

# Progress on increasing quality and transparency in ICES commercial fisheries data

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## Quality assurance 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. Quality assurance is key to the ICES mission to advance and share scientific understanding of marine ecosystems and the services they provide. The ICES Quality Policy has been published recently and is founded on the 10 principles that guide the advisory process [ICES, 2023a]. The ICES Data Centre has attained CoreTrustSeal certification.

## Regional Database and Estimation System, and the Transparent Assessment Framework

The ICES Regional Database and Estimation System (RDBES) stores detailed commercial fisheries biological sampling data, and aggregated effort and landings data from ICES member countries. Its aims include: 1) to ensure that quality controlled commercial fisheries data can be made available for the coordination of regional fisheries data sampling plans, 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 ICES Transparent Assessment Framework (TAF) is an online resource for yearly ICES fish stock and mixed fisheries assessments, as well as other types of assessments feeding into ICES advice on topics including contaminants, fishing impacts, survey indices, ecosystem and fisheries overviews.

The RDBES and TAF will replace the current ICES commercial fisheries data systems in the near future and will be used to provide inputs to fish stock assessments [ICES, 2023b]. The main improvements will be [Currie D. et al., 2023]:

1. Greater transparency and more detailed data. Commercial fisheries data is a key data source used in ICES fish stock assessments. The RDBES makes it possible to upload more detailed data in a structure that reflects how the biological sampling was actually conducted. This allows users to ensure they are processing the data correctly and to also gain more detailed information from it, thus increasing the potential of the collected data. TAF provides transparent estimation at each step from detailed data to total estimates for a fish stock. This allows calculations to be easily checked and verified – they can also be re-run if there are changes to the input data. The RDBES provides a wealth of information about data availability for new assessment models, and for dealing with problems like imputation of missing data.
2. Improved estimates from fisheries dependant data. The use of a variety of different estimation methods is enabled by the RDBES data model. In particular, unbiased design-based estimation methods are supported – these methods are based on assumptions

about our sampling design which can, in principle, be controlled. Estimates of variance can also be calculated and including these has the potential to improve the quality of stock assessment model outputs.

3. Sharing best practices. With the introduction of a common RDBES data model, the ICES community is empowered to work collaboratively on estimation functions and packages. This enables more effective and efficient code to be developed as compared to working in isolation, thus improving its quality.

### Operationalising the RDBES and TAF

When replacing existing processes, it is important to verify that the new systems can, at the very least, reproduce current functions within an acceptable tolerance. To this end, a series of workshops have been held which have focused on data reproduction studies [ICES, 2023c; d]. Two main areas for these reproduction studies have been identified: national estimation, and stock estimation. National estimation is the process of creating an estimate of the length and age structure of fishing catches from a stock based on each country’s national data – this requires the combination of biological sampling data with fishing effort and landings data. Stock estimation is the process of combining these national estimates into an estimate for the whole stock. Both of these processes may involve the imputation of missing data.

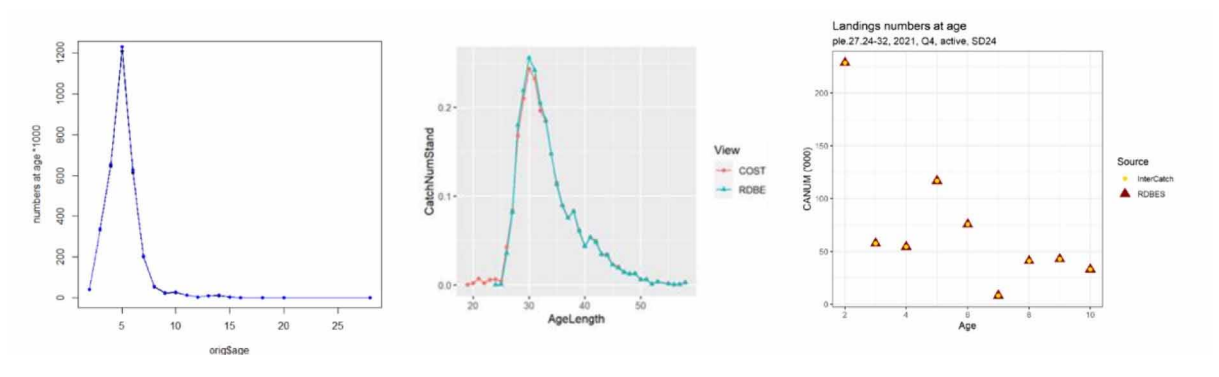


Figure 1 Selected national reproduction study results.

Good progress on both national and stock estimation reproduction has been made during the workshops - some selected national results are shown in Figure 1. Several countries have been able to satisfactorily reproduce their estimates using RDBES and have implemented their calculations in TAF, and at least one stock estimation task has been completely implemented in TAF. However, it should be noted that the aim of making an entire reproduction of stock estimation output from detailed national data submitted to RDBES has yet to be delivered - this will continue to be pursued.

These workshops have also served several other purposes for the RDBES development. They have: evaluated the use of TAF as a framework for estimation with RDBES data; encouraged adaptation of RDBES/TAF by data-providing institutions; served as a training arena for the ICES community to get acquainted with RDBES/TAF; developed recommendations for standardised output formats; elucidated roles and data access requirements for current and future estimation workflows; and produced potentially re-usable code for tasks shared between roles in the RDBES/TAF system.

### References

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