

The ugly duckling that turned into a beautiful swan (ICES Stock Assessment Database)

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Introduction

ICES provides scientific analytical assessments and advice on fish stocks to a range of management partners, including the EU Commission and NEAFC. The stock assessment results, and their presentation are a key data output, and ICES has a stock assessment system (<http://stock-assessment-graphs.ices.dk>) that underpins its advice. This system consists of a database, and a web tool to produce charts, data tables and web services. This system ensures a transparent and consistent version controlled presentation of assessment results, it also allows end users to gain a better overview of the stocks assessed by ICES through one interface. The system started off as an Excel spreadsheet with macros for charting, and has become an online content management system for stock assessment results that form the evidence base of the ICES advice.

Historical development

In 2013 ICES developed a new Stock Assessment System that was able to produce standard charts of the annual fish stock assessments results, as the existing Excel based tool was prone to data and calculation errors, was difficult to share amongst multiple users and had no online presentation capability. The charts present the main assessment results including biological reference points and (where available) yield per recruit data. The system includes a relational database and a web based interface where assessment experts can upload assessment results (password protected), and adjust settings to be able to produce the charts that are included in the assessment advice sheets¹.

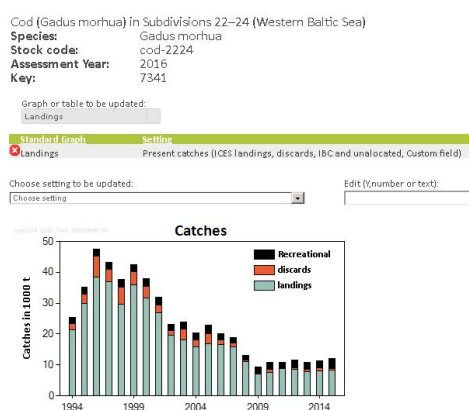


Fig 1: The user customizing the settings of the landings graph.

The system was very well received by the community of experts and end users, and added value in disseminating the results data which led to a change in the scope of the system, from producing charts to becoming the Stocks Assessment Database. This change in role led to substantial changes in the system.

What could be seen as a light change was in reality a concept change in the system, and led to iterative debugging and correction of the system and the database. The data uploaded prior to 2013 was not

¹ See Cod species example <http://tinyurl.com/npu72s3>

quality assured and there were few controls on data input. In the new system, the historic comparison charts showed clearly where old base data were not correctly documented (supported by metadata like units, survey or area). Overall, several issues arose due to the lack of metadata or presence of incorrect data. All these issues were solved while users continued to upload and disseminate data from the production database.

In 2015, with the system proving to be a success, the roll out to different types of assessments became the next logical development. This represented a big shift in the framework of the database. The system went from handling mainly controlled and well-structured data, to stocks where most of the data time series are heterogeneous (custom units and custom headers). This was accommodated by building a new XML template to allow the user to upload their own custom time series and to give them a little more freedom to build their own charts. The database was extended to encompass more types of information, for instance a more flexible set up including survey data considered representative for stocks where no standard assessment method is used.

Fig 2: Stock Assessment Database Template

Importing mechanism

The stock assessment database has its own standard reporting format, which is defined in XML and can be accessed by web interface or using a webservice. Users can follow the XML schema representing the stock assessment XML schema, or for users not comfortable with XML, there is an Excel template (Fig 2) with built in macros that exports the filled spreadsheet into the XML file following the XML Stock Assessment Database Schema (<http://tinyurl.com/jczpvdd>).

Outputs and visualization

The web interface for the visualization of the stock assessment charts data is based on three access levels:

- 1) Users without login can access the publicly available stocks.
- 2) Users with login can upload and adjust the settings of a stock.
- 3) ICES users can login, upload and manage the stocks (includes deleting stocks).

The system also offers another way of accessing the system, using webservices. The webservices (<http://stock-assessment-graphs.ices.dk/webservices.aspx>) can automatize most of the tasks in the stock assessment database. Users can upload and receive the data directly using the Simple Object Access Protocol (SOAP) standard. This has proven particularly useful because many users are using R scripting to manipulate the data, and can load the data directly via webservices.