixing proportions. A comparison of the different statistical approaches, underlying assumptions, methodology and performance is needed.

Presentation SCRS/P/2025/022 compared otolith microchemistry and genetic stock of origin assignments obtained using the 96 SNP panel and the array. The presentation provided insights on the proportion of bluefin tuna individuals spawned in areas other than the Mediterranean Sea and the GOM or showing differentiated migratory behavior.

The Group asked whether the meta data for the samples with poor agreement were available in order to determine if there were features they shared. The authors indicated that the meta data were available and that the comparison would take place. Furthermore, clarification was provided that the data examined included GBYP data from 2012 and that the otolith baseline samples were adult spawners from the GOM and Mediterranean Sea captured during the spawning season.

The Group also discussed if a new baseline could be developed from larval samples. The authors explained that due to the otolith's small size, otoliths from several fish would need to be combined but otherwise this was possible. The issue of the discriminating power of the otolith microchemistry data to identify stock of origin was questioned given differences with results from genetic stock of origin. The Group mentioned that the oxygen isotope provides the greatest discriminating power, and that it is affected by water temperature, which has been warming in the Mediterranean Sea. Reports were provided that there had not been much drift related to warming observed in the reference samples over time.

Noting that a portion of samples were unassigned, the Group suggested that this could be due to a contribution of fish from alternate historical spawning areas that have been described in the literature. The stock assignments from the Slope Sea larvae were noted to have a third mode related to the potential hybridization of western and eastern stocks, and it was inferred that this was not likely evidence of a third stock given how broad the distribution was.

The Group discussed the origin assignment based on 96 *loci* and the misassignment of some samples. The analysts indicated that these could be rerun using the array to obtain better assignments; given the very clear separation between eastern and western reference samples, mixing proportions based on individual assignment and population estimates would be similar.

6. Consider a *de minimis* reconditioning to possibly include:

6.1 CKMR

Long discussions occurred on whether ECs were triggered as a result of the presented new BFT-W CKMR results (SCRS/2025/070). While the Group agreed BFT-W CKMR was a large step forward in knowledge of the scale of the western stock, the Group struggled to reach consensus on if this new information fell within the definition of ECs as contained in the protocol in *Recommendation by ICCAT amending the Recommendation 22-09 establishing a management procedure for Atlantic bluefin tuna to be used for both the western Atlantic and eastern Atlantic and Mediterranean management areas* (Rec. 23-07). Some participants felt the BFT-W CKMR results were a large step forward in knowledge of western scale and a substantially different understanding of stock scale compared to the assumptions incorporated in the 2022 MSE results. Others felt that while the CKMR was a solid new piece of information, the results were not beyond anything seen in the full range of the 2022 OMs results and, therefore, they did not consider that these new CKMR results warranted triggering ECs.

During the meeting further comparisons were made between the MSE and CKMR scale (**Figure 1**), these were provided to help participants reach consensus on whether the CKMR results were sufficiently divergent from the 2022 MSE results to warrant triggering ECs. A 'like-for-like' comparison was conducted by overlaying the 2018 CKMR estimate (which is biomass of age 8+) and its distribution with a histogram of the OM biomass of age 8+ fish (**Figure 1**).

While the Group was not able to determine if ECs were triggered during this meeting, the Group did endorse a workplan first outlined in 2024 (and modified slightly during the meeting) for external contractors to work with the Species Group to complete additional analysis incorporating the BFT-W CKMR into the MSE used in 2022 to provide results. The Group noted the aspirational nature of the workplan and the fact that it will be challenging to complete and review by September 2025. It is intended to investigate the impact of newly available information, and it might also provide insights for the discussion at SCRS in 2025 to evaluate the occurrence of EC as defined in Rec. 23-07**.** The endorsed workplan is outlined in Section 6.7 of this report.

6.2 Existing indices up to 2023

The Group did not discuss this in depth. Some participants did mention that the updated indices could be incorporated in a *de minimis* reconditioning. but that this would be something not feasible to be accomplished in time for the 2025 Species Group meeting.

6.3 Revised indices up to 2023

The Group did not discuss this extensively, only minimally. It was pointed out that the strict update presented for MOR-POR trap (SCRS/P/2025/024) did not indicate a modeling issue (unlike in 2024).

6.4 Re-tune BR MP on reconditioned models

See Section 6.7 for workplan.

6.5 Implications of reconditioning and consideration of possible retuning

The Group did not discuss this in any detail, but members of the Group highlighted the complexity of the reconditioning exercise. This exercise requires specific attention, and it may encounter several technical difficulties along the way, in particular within the reduced timeline available to complete the endorsed workplan and specifically because this is the first attempt at integrating the BFT-W CKMR into the MSE, which warrants great care in checking whether the reconditioned OMs fit the data satisfactorily. Concern was expressed that the 2024 workplan had envisioned that the reconditioning would be completed and presented by this meeting, so there will be less time for comprehensive review than intended. Knowing this, it was mentioned that if the incorporation of the BFT-W CKMR though not updated indices into conditioning the 2022 MSE structure was feasible by 2025 September Species Group meeting then a newly tuned BR MP could be provided to the Commission if ECs are deemed to exist and the SCRS recommends such action.

6.6 Develop new projections related to existing ECs provisions, consistent with the lite-reconditioning

The Group did not discuss this.

6.7 Endorsed workplan for incorporating CKMR

The Reference Grid of OMs used in the MSE contained an axis for scale. This was done by incorporating in the conditioning of the OMs a Bayesian prior for the scale of the West area average biomass (2 levels: 15 and 50kt) and a Bayesian prior for the East area average biomass (2 levels: 200 and 400 kt). In each case, the two levels corresponded to a high and a low value, with very small CVs. The basis for these values were past stock assessments, which were admitted being poorly informed on scale, but provided the only biomass scale information available when the OMs were conditioned.

This reconditioning would exclude the two priors for the West area, and replace them in the conditioning by the more reliable information now available from the BFT-W CKMR estimate (and its CV) for the western stock (note stock, not area). Specifically, this estimate from the BFT-W CKMR would be of the TRO. The consultant for this work would be asked to include code in the OM conditioning to calculate TRO, if given the requisite information needed to do this. This should be provided by the scientists conducting the CKMR computations to the consultant.

No other changes to the conditioning, whether to data or priors, and in particular for the East area, would be made. This process would effectively reduce the number of OMs by 1/2, i.e. from 48 to 24 OMs.

The chronology for this workplan would be as follows, below.

- The external contractor would need to complete the above work by the end of June 2025:
    - The newly conditioned OMs would then be available to the bluefin tuna Species Group
- Consider whether the OM reconditioning warrants retuning the BR MP, if yes
    - The MP would not be changed but simply have its tuning parameters adjusted to align with the new OMs.
- A virtual meeting of BFTSG (over 2-3 separate days, 4-hour sessions), would be needed in late July 2025:
    - At this meeting the work conducted to date would be reviewed and to provide enough time for the incorporation of any changes and/or improvements suggested before the 2025 September Species Group meeting.
    - Results of the retuned BR MP and OM conditioning should be provided 7 days in advance.
    - The external contractor would incorporate any of the changes and/or improvements requested at the virtual BFTSG meeting and deliver a final product 2 weeks before the 2025 September Species Group meeting.
    - 2025 September Species Group meeting would then review the finalized conditioning, subsequent OM results and newly tuned BR MP.

7. BFT-W CKMR next steps

The Group discussed the next steps for BFT-W CKMR to move to an operational phase, pending funding availability:

- Continue larval and adult sampling of the USA and Canadian fisheries and, extend sampling to both the Mexican and Japanese longline fisheries;
- Targeted larval and adult sampling in the Slope Sea;
- Using both Parent-Offspring Pairs (POPs) and Half-Sibling Pairs (HSPs) to estimate abundance and total mortality;

- By 2027, provide a 7-8 year time series of SSB for OM conditioning (once OMs are restructured to incorporate CKMR data)
- Use CKMR estimate or raw return information as input to OMs for conditioning (once OMs are restructured to incorporate CKMR data)
- Potential development of a BFT-W CKMR-based MP for 2027 based on POP return rate or SSB index.

Scientists from other CPCs expressed interest in supporting the next phases of BFT-W CKMR. Inclusion of other CPCs was discussed, including recent collaborations between Canada and Mexico, which outlined biological sampling in Mexico as an area of research priority. Japan's scientists also indicated a possibility to include biological samples from the longline vessels in the CKMR program. The inclusion of other western BFT harvesting fleets was a welcomed extension to the current sampling. These samples are expected to further advance the work, both in terms of increased sample sizes, and also additional information on spatial distributions and life history of the species. Japan's scientists also confirmed the sampling and availability of samples from Northeast Atlantic fishing grounds for BFT-W CKMR, if requested.

The Group had a lengthy discussion on the assumptions and results of the BFT-W CKMR. It was discussed that although the method was complex, it has been successfully applied to other species including southern bluefin tuna, and there is full support that it is a very promising method that represents the current best available science for western bluefin tuna.

The Group noted that each CKMR project needs to be tailored to individual species/stocks characteristics. Although for western bluefin tuna, synthesis of migration patterns from electronic tagging data, simulation testing of the CKMR study design, genetic pilot studies, and custom statistical model development occurred to address the major uncertainties, it was noted that it is important to understand the assumptions behind the model (the "givens") and to estimate how violations of these assumptions could affect the results. The Group provided feedback on how some of the assumptions could be tested, including considering whether group or individual assignment to stock might affect the results.

The Group discussed how mixing proportions were estimated for the CKMR study. The analysts explained that the mixing proportions used in CKMR were based on the respective areas of eastern and western probability density distributions, rather than individual assignment. They also explained that in this application, mixing proportions based on population assignment provided for a cleaner threshold separating the eastern and western probability density distributions, which assists with the future assignment of parent-offspring pairs to a stock. However, the Group also noted that while using mixing proportions would not introduce bias in the CKMR estimate of BFT-W absolute abundance, several participants expressed the view that using individual assignment should give more precise estimates.

The Group concluded that the CKMR estimate of western stock adult abundance is sound and represents a significant advancement in our knowledge of population scale. Some aspects of the application of the CKMR methodology require further clarification and possible investigation and the analysts offered to do this. In particular, the following elements were noted:

- The formula that was applied for the CKMR probabilities uses a calculated probability that a fish is of western origin conditional on knowing its sex, length and year of capture, instead of using the probability that a fish is of western origin given its genotype. Whereas doing this can facilitate the statistical work, as it allows grouping the fish by covariate values (the covariates being sex, length and year of capture), instead of using the individual genotypes, there were questions about potential consequences on the results incurred by this procedure.

No major concerns were identified in the modeling, and the Group agreed the approach is a great advancement in the understanding of the abundance, stock composition, and fecundity of the western stock.

8. Eastern bluefin tuna (BFTE) CKMR

8.1 Preliminary activities

Presentation SCRS/P/2025/021 showed results on the genetic analysis applied to different tissue samples to determine which one is the most appropriate for sample collection for CKMR. This suitability analysis has confirmed that almost non-invasive sample collection was possible for genetic analysis, opening new sampling opportunities, relevant not only for CKMR but also for other applications, such as e.g. age estimation through epigenetics.

The Group noted the relevance of this work even if CKMR was paused temporarily, since it permits to collect useful information obtained from genetic analysis, such as potentially age. It was also noted that if ages were derived from epigenetics in the future, based on e.g. keel samples, appropriate calibration (with otoliths) of an epigenetic clock would be required.

A study was developed in the GBYP Phase 14 (under Biological Studies component) with the objective of examining sibship for larvae collected in the Balearic Sea survey and investigate whether potential supersibship could create serious difficulties for CKMR analysis. Approximately 3400 larvae collected from several survey stations were genotyped. The stations were chosen to represent different levels of larval aggregation (ranging from high to low amounts) and approximately 30% of the larvae caught in each selected station were genotyped, to try and mimic a situation where the genotyped larvae are taken proportionally from all survey stations. The number of half-sibling and full-sibling pairs found among these larvae, within stations, across stations, and with other larvae available from the 2020 survey, were shown to the Group and are available in Table 3.3 of the GBYP report (Fraile *et al*., 2024).

The Group noted that the sibship level found was non-ignorable for CKMR analysis, but was nevertheless somewhat lower than in the 2018 GOM survey. Therefore, larval samples from the Balearic survey constitute a useful source of juveniles for CKMR, provided the methodology developed for BFT-W to deal with larval supersibship is applied. The fact that these larvae could show supersibship was already taken into account in the BFTE design work conducted in 2024 (in an *ad hoc*, but appropriate way for design purposes). It was also concluded that the most appropriate way to select larvae for genotyping (for CKMR purposes) would be spreading them across stations (taking a proportion from each station), instead of concentrating the genotyping on e.g. stations with low larval abundance. This was considered the safest way to appropriately represent the entire range of spawners in the Balearic Sea and avoid potential biases. The fact that half-sibling pairs were found between different years is suggestive of some level of spawning site fidelity.

8.2 Future planning and funding (BFT Technical Sub-group on CKMR)

The Chairs reminded the Group of the plan that had been presented to the SCRS plenary meeting in 2024 and endorsed by the SCRS. This involved conducting additional methodological work and studies, as well as field sampling starting in 2025. However, the Commission did not adopt the plan in their 2024 Special Meeting of the Commission, and it is unclear to the Group, at this point, how it may proceed given serious financial difficulties encountered. It was said that it may still be possible to aim for the long-term vision of that original plan (i.e. for around 2030), but this is not clear at present.

It was noted that maybe the Group could still work on those lines that were approved in the budget for 2025, noting that these funds have to be spent before the end of the year in order not to lose them.

A representative from the European Union (EU) reminded the Group that, as previously communicated to the Secretariat, the EU voluntary contribution to GBYP should not be used to support CKMR studies. Representatives from other CPCs noted their support for activities under the CKMR funding item, however it remains unclear how much funding might be available for BFTE CKMR. Participants noted that future support for CKMR may require a greater degree of conversation between scientists and managers on its technical details and on the benefits of a CKMR approach.

9. BFT Technical Sub-groups on farm operations and early life history: activities and planning

Presentation SCRS/P/2025/023 showed the work conducted by the BFT Technical Sub-group on early life history in the GOM, the Balearic Islands, and the central (East of Tunisia and Strait of Sicily) and Eastern Mediterranean.

Concerns were shown about the appropriateness of conducting the survey in the second half of June - first days of July, even more in the context of climate change that could anticipate the spawning season and make the larvae less available.

Some clarification was requested on the depth of the survey carried out in the Levantine Sea, that goes up to 200 m. It was acknowledged that, knowing this is not the optimal depth range for BFT larvae, it was defined to be consistent with the biodiversity studies conducted during the same survey, noting that since larvae estimation methods are standardized, estimates will not be affected by the depth range.

It was also highlighted that larval surveys are considered valuable for BFT science and the Group will continue to support this research activity. Additionally, the BFT Technical Sub-group on early life stage history confirmed that the advances on Balearic larval index for 2024 will be available by the 2025 September Species Group meeting. It was also noted that some studies are now directed to get the larval survival index, which is being improved by taking into consideration zooplankton prey effects, that will be also presented during the 2025 September Species Group meeting.

Document SCRS/2025/073 showed results from a study that compares the accuracy of the manual *versus* automatic methods for size estimation in a Moroccan Atlantic farm from 2 cages. The length data estimated at preharvest by the two systems were compared with actual length data at harvest. The document noted that estimated growth rates in length by the manual system are higher than those from studies conducted under the GBYP program. It was highlighted that this study was developed under commercial conditions, which caused some difficulties in sampling a higher percentage of fish. It was concluded that manual measurements are more accurate than automated ones.

The Group acknowledged the importance of conducting these length measurements on the same subsamples of the 2 monitored cages. However, further improvements in both methods used and the statistical analysis carried out for comparisons are needed.

Document SCRS/2025/065 presented a new length-weight (L-W) relationship calculated specifically for the Bay of Biscay using observations between June and August, coinciding with the period in which caging operations are expected to take place in the new farm that will start operating as a pilot study in 2025 (*Recommendation by ICCAT amending Recommendation 23-08 for a pilot project for farming bluefin tuna (Thunnus thynnus) in the Cantabrian Sea* (Rec. 24-06)). Results showed that other L-W relationships used in ICCAT for farms in different areas would substantially overestimate the weight of BFT in the Bay of Biscay.

Discussion followed on the potential causes for this, and it was argued that lower condition of the individuals, especially the large ones could be due to the post-spawning migration, which also affects the fish caught by EU-Portugal traps and reflected in Lino *et al.* (2021), although to a lesser extent. The Group also noted the need to check the availability of data from Rodriguez-Marin *et al*. (2015) from the same time and place. Some concerns were noted and these will be provided to the authors to follow up in advance of the Species Group meeting.

The Group noted that, while having a general L-W relationship could be beneficial in some situations, for quota monitoring purposes (which is basically a compliance issue) it was most appropriate to use L-W relationships reflecting fish condition in the place and area where fish are caught. In fact, it was pointed out that L-W relationships specific to a time and place have been used in other farms already, and that in this case, the new equation presented represents the best available information about the length-weight relationship in the Cantabrian Sea during June-August to be used for farming activities in the Cantabrian Sea.

10. Nature of 2026 '*Status assessment*' and plan for MSE review

Document SCRS/2025/066 provided an updated review of previously presented suggestions for the MSE. In particular, the author proposed the need to disentangle the tuna trap CPUE data series to better complement additional trap data collection protocols (genetic, microchemistry, and tagging data). A new stratification of the areas was proposed, which would better reflect scientific understanding and existing data. The authors supported again "one stock" robustness test, suggesting it would provide a useful test of the comprehensive aggregation of Atlantic bluefin tuna, and accompanied by an updated figure summarizing the highly complex mixing knowledge.

The Group noted the limited time to engage in the discussion required to address all the information presented. The decision to consider each complexity presented largely depends on the goals of the exercise. The Group highlighted that the goal of the MSE is to serve as a tool to provide management advice, not necessarily to explain and model the proposed level of complexity. Limited data availability, particularly informing movement, inherently constrains the MSE complexity.

Document SCRS/2025/058 provided a comprehensive overview of an unusual situation that happened in 2024 in the western Mediterranean, particularly in the Sardinian trap fishery. Real time information enabled exploration of the environmental drivers (e.g., seasonal temperature anomalies, circulation patterns, anthropogenic offshore energy infrastructure) that correlated with anomalous bluefin tuna availability and catches (many small spawners and fewer large fish). The author suggested that the minimum size for bluefin tuna should be revised as proposed several times in the past and that the 5% tolerance for the undersized fish should consider the anomalous environmental circumstances.

The Group highlighted the potential confusion that may arise from colloquially using technical MSE jargon, like the term "Exceptional Circumstances", used in the document which has a clear definition within MSE.

Presentation SCRS/P/2025/019 presented responses to the external review of the 2021 Western Bluefin Stock Assessment Meeting (Maunder, 2021). The presentation addressed reviewer feedback on catch, size composition, indices of abundance, and life history parameterization. The authors presented analyses conducted to support these responses, which revealed the strong impacts that data uncertainty and biological assumptions had on the biomass scale estimation. The work will continue to address the comments fully and to improve the current area-based assessment model.

The Group supported these efforts and noted that the external reviewer also highlighted the value of CKMR. It was noted that CKMR inclusion into an integrated assessment modeling platform, like Stock Synthesis (SS) model, requires consistency of all data sources to produce an appropriately characterized model.

Document SCRS/2025/071 offered alternate approaches to incorporate environmental considerations in the stock assessment by (1) directly considering environmental drivers within Stock Synthesis (SS3), and (2) using VAST to create alternative rod and reel CPUE indices that account for environmental impacts (Atlantic Multidecadal Oscillation) on bluefin availability outside of the assessment model. Results from exploratory SS3 models with either a U.S. VAST index or a joint U.S.-Canada VAST index suggested similar or improved diagnostics, with comparable stock estimates.

The Group observed that the combined U.S.-Canada VAST index better represented stock dynamics, as presented by reduced autoregressive patterns in index residuals within SS3 compared to applying a VAST index for only the US and retained the existing Canada index, which likely suggested that VAST was able to reconcile conflicts between the US and Canada indices. The Group inquired about the stability of VAST indices to the addition of new years of data, and the VAST modelers suggested that the historical trajectory was relatively robust to the addition of new data points.

'Status assessment'

The Group prioritized discussion around defining the upcoming '*status assessment*', which is intended to potentially provide insights into MP performance and provide updated stock status information, if estimable. The Group recommended using stock assessment approaches (outlined below) to conduct the *'status assessment'*, as these are valuable tools for this purpose. However, the *'status assessment'* is not intended to provide new TAC advice.

The *'status assessment'* is distinct from the more substantive MP review, which is intended to review and potentially revise the MP and may include a thorough review, update, and/or revision of relevant scientific data and associated OM structure, a complete or partial reconditioning of the OM grid, and/or exploration of alternate candidate MPs. The *'status assessment'* should complement annual ECs provisions, which are reviewed annually but may have relatively weak statistical power on their own to detect stock status or biomass trajectory. Moreover, the *'status assessment'* should be representative of the current priorities of the Group, e.g. the design of the *'status assessment'* should reflect the Group's desire to allocate more time to the MSE over stock assessment.

The Group expressed concern regarding the lack of an accepted stock assessment, the complexity of the assessment required to meet the scientific needs of the stock, the high uncertainty in stock assessment results, and the desire to estimate stock status as a product of the *'status assessment'*. Simpler approaches were considered, although the need to justify simplifying assumptions may undermine results. The Group highlighted the challenges associated with estimating biomass-based benchmarks, while fishing mortality-based benchmarks may be more achievable.

The Group referenced the MSE review process for Commission for the Conservation of Southern Bluefin Tuna (CCSBT), in which the same model is used to condition the OM as to assess the stock. The stock assessment precedes the MSE update, and is conducted for each reference OM. The Group considered following a similar approach to CCSBT, though noting that the M3 (OM) model would be inappropriate, as currently parameterized, for an assessment update because of the strong priors on stock magnitude and because M3 does not produce comprehensive stock assessment outputs. The Group considered the value of encompassing uncertainty by fitting to each reference OM model, though ultimately suggested building the *'status assessment'* based on a single (or select few) 'base' or central reference OM(s), that capture(s) the best prediction of the underlying stock dynamics.

Proposal for 'status assessment' and MSE review

The Group intends to process the most up to date available data streams and fit a base case Multi-stock Assessment with Regional Spatiotemporal dynamics (MARS) model (Huynh *et al.,* 2024) to those data, including typical analyses and diagnostics that support the peer-review of a conventional stock assessment such as sensitivity tests, retrospective analyses and likelihood profiles.

The Multi-stock Assessment with Regional Spatiotemporal dynamics (MARS) model (Huynh *et al*., 2024) was defined to meet the needs of Atlantic bluefin tuna (e.g., multi-stock, multi-area, seasonal, and mixing) and associated data (e.g., stock of origin, tagging, and CKMR), thereby overcoming limitations that previously lead to unaccepted stock assessments. The Group agreed that using the MARS model for the *'status assessment'* would essentially integrate the *'status assessment'* into the MSE framework because MARS and M3 are based on a similar structure. This allows the base (or select few) existing OM(s) parameterizations from the reference grid to form the *'status assessment'* models, and allows for full diagnostics (e.g., retrospective analyses, and likelihood profiling), and will serve to inform OM reconditioning at the next MSE review. Note that the Group anticipates that M3 will continue to be used to define OMs for subsequent MSE reconditioning. The Group highlighted the need to be able to run the *'status assessment'* and MSE and recommended that MARS be added to the ICCAT software catalogue.

The '*status assessment*' should produce reference points as considered appropriate and if estimable. One base case (or a select few key) 'status assessment' model(s) should be selected (possibly parameterized similarly to one or a few OM reference grid models) to represent the best understanding of underlying stock dynamics. All models and supporting code should be open-source, fully documented, and available for peer review. The model can also incorporate CKMR data and should incorporate BFT-W CKMR information which might allow for estimation of western stock biomass scale.

Commensurate with the modeling exercise the process should also allow for online training workshops for Group scientists to learn the modeling platform. The modeling could be led by an external group but would need very strong participation from SCRS stock assessment modelers so that the Committee can develop the capacity to run the model internally.

The initial 'continuity' model to be selected should have configurations that match exactly the spatial, fleet and index structure of the existing MSE OMs, with similar indices and input data. It will have a terminal year of data of 2024. The Group may request other sensitivity runs which could include other modeling spatial configurations, alternate CPUE indices, or biological assumptions.

Timeline for '*status assessment*' *and MSE Review*

September 2025 Data Guillotine for indices, genetic, tagging and otolith composition data for 'continuity' '*status assessment*'. Develop call for tenders for modeling contractors and MSE revision work. Discuss proposals for revised spatial structure. Develop a proposal for a few OM models for the Terms of Reference (TOR) for the '*status check*' MARS modeling.

Table of data input availability for '*status assessment*' and MSE review.

Input data	*Terminal year*	*Available*	*Comments*
Task 1	2024	September 2025	
Task 2 Size	2023	April 2025	5cm and 25cm bin
CATDIS	2023	April 2025	catch by quarter
Indices	2024	September 2025	
Genetics	2021	September 2025	EATL up to 2024
Otolith chemistry	2022	September 2025	NATL up to 2023
Tagging	2024	September 2025	

November 2025 Present overview of plan to Panel 2.

March 2026 Panel 2 meeting to initiate dialogue on the workplan.

April 2026 Data Preparatory meeting; Continuity model run presentation/MSE review data scoping and recommendations/Draft sensitivity *'status assessment'* model runs/Finalize alternative model structure/Create MP developer teams.

July 2026 Stock Assessment meeting; Review Sensitivity model runs/Develop *'status assessment'* advice to include stock status based on fishing mortality and possibly biomass/MSE review modeling scoping incorporating feedback from Panel 2 and MP developer teams.

September 2026 Finalize *'status assessment'* and approve MSE structural assumptions and data guillotine for data inputs.

March 2027 Panel 2 meeting to present overview of the MSE structure.

April 2027 MSE workshop on OM conditioning and initial runs with BR MP.

[optional independent experts peer review of MSE framework, if substantively revised]

September 2027 Present conditioning results to the SCRS Plenary.

March 2028 Panel 2 meeting, initial feedback on BR MP performance.

April 2028 Further development, vetting and tuning of BR and other Candidate Management Procedure (CMP) with possible iterative online meetings for further development.

September 2028 Finalize Candidate MP to present to Panel 2 for 2029-2031 TAC advice.

October 2028 Extra Panel 2 meeting to select CMP and develop TAC advice.

September 2029 Revised EC protocols drafted.

11. GBYP activities and planning

11.1 Decision about the possible cancellation of aerial surveys in the Central Mediterranean

As requested by the Commission, the Group discussed the possible cancellation of the GBYP aerial campaign in the Central Mediterranean, considering the factors affecting the reliability of aerial surveys estimations, the progressive decrease in funds availability and the fact that the data collected has never been selected by the Group to be used as an index of abundance in stock assessments nor informing the BFT MSE.

There was minor support for the continuation of the GBYP aerial campaign in the Central Mediterranean. The Group agreed that the 2025 GBYP aerial survey should be carried out only in the Balearic Sea area.

11.2 Model-based approaches for aerial survey

The Group discussed the convenience of using a small part of the funds initially allocated to aerial survey in Central Mediterranean to improve the interannual standardization of the available time series, particularly for the aerial surveys in Balearic Sea, by modelling the effects of environmental factors on the accessibility of BFT schools to aerial sighting in the study areas. The Group agreed that it would contribute to enhance the quality of the current aerial survey index used in the BFT MSE. Therefore, the Group recommended that further work towards the standardization of GBYP aerial surveys index time series be developed in 2025.

11.3 GBYP activities

Tagging

Presentation SCRS/P/2025/020 provided preliminary results of two acoustic tagging campaigns carried out in June/July 2024 in a tuna trap off the southern Portuguese coast. The main objective was to test the capacity of a network of receivers located in the Gulf of Cadiz, especially the curtain of receivers recently deployed across the Gibraltar area under the EU STRAITS project, to detect acoustic tagged BFT. The results demonstrated that BFT can be effectively monitored using acoustic tracking techniques when entering and/or exiting from the Mediterranean Sea.

The Group requested some clarifications about the capability of these new arrays of receivers to detect different models of transmitters and about the accessibility to the generated data. The authors informed that these acoustic tagging activities use open access protocols, and that the ICCAT Secretariat has created an account in the European Tracking Network database to make available to SCRS the data from acoustic tags deployed under ICCAT tagging programs or from other institutions that are willing to collaborate with ICCAT.

The Group recognized the potential of acoustic tagging to address important current knowledge gaps, such as natural mortality, and recommended that GBYP continue supporting this line of research.

CKMR development and biological studies

The Group was requested to provide a prioritized list of additional studies to be carried out in 2025 within the GBYP biological studies program, taking into account the EU decision of not allocating any funds from its voluntary contribution to any activity related to CKMR and MSE reconditioning. The Group pointed out that CKMR related studies, aiming to improve the feasibility CKMR study for the eastern BFT stock, should be maintained.

A number of other studies and sampling activities were proposed:

- Expanding sampling to support further genetic studies on epigenetic ageing and stock structure;
- Develop the current knowledge on interbreeding in the Slope Sea;
- Fill knowledge gaps to inform mixing;
- Biobank improvement and maintenance;
- Development of methodologies to characterize (number and size frequencies) the BFT catches at first transfers.

Final decisions on which projects to undertake will be taken by the GBYP steering committee pending further elaboration of available funding.

11.4 Terms of reference of GBYP biological studies in 2025

Due to the lack of time and unknown funding levels, it was agreed that the ToRs would be drafted in the intersessional period by the GBYP steering committee.

12. Recommendations

The Group recommended that, once the concerns around the L-W relationship for the Cantabrian Sea were addressed, it be presented to the Sub-Committee on Statistics as a candidate to be added to the list of L-W equations for farms used to monitor quota consumption during farming.

The Group recommended that an ICCAT or SCRS representative attend the Regional Coordination Group, Large Pelagic (RCGLP) meeting requesting genetic sampling, for the purposes of population structure research and future application of eastern bluefin tuna CKMR.

The Group recommended using the strict update to the Morocco-Portugal trap index up to and including 2024 and continue excluding the 2023 data, the strict update to the Japan longline Northeast and West indices up to and including 2024, and the strict update to the U.S. Rod and Reel 66-144 cm index up to and including 2024, for EC provision and MP recalculations in 2025.

The Group recommended assembling data sets to conduct a '*status assessment*' of the Atlantic bluefin population, prior to the bluefin tuna Species Group meeting in September 2026. The requested data are as follows:

- Catch and length compositions by year, quarter, OM fleet, and OM area up to 2024 fishing year. *ICCAT Secretariat*

- Individual genetic based stock assignment probabilities for sampling locations within the Convention areas prior to 2025. The data must be accompanied by a direct measure of size, age, location (highest resolution possible), date (highest resolution possible), genetic method (96 SNP panel, array, CKMR), sample ID and Sampling program. *National Scientists*

- Individual otolith microchemistry data (oxygen and carbon isotopes) for sampling locations within the convention areas prior to 2025. The data must be accompanied by a direct measure of size, age, location (highest resolution possible), date (highest resolution possible), sample ID and Sampling program. *National Scientists*

- Individual bluefin tuna location data derived from pop-up satellite archival tags (PSATs) for tag deployment locations within the convention areas prior to 2025. The data must include daily location estimates, a measure of size, stock of origin classification, classification method (genetics, proximity to known spawning ground during spawning times), track estimation method and Sampling program. *National Scientists*

- Data providers of both genetic and otolith data must indicate if fish occur in both sources and must ensure that the sample IDs properly identify those paired observations. The lowest resolution for location is BFT ICCAT area and the lowest resolution for date is quarter. Sample IDs should be those assigned to the sample by the original data owner and not a subsequent sample ID assigned by another user in order that duplicates can be identified across data providers.

13. Other matters

13.1 New rules on funding

The Secretariat provided the background for the new rules related to SCRS science funding requests that should be followed by the Group while drafting the Recommendations with financial implications. This included an overview of the available funding and use made between 2020 and 2024 within the GBYP. It was explained that the *Explanatory note on the draft ICCAT budget for financial year XXXX*, which is annually prepared by the Secretariat and discussed during the annual meeting of the Commission aiming the approval of the regular budget, shall now include much more information regarding the science budget, including among others: i) a general overview on the use of funds made available over the previous five years; ii) the balance of the science budget; iii) clear description and justification on the activities to be developed, together with thorough estimates of the associated funding requests; iv) the rationale for those activities that are planned for multi-years; and, v) that the funding requests to be estimated for the upcoming two biennial cycles of the Commission regular budget, and compiled in the budget table template developed by the Secretariat.

Accordingly, a new template has been developed by the Secretariat to be filled by the SCRS subsidiary bodies, while drafting their recommendations with financial recommendations (see below). However, since the first draft of the *Explanatory note on the draft ICCAT budget for financial year 2025* is due by late June 2025, it would be essential that Chairs/rapporteurs provide a tentative list of activities and estimates of associated cost by major line of activity as detailed in the table below in advance.

Working group	*2026*	*2027*	*2028*	*2029*	*Explanations*
Tagging					
Tag and tagging material purchases					
Rewarding, awareness and satellite					
Tagging campaign					
Biological studies:					
Reproduction					
Age and growth					
Genetic					
Other (sample bank)					
Sample collection and shipping					
Other fisheries related studies					
Consumables					
Workshops/meetings					
Modelling:					
MSE					
Stock assessment					
Other					
Science coordination (e.g. GBYP, Steering committee)					
TOTAL					

An Excel file has also been made available by the Secretariat to allow more thorough estimates related to travel and subsistence costs, that should be used by the SCRS to estimate costs associated with the invitation of experts and/or instructors to meetings and workshops.

The Group was informed that the SCRS Science Strategic Plan Ad Hoc Drafting Group will be working intersessionally to advance the drafting of the 2026-2031 SCRS Science Strategic Plan for review at the SCRS Science Strategic Plan Meeting (9-11 July 2025). The SCRS Chair reminded the Group that all Species Groups have been asked to develop 6-year plans within their research programs, in parallel with the Strategic Plan development, to encourage strategic research planning and facilitate collaborative efforts across Species Groups. He suggested that the budget table template could serve as a good format for 6-year research plan summary tables, as well, since the headings included are fairly comprehensive, and new rows could be added under each heading for separate research projects. This would also greatly facilitate synchronizing the budget template for the funding requests with the strategic research plans.

13.2 Other matters

Document SCRS/2025/059 summarized the BFT length frequency distribution of Balfegó purse seine (PS) fleet (2016-2024) during fishing operations in the Balearic using a custom Artificial Intelligence (AI) tool. Lengths were estimated using: 1) artificial intelligence video estimates at transfers to the transport cages and 2) measured straight fork length (SFL) at harvest. Both measurements showed similar results. The data indicated an increase in individuals of sizes around 130-150 cm in the last two years (2023 and 2024), although mainly last year, and a gradual increase in the largest individuals (>250 cm) observed by both approaches since 2016. This particular AI tool proved the capacity to analyze the interannual changes in catch size distribution. Other studies in the Mediterranean are indicating similar observations.

While it appears that a strong cohort may be entering the resource, given the observed increase in the proportion of small fish, caution is warranted before reaching this conclusion. A little more time (1-2 years) is required to confirm this potential strong cohort. The latter could lead to consideration of adapting management measures (i.e.: fishing period, % of minimum size tolerance for PS) to deal with the increasing percentage of small fish.

The Group discussed the use of AI to estimate fish size at first cage transfer. This AI tool could measure large numbers of fish during the first transfer; it still must be ground-checked against manual estimates. It still may not be efficient for estimating the number of fish due to double counting. However, onboard observers continue to provide total counts.

14. Adoption of the report and closure

The report was adopted during the meeting. The Chairs of the Group thanked all the participants for their efforts, the EU (French national institute for ocean science and technology, IFREMER, France) for hosting the meeting. The meeting was adjourned.

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Table 1. Strict updates of abundance indices for Atlantic bluefin tuna in the East Atlantic and the Mediterranean.

series	SPN BB		SPN-FR BB		MOR-SPN TRAP		MOR-POR TRAP		JPN LL EastMed		JPN LL NEA01		JPN LL NEA02		French Aerial survey 1		French Aerial survey 2		W Med Larval Survey		W Med GBYP Aerial Survey	
age	2-3		3-6		6+		10+		6 - 10		4 - 10		4 - 10		2-4		2-4		Spawners		Spawners	
indexing	Weight		Weight		Number		Number		Number		Number		Number		Number of schools		Number of schools				Total weight (t)	
area	East Atlantic		East Atlantic		East Atl and Med		East Atl and Med		East Atl and Med		NEast Atl		NEast Atl		West Med		West Med		West Med		Balearic Sea	
time of the year	Mid-year		Mid-year		Mid-year		Mid-year		Mid-year		Begin-year		Begin-year		Mid-year		Mid-year					
source	SCRS/2014/054		SCRS/2015/169		SCRS/2014/060		SCRS/P/2025/024		SCRS/2012/131		SCRS/2025/067		SCRS/2025/067		SCRS/2022/068		SCRS/2025/062		SCRS/2025/072		see Figure 13, SCRS/2025/038	
Year	Std. CPUE	CV	Std. CPUE	CV	Std. CPUE	CV	Std. CPUE	CV	Std. CPUE	CV	Std. CPUE	CV	Std. CPUE	CV	Index	CV	Index	CV	Index	CV	Index	CV
1952	179.22	0.43																				
1953	184.74	0.53																				
1954	226.46	0.41																				
1955	187.01	0.42																				
1956	470.53	0.43																				
1957	315.05	0.41																				
1958	252.25	0.41																				
1959	506.79	0.41																				
1960	485.16	0.43																				
1961	327.29	0.41																				
1962	180.12	0.46																				
1963	312.09	0.49																				
1964	457.40	0.42																				
1965	228.91	0.41																				
1966	349.10	0.42																				
1967	345.89	0.41																				
1968	447.00	0.42																				
1969	610.62	0.40																				
1970	594.66	0.43																				
1971	744.71	0.40																				
1972	525.63	0.41																				
1973	535.63	0.40																				
1974	245.39	0.44																				
1975	484.22	0.41							1.90	0.15												
1976	483.96	0.41							2.15	0.12												
1977	547.56	0.41							3.53	0.14												
1978	705.26	0.41							1.50	0.15												
1979	623.01	0.41							2.70	0.14												
1980	634.81	0.45							1.69	0.16												
1981	510.66	0.42			768.36	0.57			1.63	0.17												
1982	503.78	0.42			1038.12	0.35			3.32	0.13												
1983	625.14	0.43			1092.05	0.35			2.12	0.13												
1984	331.71	0.45			1200.27	0.35			1.62	0.12												
1985	1125.74	0.41			814.46	0.35			1.75	0.15												
1986	751.21	0.42			394.33	0.28			1.32	0.14												
1987	1008.43	0.42			433.53	0.28			2.16	0.13												
1988	1394.68	0.42			1014.56	0.28			1.35	0.14												
1989	1265.60	0.40			531.45	0.28			1.05	0.16												
1990	986.51	0.41			614.37	0.23			1.41	0.14	0.43	0.25										
1991	901.20	0.42			727.86	0.23			1.21	0.13	0.54	0.22										
1992	695.16	0.43			313.95	0.23			1.03	0.14	0.80	0.16										
1993	2093.55	0.40			325.36	0.23			1.04	0.14	0.74	0.13										
1994	1007.03	0.42			341.90	0.23			1.12	0.16	0.95	0.15										
1995	1235.91	0.41			223.43	0.23			1.42	0.15	0.97	0.14										
1996	1739.29	0.40			375.22	0.25			0.50	0.22	2.38	0.13										
1997	2246.41	0.40			992.41	0.25			0.53	0.21	1.43	0.14										
1998	879.51	0.41			925.14	0.25			0.71	0.17	0.82	0.15										
1999	339.77	0.44			1137.45	0.25			0.64	0.22	1.21	0.14										
2000	960.44	0.40			739.23	0.23			0.74	0.20	1.04	0.12			0.02	0.38						
2001	704.49	0.45			1264.62	0.23			0.96	0.17	1.32	0.13			0.01	0.37			5.43	0.41		
2002	687.42	0.42			1130.42	0.23			2.05	0.15	0.89	0.13			0.01	0.49			12.86	0.49		
2003	444.91	0.48			662.66	0.24			1.70	0.13	1.00	0.16			0.01	0.31			2.89	0.52		
2004	1210.46	0.42			332.36	0.23			0.82	0.18	0.87	0.13							15.05	0.42		
2005	2383.57	0.40			677.39	0.23			0.88	0.15	0.68	0.13							2.43	0.38		
2006	850.09	0.48			633.94	0.23			1.91	0.15	0.81	0.13										
2007			2179.98	0.31	1000.60	0.23			0.94	0.19	0.85	0.13										
2008			2154.01	0.30	634.18	0.23			1.22	0.17	0.99	0.13							2.29	0.78		
2009			955.38	0.30	876.71	0.23			1.04	0.24	1.50	0.12					0.02	0.35				
2010			2126.20	0.31	1042.24	0.24							2.21	0.13			0.01	0.53			1659	0.55
2011			2785.47	0.30	674.97	0.23							3.75	0.17			0.03	0.25	10.89	0.40	1392	0.43
2012			2306.99	0.39			101.60	0.32					8.23	0.22			0.02	0.27	31.31	0.20		
2013			1569.13	0.44			139.70	0.35					6.81	0.17					49.74	0.31	2393	0.42
2014			678.29	0.41			68.80	0.34					7.75	0.23			0.06	0.27	24.03	0.29		
2015							106.30	0.35					6.24	0.23			0.03	0.24	41.62	0.23	4766	0.47
2016							104.30	0.36					5.77	0.20			0.11	0.20	36.93	0.29		
2017							118.80	0.36					7.03	0.23			0.07	0.25	83.68	0.24	9393	0.44
2018							78.70	0.36					8.41	0.24			0.03	0.17			15683	0.31
2019							108.40	0.34					8.07	0.23			0.06	0.14	54.59	0.24	13947	0.40
2020							113.00	0.34					5.94	0.20			0.14	0.15	118.56	0.22		
2021							172.00	0.30					6.14	0.20			0.10	0.14			5701	0.53
2022							139.60						4.70	0.21			0.05	0.26	52.09	0.25	9234	0.45
2023													2.94	0.19			0.10	0.29	109.59	0.27	7513	0.75
2024							356.90						5.40	0.17								

* GBYP aerial survey for the West and Central Mediterranean will be used as auxiliary information

Table 2. Strict updates of abundance indices for Atlantic bluefin tuna in the West Atlantic.

series	US RR 66-144cm		US RR >177cm		US RR<145cm		US RR>195cm		MEXUS GOM LL		GOM Larval Survey		JPN LL1*		JPN LL2		JPN LL GOM		CAN Acoustic survey1		CAN Acoustic survey2		CAN SWNS RR		CAN GSL RR	
age	66-144cm		>177cm		<145cm		>195cm		8-35		8-16		4-10		5-16		9-16		5-16		5-16		5-16		8-16	
Indexing	Number		Number		Number		Number						Number		Number		Number									
area	West Atl		West Atl		West Atl		West Atl		GOM		GOM		West Atl		West Atl		GOM		Gulf of St Lawrence		Gulf of St Lawrence		West Atl (SW Nova Scotia)		Gulf of St Lawrence	
time of the year	June to October		July to October								May		Begin-year		Begin-year											
source	SCRS/P/2024/021		SCRS/2022/		SCRS/1993/067		SCRS/1993/067		SCRS/2022/160		SCRS/P/2018/055		SCRS/2025/067		SCRS/2025/067		SCRS/1991/071		SCRS/2021/036		SCRS/2021/036		SCRS/2024/123		SCRS/2023/135	
Use in VPA	yes		(possibly yes)		yes		yes		yes		yes		yes		yes		yes		yes		no		yes		yes	
Use in SS3 and OM	yes		yes		yes		yes		yes		yes		yes		yes		yes		yes		no		yes		yes	
	estimate param																									
Year	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV	Std. index	CV
1970																										
1971																										
1972																										
1973																										
1974																	0.97	0.27								
1975																	0.53	0.21								
1976													0.37	0.55			0.67	0.21								
1977											2.42	0.47	0.93	0.46			0.91	0.22								
1978											4.31	0.23	0.78	0.49			0.88	0.23								
1979													0.75	0.39			1.29	0.28								
1980					0.80	0.43							1.37	0.40			1.16	0.27								
1981					0.40	0.52					0.83	0.44	1.10	0.37			0.55	0.24								
1982					2.10	0.33					1.21	0.26	0.78	0.39												
1983					1.11	0.26	2.61	0.10			1.14	0.34	0.47	0.47												
1984							1.25	0.19			0.32	0.53	0.67	0.40												
1985					0.63	0.64	0.86	0.30					0.83	0.37												
1986					0.78	0.43	0.50	1.10			0.34	0.42	0.01	0.77												
1987					1.22	0.40	0.53	0.48			0.31	0.47	0.38	0.44												
1988					0.99	0.38	0.94	0.36			1.18	0.32	0.34	0.49											0.06	0.35
1989					0.99	0.43	0.76	0.36			0.78	0.37	0.69	0.42											0.21	0.30
1990					0.90	0.34	0.63	0.34			0.32	0.34	0.48	0.44											0.15	0.28
1991					1.26	0.35	0.82	0.28			0.30	0.55	0.59	0.42											0.07	0.33
1992					0.82	0.42	0.91	0.28			0.44	0.34	1.02	0.38											0.26	0.28
1993			0.49	0.15							0.48	0.64	0.97	0.38											0.31	0.25
1994			0.70	0.20					0.85	0.30	0.56	0.34	0.90	0.37					0.03	0.28					0.16	0.25
1995	1.12	0.12	1.49	0.30					0.43	0.28	0.24	0.53	0.64	0.47					0.03	0.14					0.27	0.26
1996	1.25	0.12	2.67	0.49					0.72	0.19	0.80	0.49	2.14	0.38					0.07	0.10			0.33	0.17	0.02	0.30
1997	1.82	0.10	1.17	0.24					0.20	0.54	0.35	0.39	1.58	0.37					0.04	0.12			0.28	0.17	0.02	0.28
1998	0.89	0.10	1.58	0.30					0.72	0.27	0.12	0.53	0.73	0.42					0.04	0.21			0.36	0.17	0.04	0.27
1999	0.85	0.17	1.55	0.30					0.46	0.25	0.49	0.50	1.07	0.36					0.04	0.12			0.69	0.18	0.08	0.26
2000	1.10	0.18	0.95	0.23					2.26	0.15	0.23	0.51	1.05	0.38					0.02	0.14			0.31	0.19	0.04	0.26
2001	0.70	0.11	1.99	0.41					0.95	0.18	0.43	0.32	0.90	0.37					0.04	0.15			0.59	0.18	0.04	0.27
2002	0.97	0.15	1.90	0.35					1.43	0.17	0.27	0.64	0.81	0.39					0.02	0.19			0.53	0.17	0.10	0.23
2003	0.60	0.09	0.56	0.18					1.16	0.15	0.72	0.38	1.20	0.41					0.04	0.14			0.44	0.18	0.14	0.22
2004	1.49	0.09	0.39	0.17					0.58	0.16	0.52	0.67	1.10	0.44					0.04	0.07			0.62	0.16	0.30	0.21
2005	1.48	0.11	0.45	0.17					0.53	0.16	0.18	0.29	1.02	0.35					0.05	0.05			0.78	0.17	0.21	0.20
2006	0.67	0.16	0.30	0.19					0.81	0.16	0.55	0.36	1.47	0.42					0.06	0.07			1.00	0.16	0.17	0.20
2007	0.64	0.09	0.32	0.16					0.47	0.15	0.45	0.37	0.88	0.61					0.04	0.13			0.72	0.16	0.36	0.20
2008	0.63	0.10	0.34	0.16					0.75	0.14	0.33	0.37	1.43	0.65					0.03	0.08			0.81	0.17	0.24	0.20
2009	0.50	0.12	0.40	0.16					0.64	0.14	0.60	0.32	2.34	0.52					0.06	0.09			1.23	0.17	0.62	0.20
2010	0.80	0.10	0.78	0.20					0.47	0.14	0.31	0.51			0.55	0.53			0.07	0.04			1.45	0.17	1.00	0.23
2011	0.71	0.12	0.71	0.19					0.91	0.15	1.07	0.39			1.88	0.38			0.05	0.08			1.16	0.16	0.70	0.20
2012	0.77	0.13	0.61	0.18					1.56	0.13	0.28	0.47			2.48	0.37			0.10	0.07			1.06	0.18	0.74	0.20
2013	1.22	0.13	0.39	0.15					0.72	0.14	0.97	0.34			1.99	0.37			0.08	0.06			0.71	0.17	0.70	0.20
2014	0.73	0.15	0.52	0.17					1.33	0.13	0.27	0.37			2.13	0.39			0.08	0.06			0.94	0.18	0.76	0.20
2015	0.35	0.14	0.83	0.20					1.98	0.13	0.40	0.30			1.32	0.37			0.08	0.10			0.98	0.17	0.56	0.20
2016	0.54	0.15	1.03	0.23					1.58	0.13	2.38	0.26			3.29	0.41			0.09	0.01			1.09	0.17	0.72	0.20
2017	0.86	0.14	1.60	0.30					1.24	0.15	1.00	0.29			3.67	0.42			0.05	0.01			1.01	0.19	0.59	0.20
2018	0.63	0.16	1.55	0.29					1.53	0.14	2.09	0.24			6.77	0.39					0.01	0.01	0.91	0.19	0.60	0.20
2019	1.16	0.13	1.77	0.32					1.72	0.14	1.51	0.28			5.68	0.38					0.02	0.01	1.23	0.17	0.59	0.20
2020	1.57	0.15	1.50	0.28					1.35	0.16					4.38	0.43							1.41	0.20	0.68	0.20
2021	2.02	0.12	1.32	0.27					1.78	0.14	1.95	0.31			3.62	0.36							1.54	0.20	0.51	0.20
2022	0.94	0.15							2.32	0.14					3.55	0.36							1.53	0.19	0.60	0.20
2023	0.74	0.18							1.69		2.80				2.43	0.36							1.56	0.20		
2024	2.25	0.10													7.12	0.44										

* the value for 1986 in JPNLL1 was not used in Stock synthesis model in 2021

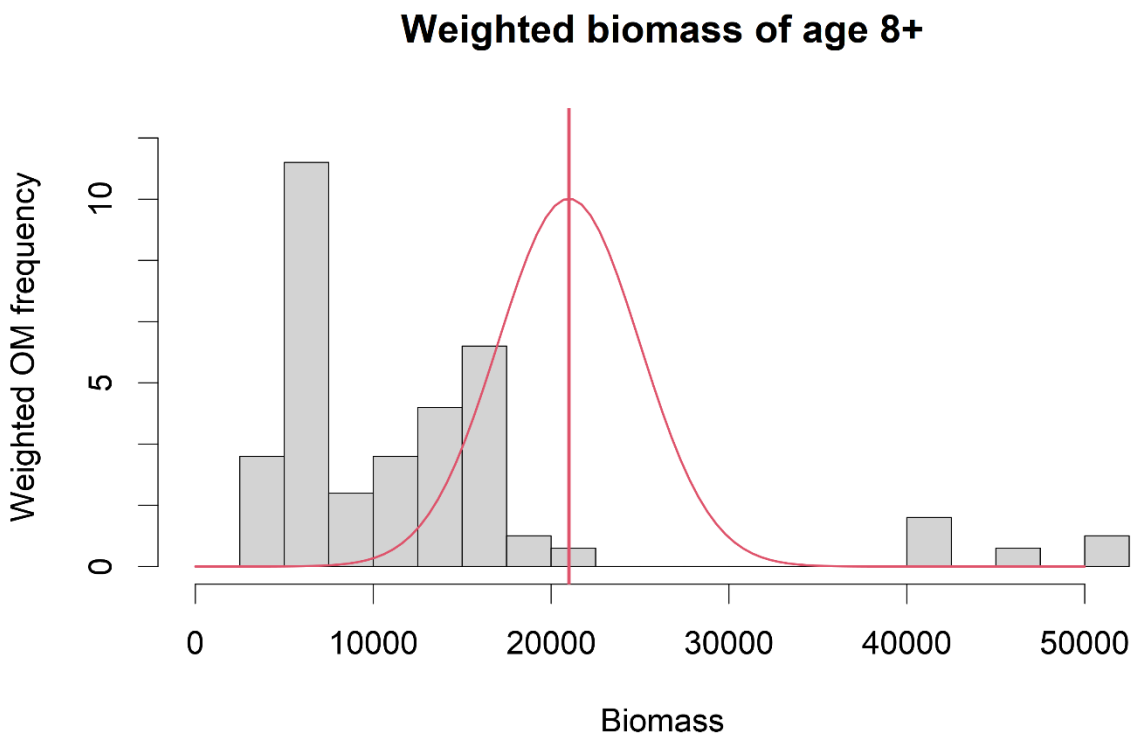

Figure 1. Comparison of total biomass age 8+ for 2018 extracted from the plausibility weighted 48 operating models compared with the CKMR estimate (21K (cv=0.19)) of biomass of age 8+.

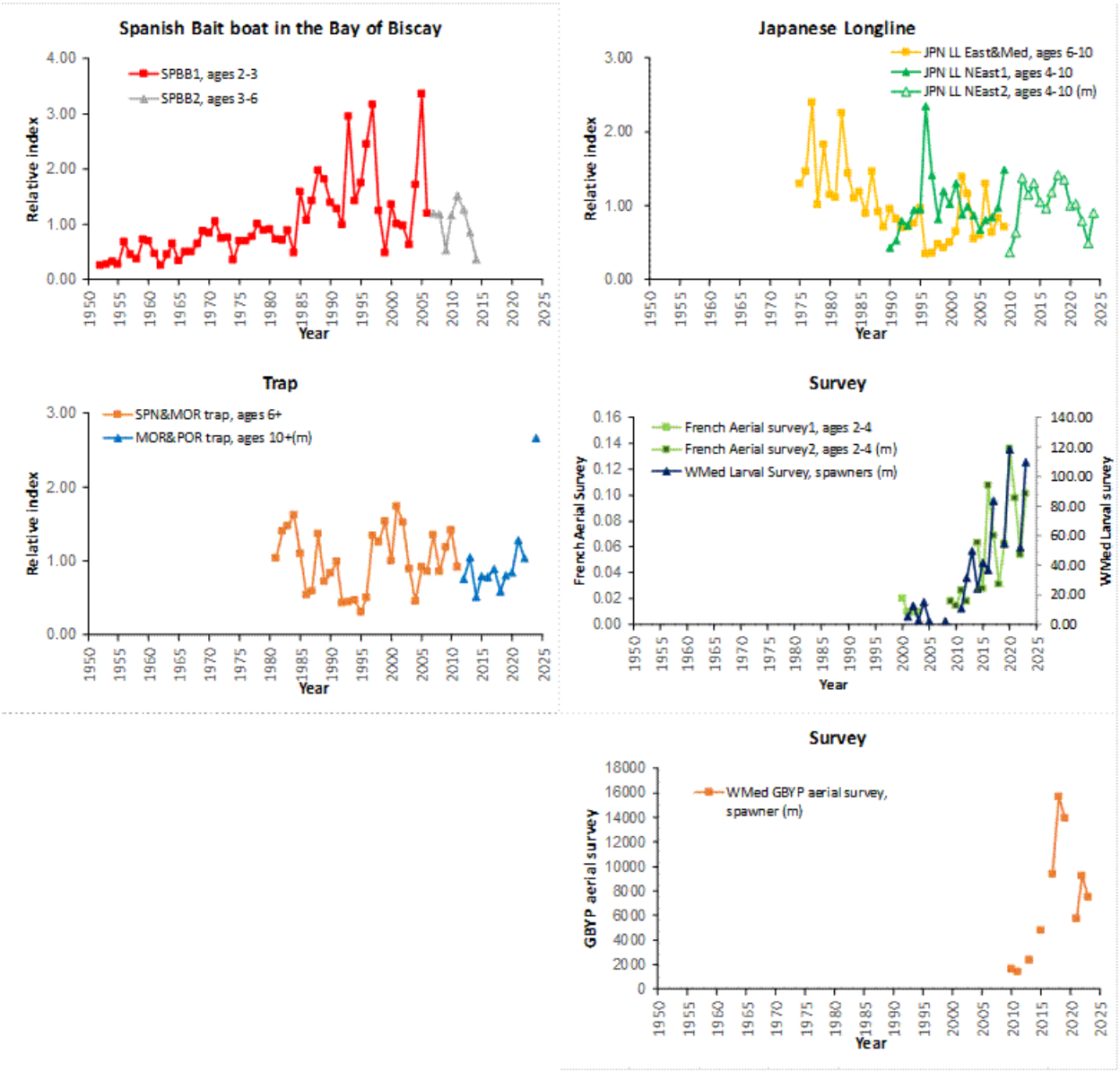

Figure 2. Strict updates of abundance indices for Atlantic bluefin tuna in the East Atlantic and the Mediterranean.

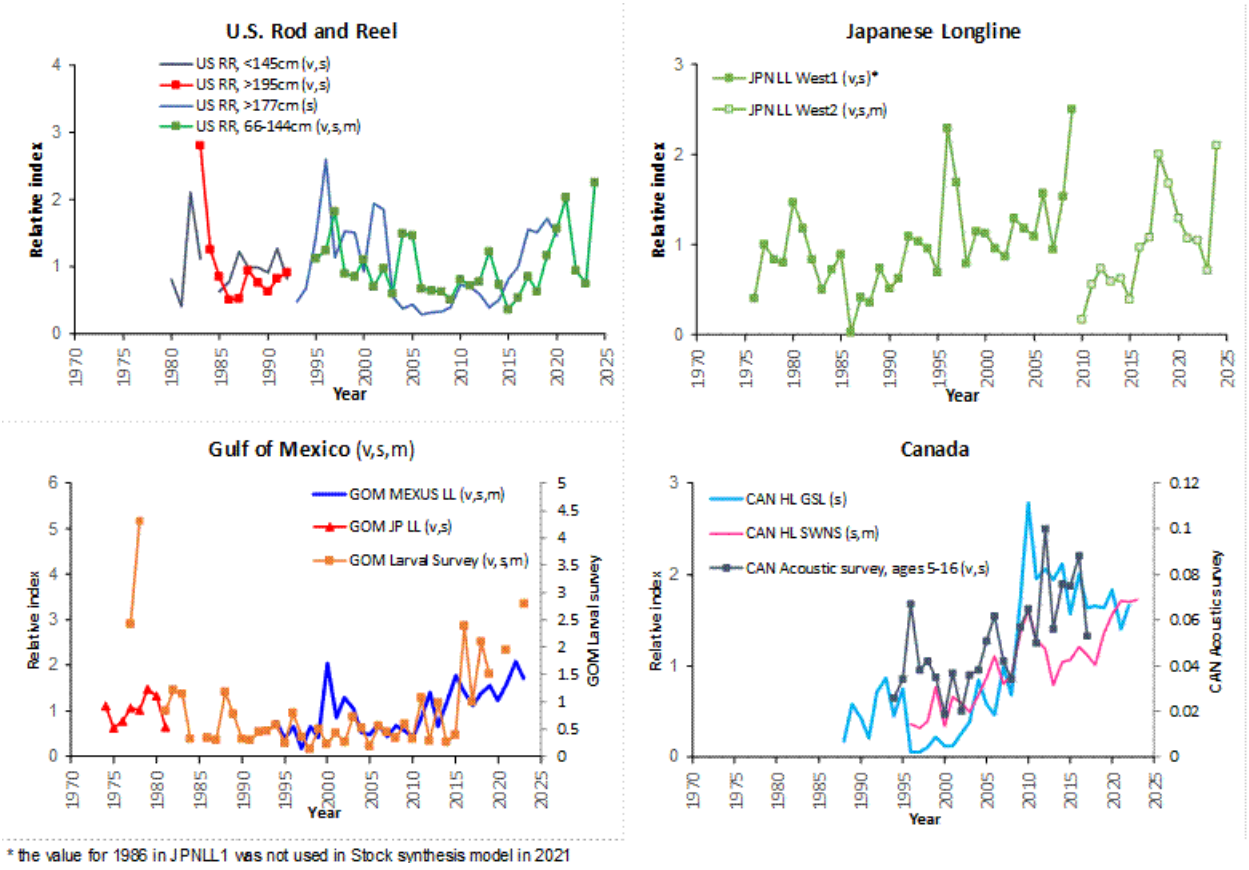

Figure 3. Strict updates of abundance indices for Atlantic bluefin tuna in the West Atlantic.

Appendix 1

Agenda

1. Opening, adoption of the agenda, and meeting arrangements

2. Presentation of Close-Kin Mark-Recapture (CKMR) estimate of the western Bluefin tuna (BFT-W) spawning stock biomass (SSB)

3. Evaluation of the influence on the existing BR MP of the following:
   3.1. CKMR estimate of the W-BFT SSB
   3.2. A 2-year cycle for GBYP aerial survey
   3.3. Removal of GBYP aerial survey for BR Management Procedure (MP)
   3.4. Request from Panel 2 to consider underage and subsequent carryover provisions

4. Evaluation of updated and/or revised indices in the Operating Models (OMs)
   4.1. Presentation of the indices (strict updates)
   4.2. Evaluation of strict updated indices
   4.3. Evaluation of revised indices

5. Evaluation of stock mixing information (BFT Technical Sub-group on Stock Mixing)

6. Consider a *de minimis* reconditioning to possibly include:
   6.1. CKMR
   6.2. Existing indices up to 2023
   6.3. Revised indices up to 2023
   6.4. Re-tune BR MP on reconditioned models
   6.5. Implications of reconditioning and consideration of possible retuning
   6.6. Develop new projections related to existing Exceptional Circumstance (EC) provisions, consistent with the lite-reconditioning
   6.7. Endorsed workplan for incorporating CKMR

7. BFT-W CKMR next steps

8. Eastern bluefin tuna (BFTE) CKMR
   8.1. Preliminary activities
   8.2. Future planning and funding (BFT Technical Sub-group on CKMR)

9. BFT Technical Sub-groups on Farm Operations and Early Life History: activities and planning

10. Nature of 2026 '*Status assessment*' and plan for MSE review

11. GBYP activities and planning
    11.1. Decision about the possible cancellation of aerial surveys in the Central Mediterranean
    11.2. Model-based approaches for aerial survey
    11.3. GBYP activities
    11.4. Terms of reference of GBYP biological studies in 2025

12. Recommendations

13. Other matters
    13.1. New rules on funding
    13.2. Other matters

14. Adoption of the report and closure

Appendix 2

List of participants[1]

CONTRACTING PARTIES

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Appendix 3

List of papers and presentations

Number	Title	Authors
SCRS/2025/049	A brief initial analysis of 'does the west CKMR estimate matter for the ABFT MSE'?	Butterworth D., and Rademeyer R.A.
SCRS/2025/057	Origin of BFT from the Norwegian Sea based on Otolith Chemistry	Fraile I., Lastra P, Artetxe I., Arrizabalaga H., Nottestad L., Sorensen O., Lange T., and Rooker J.
SCRS/2025/058	Can an unusual combination of SST and oceanography be considered an exceptional circumstance? The case of a Sardinian tuna trap in 2024 (western Mediterranean Sea).	Di Natale A.
SCRS/2025/059	Length frequency distribution of Bluefin tuna caught by the purse seine fleet in the Balearic Islands: period 2016-2024.	Navarro J.J.
SCRS/2025/062	French aerial abundance index for 2009-2023, accounting for the environmental effect on bluefin tuna availability in the Gulf of Lion	Rouyer T., Derridj O., and Bal G.
SCRS/2025/063	A Summary of ABFT Stock Mixing Data	Hanke A.R., Artetxe I., Fraile I., Busawon D., Diaz Arce N., Arrizabalaga H., and Rodríguez-Ezpeleta N.
SCRS/2025/064	A revised index of Bluefin tuna relative abundance based on Portuguese-Moroccan Trap Data	Hanke A.R., Akia S., Lino P., Coelho R., Abid N., and Walter J.
SCRS/2025/065	Determination of a length-weight relationships applicable to Atlantic bluefin tuna (*Thunnus thynnus*) caught in the Bay of Biscay (Cantabrian Sea)	Luque P.L., Artetxe-Arrate I., Arrizabalaga H., and Fraile I.
SCRS/2025/066	Improving the data for the BFT MSE	DiNatale A., Garibaldi F., and Piccinetti C.
SCRS/2025/067	The standardized CPUE for Japanese longline fishery in the Atlantic up to 2024 fishing year	Tsukahara Y., Fukuda H., and Nakatsuka S.
SCRS/2025/069	Updated Standardization of Fishery-Dependent Abundance Indices for Atlantic Bluefin Tuna in the Southern Gulf of St. Lawrence and Canada Atlantic coast within area of Scotian shelf using vast:1996-2023	Akia S., Hanek A.
SCRS/2025/070	Close-kin mark-recapture spawning stock abundance estimates of western Atlantic bluefin tuna (*Thunnus Thynnus*)	Lauretta M., Grewe P., Bravington M., Walter J., Baylis S., Thomson R., Golet W., Zapfe G., Walter K., Hanke A., Busawan D., Aulich J., Potter N., Orbesen E., Reglero P., Alvarez-Berestegui D., Gerard T., Malca E., Pacicco A., Porch C., and Davies C.
SCRS/2025/071	Alternate approaches to accounting for environmental impacts in the stock assessment of western Atlantic bluefin tuna	Carrano C., Kerr L.
SCRS/2025/072	Back-calculated and habitat standardized larval abundances of Atlantic bluefin tuna in the Balearic Sea (western Mediterranean) (2001-2023)	Alvarez-Berastegui D., Tugores M.P., Torres A.P., Martín-Quetglas M., Santandreu M.,

		Alvarez I., Balbín R., and Reglero P.
SCRS/2025/073	Results of the pilot study on AI-based automatic fish length estimation for Bluefin tuna in a Moroccan Atlantic farm	Abid N., Benziane M., Idrissi M.M., and Bensbai J.
SCRS/P/2025/019	Revisiting the review of 2021 stock assessment of western ABT for future stock assessment	Tsukahara Y., and Fukuda H.
SCRS/P/2025/020	Tracking *Thunnus thynnus* adult movements through Gibraltar Strait after acoustic tagging in tuna trap (South coast of Portugal)	Vilas C., Lino P.G., Mansilla O., Sanchez-Leal R., Jimenez J., Cabanellas M., Abecasis D., Martinez-Ramirez L., Poco A., Nunes M., Morita F., Alemany F., and Dos Santos M.N.
SCRS/P/2025/021	Results on the suitability of different ABFT tissues for CKMR-related genetic analyses	Diaz-Arce N., Lino P., Rouyer T., Nunes M., Hirofumi M., and Rodriguez-Ezpeleta N.
SCRS/P/2025/022	Knowns and unknowns about ABFT mixing in the North Atlantic learnt from genetic and otolith microchemistry-based methodologies	Diaz-Arce N., Arrizabalaga H., Fraile I., Artetxe-Arrate I., and Rodriguez-Ezpeleta N.
SCRS/P/2025/023	Updated activities by the Bluefin tuna early life ecology subgroup	Alvarez-Berastegui D.
SCRS/P/2025/024	Updated analysis for the standardized CPUEs of the EU.PRT + MOR Traps	Lino P., Coelho R., and Abid N.
SCRS/P/2025/025	Are SSB estimates from BFT-W CKMR valid?	Bravington M.

Appendix 4

SCRS document and presentations abstracts as provided by the authors

SCRS/2025/049 - The west CKMR estimate is taken into account in the ABFT MSE computations using a simple likelihood weighting approach. This suggests that this estimate does "matter", as the associated calculations indicate that notably higher TACs for the west area might be possible. The availability of a CKMR estimate for the east would likely have important implications for the MP performance for the east. Fewer future GBYP aerial surveys in the east would lead to a slight deterioration in conservation performance there, though this could be ameliorated by a minor retuning the MP. It must, however, be emphasised that these results are dependent on a simple and approximate method for taking the west CKMR estimate into account. The reliability of this approach therefore needs to be checked by repeating these computations under formal re-conditioning of the OMs to incorporate the west CKMR estimate.

SCRS/2025/057 - Understanding the population structure and mixing rates of Atlantic bluefin tuna (*Thunnus thynnus*) is crucial for the effective conservation and management measures of this species and its fisheries. This study utilized δ13C and δ18O isotopes in otoliths to determine the natal origin of giant Atlantic bluefin tuna caught in the Norwegian Sea during their autumn feeding between 2018 and 2023. Otoliths were collected over six consecutive years under the GBYP Research Program of the International Commission for the Conservation of Atlantic Tunas (ICCAT). The δ13C and δ18O isotope values in the yearling portion of the otoliths were measured using ion ratio mass spectrometry and compared with reference values from spawning adults captured in the Mediterranean Sea and Gulf of Mexico. Mixed stock analyses revealed that bluefin tuna captured in the Norwegian Sea originated from the Mediterranean Sea..

SCRS/2025/058 - The Sardinian tuna traps are the only ones in the Mediterranean Sea and they are considered one of the few reliable observatories for the bluefin tuna in this area. In 2024, the catches had an unusual presence of small fish and the western Mediterranean water masses in spring were unusually cold, also allowing for many gyres offshore that apparently attracted bluefin tuna from the northern part. Thanks to the detailed data available, this paper presents the case as a possible example of how an environmental and localised exceptional circumstance can directly affect the distribution, the size frequencies and the catches of bluefin tuna. The parallel effects of experimental drillings for offshore wind farms was also considered, as an additional factor for modifying the usual bluefin tuna migratory behaviour.

SCRS/2025/059 - This study presents the length frequency distribution of Balfegó fleet during the last 9 years, considering only the fishing operations carried out exclusively in the Balearic fishing grounds. The length come from two different approaches: 1) artificial intelligence estimates at the time of transfers to the transport cages and 2) observed measures taken at harvest. Both measurements show the same results, even a certain systematic difference is observed due to the growth occurred during the time lapse spent by the fish under rearing conditions. When analysing the time series, to main features can be observed, on the one hand, an increase in individuals of sizes around 130-150 cm in the last two years (2023 and 2024) and mainly in the last year. On the other hand, a gradual increase in the largest individuals (>250 cm) has been observed by both approaches since 2016.

SCRS/2025/062 - The French aerial survey over the Gulf of Lion is a fisheries independent index. This survey has been used for the stock assessment of Eastern Atlantic Bluefin Tuna (EABFT, Thunnus thynnus), within the MSE and that is also included in the current Harvest Control Rule. Up to this day, the index presents important year to year variations linked to the stock dynamics but also largely to environmentally-driven changes in the availability of young Bluefin tuna in the Gulf of Lion. Here we propose an updated index based on a state space modelling approach which accounts for both.

SCRS/2025/063 - Contributions of stock of origin data stemming from genetic and otolith microchemistry data sources is summarized with a view to informing future BFT MSE modeling and decision making processes. Observed trends in stock mixing are also compared to those emerging from the BFT MSE operating models.

SCRS/2025/064 - A revised Portuguese – Moroccan trap index is developed using the R package sdmTMB which supports fitting spatial temporal models. The final model included a spatial temporal random field component where the mesh features a barrier between Moroccan and Portuguese traps and where the spatial decorrelation distance is not directional.

SCRS/2025/065 - Length-weight relationships are needed to transform the size of BFT at the time of caging into weight, which allows to monitor quota consumption. In 2021, the SCRS revised and adopted LWR for two areas of the eastern Atlantic, i.e., Atlantic coast of Morocco and southern Portuguese coasts. With ICCAT's amendment to Rec 24-06 for new ABFT farming in the Cantabrian Sea, a specific LWR is needed to determine the biomass in farming cages. However, no specific LWR model exists for the Cantabrian Sea during summer. This study presents a LWR for the Cantabrian Sea Area determined on the basis of ABFT sampled from 2009 to 2024 period from June to August. A comparison of this study´s LWR with current LW equations adopted by SCRS-ICCAT is also presented and shows that the equations used for other eastern Atlantic areas significantly overestimate the real weight of the fish. Thus, we recommend using the LWR presented here for the farming operations in the Cantabrian Sea.

SCRS/2025/066 - The changes noticed in 2024 about a much comprehensive and Atlantic-wide approach in examining the data collected so far on bluefin tuna need additional work for reorganising the data before the next BFT MSE round in 2027. This was also agreed in some previous SCRS BFT SG meetings. As already noted in a previous paper in 2024, it would be necessary to split some CPUE data sets for better linking them to the genetic and microchemistry data. This will provide a much more focused insight in the Bluefin tuna mixing in some areas. Furthermore, an enhanced map, with more focused areas, will enhance our understanding and the identification of areas where we need to focus some research efforts. A comprehensive Atlantic-wide approach is also necessary, for a general understanding of the species. This approach will also allow for a more comprehensive CKMR design, which better incorporates scientific knowledge and takes into account all possible components.

SCRS/2025/067 - Catch-per-unit-effort based abundance indices of bluefin tuna from the Japanese longline fishery in the West and Northeast Atlantic have been used for the stock assessment, conditioning for operating model in management strategy evaluation and actual total allowable catch calculation in management procedure. This document describes the traditional simple update indices, and some additional analysis for the alternative indices using VAST both for west and northeast Atlantic up to 2024 fishing year (FY). In addition, we provide preliminary and tentative information in 2025 FY. As a result, the simple update indices in 2024 FY for both areas turned around and had higher values than those in 2023 FY. However, additional analysis indicated that the current simple update would not appropriately standardize the CPUEs especially for the data after IQ implementation. And VAST indices for the northeast Atlantic and the west Atlantic in old series reduce the negative sign in the model diagnostics.

SCRS/2025/069 - This study updates the abundance indices of Atlantic Bluefin Tuna (ABFT) in Canada's Atlantic coast within the area of the Scotian Shelf (AC) and the Southern Gulf of St. Lawrence (sGSL) by incorporating data up to 2023 extending the indices initially developed in 2024 using the Vector Autoregressive Spatio-Temporal (VAST) model. The objective is to refine both the global abundance indices and the size-class-specific indices ensuring a more accurate representation of the population dynamics in these regions. A key methodological advancement in this study is the redefinition of size classes based on the weight composition of catches rather than using predefined age categories Three size classes were established for each region. In AC size classes were defined as small below 150 kg medium between 150 and 230 kg and large above 230 kg while in sGSL the classification was small below 240 kg medium between 240 and 370 kg and large above 370 kg. The results highlight that the medium-size class index best reflects the underlying abundance dynamics of the stock whereas the indices for small and large size classes appear to be strongly influenced by environmental conditions prey availability and stock mixing variability. Given these findings we recommend replacing the current abundance indices for AC and sGSL with the medium-size class indices as they provide a more stable and representative indicator of stock status minimizing the confounding effects of ecosystem variability. By refining these indices this study contributes to improving the accuracy of stock assessments and ensuring more effective fisheries management strategies ultimately supporting the sustainability of the Atlantic Bluefin Tuna fishery in Canadian waters.

SCRS/2025/070 - Ocean-wide distributions and mixing of tuna stocks limits resource monitoring capability, inhibits accurate population assessment, and amplifies uncertainty in sustainable harvest estimates. To resolve this, our team evaluated genetic close-kin mark-recapture abundance estimation for western Atlantic bluefin tuna from fish specimens collected during routine fishery monitoring and research surveys. Larval fish sampled in the western spawning grounds genetically marked mature fish at the time and location of regional spawning. After spawning, the adult tuna rapidly migrated to foraging areas in the Northwest Atlantic, mixing with other bluefin stocks in large aggregations targeted by fisheries. Comparison of larval genotypes to adult fish caught in the fishery allowed for estimation of spawner capture

probabilities based on parent-offspring ratios, and in turn, the absolute abundance and biomass of the spawning stock (males and females combined), estimated to be 21 kt (cv=0.19) in 2018. Applied genomics provided unprecedented information on bluefin tuna stock mixing, fecundity, and spawner abundance; and provides a robust framework for next-generation stock assessment, management procedures, and long-term sustainable fisheries.

SCRS/2025/071 - Substantial spatial shifts in the distribution of Atlantic bluefin tuna in response to varying ocean conditions have led to changes in regional catch rates and catch-per-unit-effort (CPUE) indices in the northwest Atlantic. For example, previous stock assessments have struggled to reconcile conflicting trends in US and Canadian rod and reel indices. The most recent Stock Synthesis assessments incorporated the Atlantic Multidecadal Oscillation (AMO) to modulate catchability and improve model fit, but residual patterns remained. We offer an alternate approach to incorporate environmental considerations by using a Vector Autoregressive Spatio-Temporal Model (VAST) to create alternative CPUE indices that account for environmental impacts on bluefin availability outside of the assessment model, rather than inside. Results from exploratory Stock Synthesis models with either a US VAST index or a joint US-Canada VAST index suggest similar or improved diagnostics, with comparable stock estimates. These analyses demonstrate the effectiveness of accounting for environmental effects outside of the assessment model and present indices that, with continued development, could be valuable to future assessments or management procedures.

SCRS/2025/072 - This document presents the update of the Bluefin tuna back-calculated larval abundance index from the Balearic Archipelago (Western Mediterranean). The index is calculated as the “strict update” of the previous version of the index presented in 2024 (SCRS/P/2024/124) that was applied for the current Bluefin tuna MSE. The update, including data from the TUNIBAL 2023 campaign, shows high densities of larvae, with significant differences when compared with the abundances from the previous available year.

SCRS/2025/073 - The length and weight of fattened Bluefin tuna from two cages in a Moroccan Atlantic farm were estimated in 2024 before harvest using both a manual stereoscopic camera system and an AI-based automatic system. These estimates, based on at least 20% of the total fish, were compared to actual size data at harvest to assess the accuracy of each system. The manual system slightly overestimated actual length (by 1.5% and 2.2%), while the AI-based system showed a greater underestimation (by 2.8% and 5.9%). Since weight in both systems was derived from length using a biometric relationship, discrepancies in weight estimation primarily reflected errors in length measurement. The lower accuracy of the AI system in length estimation highlights the need for further refinement to improve its performance. In contrast, the manual stereoscopic system provided estimates closer to actual values, making it more reliable under current conditions. To meet ICCAT standards for size estimation, the AI-based system requires further development and validation.

SCRS/P/2025/019 – This presented a way to develop area-based assessment model in west Atlantic, considering and incorporating a lot of valuable comments by external reviewer when 2021 stock assessment. The presenters showed some exercises with alternative model configurations, e.g., changing the start year of assessment period according to the data availability and testing alternative biological assumptions. Although the concrete proposal of assessment model was not proposed so far, it was emphasized that it is necessary for the assessment model to develop only with internally consistent data for the robust absolute biomass scale estimation. The presenters continue working the area-based assessment model as one of the candidates for the coming status check for this species..

SCRS/P/2025/020 - *No summary provided by authors.*

SCRS/P/2025/021 - The suitability of tissues collected using a tissue collector which allows for clean, quick and efficient collection were tested. In total, 18 tissues were collected from yellow finlets, keel and caudal fin from 6 ABFT tails in a tuna processing plant. Results on the amount of DNA extracted from them, genotype call rates, and comparative analysis of replicate samples from the same fish showed that keel samples worked best, being suitable for genetic analysis and further kinship comparison tests.

SCRS/P/2025/022 - Origin assignment methodologies based a subset of 96SNP markers and otolith microchemistry profiles assign individuals to either Mediterranean of Gulf of Mexico origin. However, published studies evidence spawning activity in different areas and admixture in the Slope Sea between individuals of Mediterranean and Gulf of Mexico origin. A new tool including 7000 SNPs was designed to, among others, estimate the genetic profile of ABFT samples. Assignment results of 688 samples analyzed

with the 96 SNP panel and the ARRAY showed that the 96 SNP panel overestimates the proportion of individuals of Gulf of Mexico origin, and that there is a relatively low proportions of genetically intermediate individuals across the North Atlantic feeding aggregates. Comparative analysis of more than 1700 samples for which genetic and otolith microchemistry-based assignments were available showed that in 70% of the cases both methods agreed on the origin, in the 20% the was no disagreement and for approximately 10% both methods assigned individuals to different origins. Multidisciplinary approach can help to develop further research needed to understand the origin of these individuals that do not show characteristics of the Mediterranean Sea or Gulf of Mexico spawning areas.

SCRS/P/2025/023 - The bluefin tuna (ABFT) Larval Ecology Subgroup reported on extensive larval surveys across key spawning areas in 2024, with continued efforts planned for 2025. In 2024 surveys were conducted in the Gulf of America, Balearic Sea (Western Mediterranean), Strait of Sicily (Central Mediterranean), and South Turkiye (Eastern Mediterranean). For 2025 there are also planning for sampling in the Slope Sea (Western Atlantic). Activities included adaptive sampling, standard ichthyoplankton tows using various Bongo nets, and environmental data collection (CTD, nutrients, plankton). Notable efforts included the launch of new initiatives like the TunaWave project investigating heatwave effects, the beginning of the SiLev project, uniting Turkish and Italian scientists, new collection of data in Slope Sea. Synergies with networks like MONGOOS aim to improve oceanographic support for larval research.

SCRS/P/2025/024 - *No summary provided by authors.*

SCRS/P/2025/025 – This presentation addressed the sampling coverage of the WBFT CKMR project (SCRS/2025/070). In particular, it considered whether any bias could result from sampling only a part of the total larval production (from a specific time and place within GoMex), when the goal of estimation is the total abundance of all adult WBFT regardless of where they spawn. The author demonstrated that no bias should result, because the adult samples (potential parents) are taken from "well-mixed" fisheries, in which there is no reason to expect that an adult's choice of spawning ground will affect its subsequent probability of capture (after allowing for adult length, which the CKMR model already does). Bias could, however, result if adult samples were collected from spawning grounds. The author noted that the same logic would apply to an EBFT CKMR project, where juveniles would again come from a subset of spawning grounds: sampling adults outside the Mediterranean, when they are likely well-mixed, is more robust than sampling within it.

Appendix 5

Requests of Panel 2 to the Standing Committee on Research and Statistics (SCRS)
(*Prepared by Panel 2 Chair*)

1. Panel 2 discussed allocation[2] issues at its Intersessional meeting in March 2025. Several CPCs pointed out that due to various reasons, they may not be able to fully utilize their allocations and possibly use less than 95% of the allocation. Under paragraph 6 of *Recommendation by ICCAT amending the Recommendation 22-08 establishing a multi-annual management plan for bluefin tuna in the eastern Atlantic and the Mediterranean* (Rec. 24-05), a CPC is allowed to transfer a maximum of 5% of its annual (initial) quota if so requests when the underage is equal to or more than 5% of the quota. Thus, if a CPC uses, say, only 80% of the allocation, 15% of the allocation cannot be carried over to the following year and therefore unused. While this is good for the bluefin tuna stocks, it is an economic waste of the resources.

2. To avoid such economic waste as well as help allocation negotiations in 2025, one idea is to carry over the underage beyond 5%. While a 5% carry-over of a CPC is added to the CPC's allocation in the following year, such underages beyond 5% will be pooled and added to the Total Allowable Catch (TAC) in the following year. The carried-over amount could be distributed among CPCs in a manner to be agreed by Panel 2.

3. Under the current Management Procedure (MP), if the total catch for either the West area or the East area is 20% or more above the TAC for the respective area, this could constitute an exceptional circumstance (EC). This could be interpreted that if the carried-over amount is less than 20% of the TAC, it will be within the MP and does not trigger the exceptional circumstances protocol (ECP). It should be noted that the case envisaged under the MP is overharvests by CPCs whereas the case being considered by Panel 2 is utilization of unused allocations. Panel 2 believes that the impacts of this case on the stocks are much less than the case of overharvests.

4. Accordingly, Panel 2 would like to request the SCRS to answer the following questions[3] in sufficient time to inform discussions at the 29th Regular Meeting of the Commission:

   (1) Under the current MP, is it possible to carry over unused allocation beyond 5% of a CPC's initial allocation to increase the TAC in the following year?

   (2) If so, is 20% of the TAC a reasonable upper limit for the total carried-over amounts, which should include individual carry-overs by CPCs?

   (3) If 20% is too high, what is a reasonable figure?

   (4) If the assessment of this new approach requires another simulation testing within the Management Strategy Evaluation (MSE) framework, when can the SCRS conduct it?

[2] In this paper, allocation and quota have the same meaning.

[3] If the SCRS needs to know how the carried-over amount is distributed among CPCs, please assume a pro-rata increase.