	defined. The output of this ToR, in combination with ToR b, will identify the necessary modifications needed in the WGBIOP protocol and the SmartDots data analysis to support the assessment model requirements. Term of reference d) After the protocols to collect and analyze the data, and the models that can incorporate this information have been identified, it is necessary to to review the ICES stocks that could be considered as candidate case studies to continue developing the incorporation of age error information in stock assessment. Term of reference e) This ToRs is intended to integrate with the ICES transparency and quality frameworks. Although it is not expected that in the early steps this will be a crucial element, considering it from the early steps might be useful to accommodate adequately all modifications in the assessment models.
Resource requirements	The research programmes which provide the main input to this group are already underway. The additional resources required to undertake additional activities in the framework of this group is negligible. There are no additional resource requirements for the workshop beyond the secretariat support for group organisation.
Participants	The Group will be attended by approximately 12 participants.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	There are no obvious direct linkages with the advisory committees.
Linkages to other committees or groups	There is a very close working relationship with WGBIOP, WGSMART and it is expected to be relevant for the WGs in charge of the assessment of the case study stocks. Depending on the progress, the interest of the output might be extensive to all the WGs that use the assessment models that end up incorporating the age error information.
Linkages to other organizations	No linkages to other organizations

Working Group on Estimation with the RDBES data model (WGRDBES-EST)

2020/FT/DSTSG07 A **Working Group on Estimation with the RDBES data model (WGRDBES-EST)**, chaired by Kirsten Birch Håkansson, Denmark, and Nuno Prista, Sweden, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2021	20-24 September	Online	Interim report by 18 December to DSTSG	Kirsten Birch Håkannson, Denmark Nuno Prista, Sweden
Year 2022	To be determined	To be determined	Interim report by tbd to DSTSG	Kirsten Birch Håkannson, Denmark Nuno Prista, Sweden

Year 2023	To be determined	To be determined	Final report by tbd to DSTSG	Kirsten Birch Håkannson, Denmark Nuno Prista, Sweden

ToR descriptors

ToR	Description	Background	Science Plan Codes	Duration	Expected Deliverables
a	Develop and document R scripts and functions for statistical estimation using the RDBES data format	The Regional Database & Estimation System (RDBES) will be extensively used by ICES member states, the EU Regional Coordination Groups, and ICES expert groups to store detailed commercial fisheries sample data. The RDBES will also replace the current ICES Inter-Catch system and function both as a database and an estimation system for ICES Fisheries Advice. Estimation within the RDBES will be done by means of R-scripts and functions that secure the transparency and reproducibility of assessment inputs. The estimation code will ultimately integrate TAF and make national and regional estimates more transparent. WKRDB-EST (1&2) have started developing those scripts and functions in what regards the simpler forms of design-based estimation. WGRDBES-EST will continue and finalize that work, extending it to more complex statistical estimation methods.	3.1, 3.2, 3.3	Regular activity every year with intersessional work	Documented R-scripts and functions to be added to icesRDBES package
b	Identify and document any problems with RDBES data model relating to statistical estimation	In coming years the RDBES data model will keep being improved and updated as feedback is received from RCGs, EGs (e.g., WGCATCH, WGBYC) and national users. The implications of those improvements and	3.1, 3.2, 3.3	Regular activity every year	List of recommendations to ICES data center, Core Group of RDBES development and WGRDBESGOV on aspects needing development in the RDBES data model

		updates for estimation within the RDBES will need continuous evaluation. In addition new aspects will likely be found requiring incorporation in the data model so that specific estimation methods can be implemented or specific results produced. WGRDBES-EST will contribute to the identification and evaluation of these new features and data-model related aspects.			
c	Coordinate the peer-review and inclusion of ToR a) outputs in the icesRDBES package	Worldwide availability and systematic code and methodological peer review of RDBES estimation functions and scripts may be achieved by incorporation of main estimation functions in the icesRDBES package and publication on CRAN (https://cran.r-project.org/).	3.1, 3.2, 3.3	Regular activity every year with intersessional work	IcesRDBES package and associated peer-reviewed documentation
d	Establish a road forward to the improvement of estimates of commercial catches used in ICES assessments	As the work of WGRDBES-EST progresses there is a need to update and inform WGRDBESGOV on the best path forward to keep improving commercial catch estimates used in ICES.	3.1, 3.2, 3.3	Regular activity every year	List of recommendations to WGRDBESGOV on aspects needing consideration in efforts to improve estimation of commercial catches
e	Collaborate with WGRDBESGOV and WGTAFGOV to secure the integration of outputs from WGRDBES-EST in TAF	Transparency on the use of outputs from WGRDBES-EST can be achieved by integrating the estimation scripts and/or its outputs in TAF.	3.1, 3.2, 3.3	Regular activity every year	Outputs from WGRDBES-EST are fit and ready for integration within TAF

Summary of the Work Plan

Year 1	ToR a) Discuss the feedback from WGRDBESGOV and RDBES core group on WKRDB-EST2 progress alongside results achieved intersessionally, and identify the R-code that needs development, refinement and/or testing. Develop that code and functions. ToR b) Evaluate updates of the RDBES data model from an estimation perspective. Document any problems with RDBES data model relating to statistical estimation and suggest solutions. ToR c) Continue the work started during WKRDB-EST2 in icesRDBES package, incorporating existing developments; prepare a standalone icesPackage; test and implement compatibility of the

	icesRDBES package with CRAN requirements; suggest a work-flow and roadmap for peer-review of icesRDBES functions and scripts. ToR d) evaluate progress obtained in estimation of commercial catches and suggest a way forward to WGRDBESGOV. ToR e) Initiate the collaboration with WGRDBESGOV (and relevant groups thereunder) and WGTAFGOV to identify requirements for an integration of WGRDBES-EST outputs into TAF
Year 2	ToR a) Discuss the feedback from WGRDBESGOV and RDBES core group on last years progress alongside developments achieved in interssessional work, related WKs and WGs and individual contributions related to commercial catch estimation. Identify the R-code that needs development, refinement and/or testing. Develop that code and functions. ToR b) Evaluate intersessional updates of the RDBES data model from an estimation perspective.. Document any problems with RDBES data model relating to statistical estimation and suggest solutions. ToR c) Continue the work on the icesRDBES package; test and implement compatibility of the icesRDBES package with CRAN requirements; test work-flow and advise on roadmap for longer term icesRDBES maintainence to WGRDBESGOV. ToR d) evaluate progress obtained in estimation of commercial catches and suggest a way forward to WGRDBESGOV. ToR e) In collaboration with WGRDBESGOV (and relevant groups thereunder) and WGTAFGOV conclude on requirements for a integration of WGRDBES-EST outputs into TAF and adapt output to the requirements
Year 3	ToR a) Discuss the feedback from WGRDBESGOV and RDBES core group on last years' progress alongside developments achieved in interssessional work, related WKs and WGs and individual contributions related to commercial catch estimation. Identify the R-code that needs development, refinement and/or testing. Develop that code and functions. ToR b) Evaluate intersessional updates of the RDBES data model from an estimation perspective. Document any problems with RDBES data model relating to statistical estimation and suggest solutions. ToR c) Continue the work of previous year in icesRDBES package, incorporating new developments; Publish the icesRDBES package on CRAN. ToR d) evaluate progress obtained in estimation of commercial catches and suggest a way forward to WGRDBESGOV. ToR e) Continue the work of previous year and in collaboration with WGRDBESGOV (and relevant groups thereunder) and WGTAFGOV keep updated on potential changes in the requirements for integration.

Supporting information

Priority	This working group is considered of very high priority. The activities of this WG will promote the development of a Regional Database and Estimation System (RDBES) by developing the algorithms and code required for the estimation of commercial catches within the RDBES. The RDBES will be integrated in TAF and work as a database for both ICES and the Baltic Sea, North Sea & Eastern Arctic, and North Atlantic Regional Coordination Groups (RCGs), producing the high-quality, transparent, estimates required by ICES Fisheries Advice.
Resource requirements	The members of the core group of RDBES development are requested to participate and coordinate algoritm and code development ahead of the meetings. Participation of the ICES data centre is needed with regards to expertise in package development and maintainace.
Participants	The Group is normally attended by about 20 members. Participants should be proficient in writing own scripts and functions in R language and/or have good knowledge of survey sampling and estimation.
Secretariat facilities	None.

Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no direct linkages with ACOM, but most of the Stock Assessment Working Groups will be impacted by the development of the RDBES.
Linkages to other committees or groups	There is a direct link to WGRDBESGOV, the RDBES core group and close links to activities of WGTAFGOV, WGQUALITY, WGCATCH and WGBYC. There is an indirect link with WGRFS and WGBIOP.
Linkages to other organizations	The RDBES estimates are connected to regional data collection defined by the RCGs under the European Commission. The RDBES will also support the ICES countries in providing data for both national and international assessments and optimizing their sampling programmes. In the case of EU MS, the RDBES is expected to facilitate and improve the quality of provision of commercial catch data requested under different data calls.

Workshop 3 on age reading of blue whiting (*Micromesistius poutassou*) (WKARBLUE3)

2020/WK/DSTSG08 Workshop 3 on age reading of blue whiting (*Micromesistius poutassou*) (WKARBLUE3), chaired by Jane Aanestad Godiksen*, Norway, and Patrícia Gonçalves*, Portugal, will be established and meet online, 31 May–4 June 2021 to:

a) Review new information from validation study on first annual ring identification from daily increments; (Science Plan codes: 3.1, 5.1);
b) Review otolith growth table made by IPMA after WKARBLUE2 for ageing of blue whiting; (Science Plan codes: 3.3, 4.1);
c) Clarify the interpretation of annual growth rings (1-3) by sex, quarter, and age through image analysis (measurements of ring distances and back-calculation); (Science Plan codes: 3.1, 3.3, 4.1, 4.4, 5.1, 5.2);
d) Update on guidelines and common ageing criteria. With an emphasis on testing the scheme made by WKARBLUE1; (Science Plan codes: 3.3, 4.1, 5.1);
e) Increase existing reference collections of otoliths and improve the existing database of otolith images; (Science Plan codes: 3.1, 3.2, 4.1);
f) Analyse the age reading quality from the exchange using the 3-point scale of the image (mentioned in WKNARC); (Science Plan codes: 3.1, 3.2, 3.3, 4.1);
g) Address the generic ToRs adopted for workshops on age calibration (see 'WGBIOP 2019 Guidelines for Exchanges And Workshops on Age Reading'); (Science Plan codes: 3.1, 3.2, 5.1, 5.2).

WKARBLUE3 will report by 31 August 2021 for the attention of DSTSG and ACOM.

Supporting information

Priority	Age determination is an essential feature in fish stock assessment to estimate the rates of mortality and growth. In order to arrive at appropriate management advice, ageing procedures must be reliable. Age data are provided by different laboratories and countries using internationally agreed ageing criteria. It is necessary to continue to clarify the guideline of age interpretation. Therefore, otolith exchanges should be carried out on a regular basis, and if serious problems exist age reading workshops should be organised to solve these problems.
Scientific justification	The aim of the workshop is to identify potential problems in *Micromesistius poutassou* age determination, assess variability of growth patterns among different ecosystems, improve the accuracy and precision of age determination, and share the methods and procedures used between different ageing laboratories.