

Increasing quality in ICES commercial fisheries data using the Regional Database and Estimation System

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Assuring quality within ICES

The International Council for the Exploration of the Sea (ICES) is an intergovernmental marine science organisation meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans. One of its key roles is to provide scientific advice for a wide range of recipients including its 20 member countries, international organisations including the European Commission, and other end-users.

ICES expert groups require a user-friendly framework to archive data, methods, and results used in fish stock assessments. For recurrent assessments and advice, it is important to ensure that the outputs can be replicated at a future date and also be re-run the following year. ICES assessments are carried out using various disparate data sources so it is important to ensure transparent input data processing and reproducible assessment methods, while also automating and documenting the outputs which form the evidence base. The aim should be that data are available at the highest possible resolution whilst taking into account confidentiality constraints. Assuring quality is a key element of the ICES advice plan (ICES, 2019) and the commercial fisheries Regional Database & Estimation System (RDBES) will be an essential tool in the overall quality assurance framework.

Regional Database and Estimation System (RDBES)

The Regional Database and Estimation System (RDBES) will replace the current ICES Regional Database (RDB) and InterCatch systems (Currie et al. 2018, ICES 2020) – its aims are: 1) to ensure that commercial fisheries data can be made available for the coordination of regional fisheries data sampling plans, including for the EU DCF Regional Coordination Groups (RCGs); 2) to provide a regional estimation system such that statistical estimates of quantities of interest can be produced from sample data; 3) to serve and facilitate the production of fisheries management advice and status reports; and 4) to increase the awareness of fisheries data collected by the users of the RDBES and the overall usage of these data.

The RDBES will store aggregated landings and fishing effort data, and detailed biological sample data. The significant novelty in the RDBES data model is that it provides a common structure to describe both the disaggregated sampling data and, most importantly, the sampling design underlying how those data were obtained. For the purposes of fish stock assessment it is necessary to combine detailed biological data with census data of fishing fleet activity to produce an estimate of the removals from the fish stock due to fishing mortality. The RDBES data model allows a variety of different estimation techniques to be used including unbiased design based estimation methods. The RDBES should be seen as part of the movements towards Statistically Sound Sampling Schemes (4S), greater regional coordination, and improved estimates to ICES stock assessments and advice.

Transparent Assessment Framework (TAF)

The RDBES web application will provide certain functionality such as data uploading, and managing permissions but stock estimation and imputation will be performed within the ICES Transparent Assessment Framework (TAF).

The TAF is an open framework for organising stock assessments built on Git repositories. All data inputs and outputs are fully traceable and versioned. The open framework enables stock assessment scientists to easily find, reference, download, and run the assessment from any stage in the process leading to the published ICES advice for a given stock. Anyone will also be able to find, reference, and download the estimation method behind the assessment.

Basing the stock estimation functions of RDBES on the TAF has a number of advantages: the TAF exists and users are already gaining expertise in it, there is technical and content support available, version control of data and scripts is established, and it provides strong linkages to stock assessment groups.

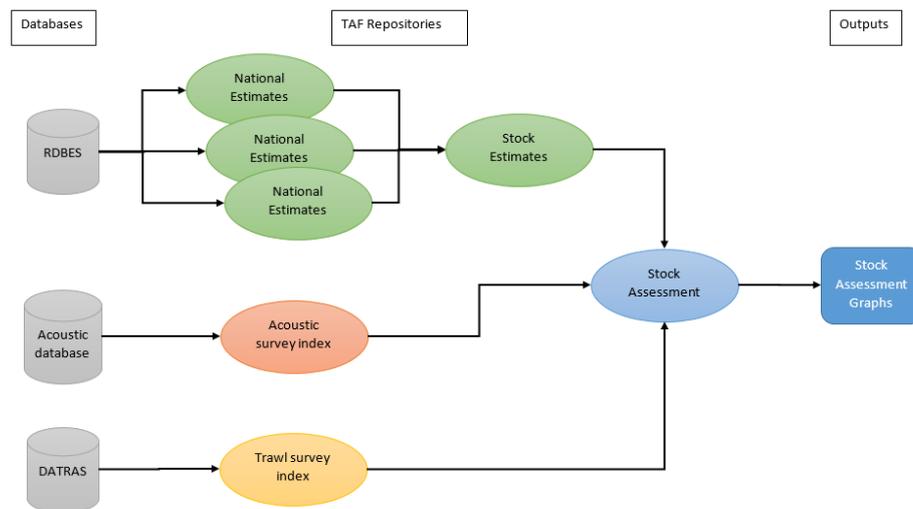


Figure 1 Example of a data processing pipeline using different TAF repositories as building blocks

Next steps

The RDBES will continue to be developed during 2020 and 2021 and it is scheduled to move into production in 2022. To this end a number of workshops have been planned which will both help data submitters with the transition to the new system and encourage more people to be involved in the process. The upcoming availability of an ICES database that explicitly incorporates important details of sampling design will allow the development of improved fisheries estimates and result in improvements in sampling at both national and regional levels. The success of the RDBES will rely on the effort and contributions from a large number of people in the wider ICES/EU commercial fisheries data collection community.

References

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