**SHORT-TERM CONTRACT FOR MODELLING APPROACHES: SUPPORT TO BFT**

**ASSESSMENT (GBYP 07/2017) OF THE ATLANTIC-WIDE RESEARCH PROGRAMME ON**

**BLUEFIN TUNA (ICCAT-GBYP – Phase 7)**

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**Progress Report 7** (July – September 2017)

**Executive summary**

The design of the reference operating models was updated to include alternative abundance scenarios that match the relative eastern and western magnitude estimated by the current VPA assessments and also mimic the rapid recent increases in eastern spawning biomass predicted by the eastern VPA. The M3 operating model was recoded to match the latest trial specifications and all operating models were re-fitted to data.

The M3 MSE package was updated with the most recent operating models and help documentation was included in the package that describes in detail how to specify and test new management procedures.

Three SCRS papers were drafted describing the fit and estimates of the new operating models (SCRS/2017/223), the design and testing of two simple MPs (SCRS/2017/224) and the exact procedure for including new MPs in the ABT-MSE package (SCRS/2017/225).



**Figure 1.** MSE status. All components have at least a preliminary version allowing for full use of the MSE framework by other users.

**Progress in current contract since Progress Report 5 (July 2017 - September 2017)**

***MSE documentation updates***

- Updated trial specifications document

- ABT-MSE R package updated to include more detail on specification of MPs

***Change in M3 model structure for OM conditioning***

- M3 model now allows for matching of (1) assessment SSB in Eastern and Western areas and (2) recent increases in Eastern area SSB over the last 10 years.

***Demonstration MPs***

- Two new MPs were coded into the ABT-MSE framework and tested under varying operating model scenarios

- The MPs were described in detail in SCRS/2017/224 – 225.

**Current status of deliverables and actions required to achieve them**

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| **Deliverable 1 July 20, 2016 (100%)** | | |
|  | i | Workplan outlining the actions required to complete the final deliverables |
|  | ii | Presentation and short report summarizing current status of deliverables and actions required to achieve them |
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The updated workplan (deliverable i) is included below. The purpose of Progress report 6 and accompanying presentations was to address deliverable ii.

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| **Deliverable 2 September 23, 2017 (0%)** | | |
|  | i | Updated presentations and short report summarizing current status of deliverables and actions required to achieve them |
|  | ii | Examples based on agreed trials, to include output statistics and fully OM conditioning diagnostics |
|  | iii | Draft papers on application of MSE |
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The purpose of progress report 7 is to address deliverable i.

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| **Deliverable 3 November 3, 2017 (0%)** | | | |
|  | i | Updated presentations and short report summarizing current status of deliverables and actions required to achieve them |
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| **Deliverable 4 February 21, 2018 (0%)** | | |
|  | i | Updated **Repository** with full tracking including version control for software development  <https://github.com/ICCAT/abft-mse> containing the OM |
|  | ii | Update of **SDP** (Software Development Plan) that will be reviewed by external experts, as agreed at Monterey meeting |
|  | iii | **Test Unit** so that code can be validated |
|  | iv | **Meta Database** summarizing all parameters and assumptions used  https://github.com/ICCAT/GBYP-MetaDB |
|  | v | Evaluation of **Management Procedures** implementation by 3rd parties.  Written up as SCRS papers and code available in repository |
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**Current status of objectives**

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| **Objective** | | | **Tasks (bold are completed)** |
|  | **i**  (100%) | Ensure the Operational Model (OM) implements the trials as specified by the 2016 CMG report. | **Added (M3 v1.0):**  **age-based movement, plus group, model initialization at equilibrium estimated F, recruitment predicted from SSB in previous year, a prior for depletion to allow the model to fit specified depletion.** |
|  | **ii**  (100%) | Us the test unit to validate the age-based movement model | **Test unit is being updated to match developments in the operating model** |
|  | **iii**  (0%) | Work with third parties to add MPs to the MSE framework including empirical control rules and simple stock assessment methods | Reach out to national scientists, members of the BFT WG (possibly leverage the chairs of Eastern and Western WGs) and the CMG to develop new MPs or to incorporate existing MPs (e.g. CCSBT) |
|  | **iv**  (0%) | Run the MSE in collaboration with BFT Species group | Requires a dedicated meeting following finalization of the TS, fitting of the appropriate OMs and integration of these into the R ABT-MSE framework. |
|  | **v**  (50%) | Collaborate with the SCRS and others (e.g. rRFMOs) to develop interactive web based graphics to communicate MSE results to decision makers and stakeholders. | A shortlist of scientists has been established who may wish to develop MPs.  Hold a webinar to demonstrate MSE package working.  Collaborate on SCRS papers describing MP performance. |
|  | **vi**  (100%) | Work with other to update and maintain the meta database of the available bluefin data and knowledge <https://github.com/ICCAT/GBYP-MetaDB> | **The meta database has been made publically available and editable** [https://docs.google.com/spreadsheets/d/ 13pFaM3BTnzQ1BNQGoYn4O2n1IeD18V3VTbN9Hv7139U/ edit#gid=1352276725](https://docs.google.com/spreadsheets/d/%2013pFaM3BTnzQ1BNQGoYn4O2n1IeD18V3VTbN9Hv7139U/%20edit) |
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**Updated Workplan for achieving deliverables**

***Deliverable 2ii. Examples based on agreed trials, output statistics, conditioning diagnostics***

In the July 2017 CMG meeting, the format for operating model fitting diagnostics was finalized. These were used in SCRS/2017/223 to describe the fit of the 12 operating models to data.

SCRS/2017/224 provides results of two MPs tested using the ABT-MSE R framework including a detailed account of their programming and integration into the package (SCRS/2017/225).

The package now includes standard MSE diagnostics and figures so that users can produce comparable outputs for their custom MPs.

***Deliverable 2iii. Draft papers on applications of MSE***

This was the intention of SCRS/2017/223-225

***Deliverable 4i – 4iv. Updated repository, SDP, test unit, meta database***

These updates will occur nearer to Feb 2018, after finalization of example MPs and operating models.

***Deliverable 4v. Evaluation of Management Procedures implemented by 3rd parties***

1. A list of prospective MP developers was produced at the September 2017 core modelling group meeting.
2. The next step is to reach out to MP developers and provide supporting materials (the ABT-MSE R package and manual / supporting papers).
3. Following this, a short webinar demonstrating MP development and testing in the package might help to further encourage MP development.
4. Finally, MP developers could co-author an SCRS paper (or series of SCRS papers) evaluating MP performance.