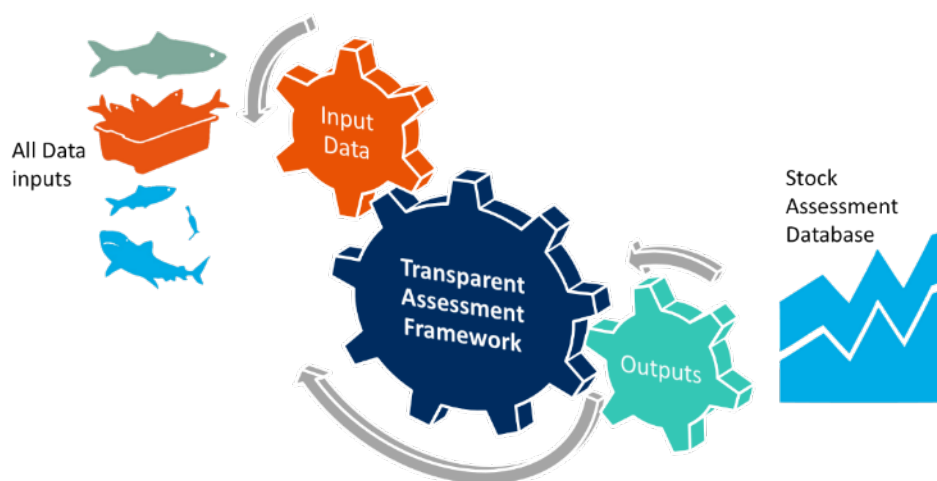


Progress report on data related activities

1 Summary

Through various initiatives culminating in a series of discussions and actions at the Bureau and Council and its subsidiary bodies, ICES is on its way to providing a 'total framework' approach to the provision of Advice and Science outputs. Much of this is founded on sound data provision and management, which is depicted in the diagram below. This report will summarize progress in this framework context.



In brief, my feeling is that we have progressed a significant way along the path to a fully connected and transparent framework for data coming into, and going out of ICES. We are still carrying risk in whether we will be able to deliver all that has been anticipated in the strategic plan, and with Council investment. However, reviewing the progress in this report, it is clear we are currently on track.

Some short highlights from the areas touched upon in this report:

- The 2 year rebuild of **RDB (Fisheries Dependent Data)**, funded by ICES Council in 2016, is commencing and engaging with the RCG's via the Steering group for the RDB, PGDATA and WGCATCH as the main providers of knowledge and expertise to the needed methodological changes.
- The RDB steering group has now agreed a new configuration which makes a place for non-DCF ICES countries and opens up development also towards the Mediterranean.
- Progress on the 2016 Council investment on **DATRAS (fisheries independent data)** is presented in detail in [Section 2.2](#). Briefly, a number of activities have started, to enable ICES Secretariat to target the activities highlighted for improvement.

- The **Acoustic data portal** is now operational, and in use by some of the ICES acoustic groups (WGIPS), with others coming online in 2017 (WGBIFS) <http://acoustic.ices.dk>
- VMS and logbook data (and resulting products) have raised the profile of ICES regionally within Europe, both in terms of knowledge providers, but also quality assurance of data.
- In the pipeline in 2017, a **Bycatch (of protected species)** database in connection with WGBYC.
- ICES Secretariat, with WGBIOP have been in discussion with ILVO (BE) to develop their Otolith age reading/annotating software (**SmartDots**) into an ICES platform for the benefit of the ICES working groups/workshops via WGBIOP.
- Smartdots was presented and demonstrated at WGBIOP 2017, the group officially adopted the Smartdots platform as the tool for age reading exchanges and workshops in ICES from 2018 onwards and expressed wishes that it will also be used for maturity exchanges and workshops in the future
- For fisheries data provided via agreement with **NEAFC** (catch and vessel positions), and discussed at the bilateral with NEAFC in January 2017. ICES are still waiting on a response from NEAFC, to make progress on improving the quality and resolution of data, which will improve the advice delivery both for NEAFC but also other partners.
- Investigation of the feasibility of hosting (and developing further) the **European Birds at Sea database** (ESAS), currently hosted by JNCC (UK) has been explored in a workshop with representatives of ESAS and ICES Secretariat. There will now be a follow-up meeting in Winter 2017 to agree on specifics of such a handover.

2 Input Data (the first cog)

2.1 Regional Database (RDB)

As discussed at Council in 2016, the aim of the RDB was to cater for all ICES countries and therefore be the main prerequisite for development of regional sampling programmes, for standardisation of data, and the tool for ensuring transparency and quality assurance of input data for stock assessment, and for the management of the marine living resources by the EU and non-EU countries in the North Eastern Atlantic area. At the steering meeting (SCRDB 29 Nov-01 Dec) which followed soon after the ICES Council meeting, non-EU ICES members (Iceland, Norway) participated physically, and the US and Canada participated by web conf. In addition, the long distance and large pelagic RCM's have been recommended to use the RDB, and therefore should be included in the steering.

Therefore, the configuration of the RCG-RDB steering committee was one of the main topics, and a new proposed configuration of the steering committee was formulated as:

- RCG's that are not actively submitting data, but interested to follow the development.
- non-EU countries as observers (primarily Norway, Iceland, Faroe islands, Greenland and Russia).
- A new group under the ICES system, the **ICES RDB Steering Group**, will be created with similar ToR's and the same chair as the RCG-RDB-Steering Committee. Non-EU countries that are part of ICES will have full membership of this group.
- The two groups will meet sequentially (2 days for RCG-RDB-Steering Committee and 0.5 days for ICES RDB Steering Group) in order that all can follow the discussion and proposed decisions, but allow the EU and non-EU countries to have a separate reporting line for the outcomes.
- This will allow some flexibility in addressing the needs of the RCG's as end users, and ICES as an end user.

The other main topic of the meeting was the re-development of the RDB as discussed and funded at Council in 2016. The tight timeline (and associated risk) was raised at Council, as a response to this a dedicated support group providing 'instant' support throughout the process was established under the steering committee. This core RDB development support group will reflect on suggestions and proposals crucial to the process of developing and building the new RDB.

The 2 year rebuild of RDB (Fisheries Dependent Data), provisionally renamed the Regional Database and Estimation System (RDBES), has had extensive activity related to WGCATCH and PGDATA in elaborating the data model and associated formats to handle all the components of commercial catch sampling. More recently, this activity has started to open up for the eventual incorporation of the recreational fisheries data management needs (WGRFS and WGEEL), which will be a major improvement to the management and accessibility of these data.

The first simple version of the RDBES web site application with menu creation of users and roles has been created. The RDBES should be ready in the spring 2019,

but the specifications are 6 months delayed, as the experts have needed more time to test the data model against their sampling schemes, and the fit across so many national and regional approaches is a challenge. In the last 7 months the core group have had 7 online meetings, 2 x 2 day workshops and numerous iterations of the data model – so the input from experts is without question (and appreciated).

2.2 DATRAS

Benthic Marine Litter data

The coordinated work within the ICES survey groups to agree on standards for the inclusion of litter data directly into the DATRAS reporting process is now well established. In 2017, via a special request from OSPAR, work has been carried out to provide a standard DATRAS output versioned product for the marine litter data. Both the input and output format were presented at the MSFD TG DATA meeting in Copenhagen in June, and they were promoted as a standard for MSFD marine litter (benthic) data.

DATRAS Governance

There has been discussion in the Data Centre, DIG, Observation Steering Group and SCICOM, on how best to manage the governance of DATRAS – in terms of technical implementation of products, prioritization, quality assurance aspects etc. DIG have had this on their agenda, and with some suggested changes from SCICOM, will proceed to setup a governance group to deal with this. This would give the ICES community more input and control of the shared systems, in the same way that the RDB has a steering group.

2.2.1 DATRAS additional tasks (Council funded)

Expert revision and automatization of NS-IBTS ALK (age length key) substitution procedure

Status: Started

- Preparing documentation of current DATRAS substitution procedure routines, to be eventually discussed and analysed by trawl survey working group such as IBTSWG, WGBEAM and BITSWG.
- Gathering algorithms of similar approach handled by other trawl databases, for better understanding of which rules DATRAS apply for missing samples.

ROCKALL and SWC-IBTS data products and indices in DATRAS

Status: 75% complete

- Calculation procedures and product workshop held in July 2017, CPUE base calculation is done for SWC-IBTS and online, ROCKALL CPUE calculation is implemented in DATRAS (will be available with indices product)
- Open source code written in R for indices calculation and is currently in finalization with Marine Scotland-ICES DC, will be published on ICES github in beginning of 2018.

LFI (Large Fish Indicator) for biodiversity indicator in Ecosystem Overviews

Status: Started

- LFI code developed for OSPAR assessment currently under review by ICES Secretariat, code review completed.
- ICES Secretariat attended and supported the ToR at WGBIFS 2017 related to the trawl data needed for a biodiversity indicator based on these data. This needs further discussion within the data and advice teams on how best to take this work forward.
- The next steps are to implement data cleaning routines, and work on statistical adjustments to counter for bias in the surveys (NSIBTS uses a standard Swept area calculation, which is not available so far in other areas) and get the final output of the indicator. This will be done during fourth quarter of 2017 and into 2018.

Compute the estimations for maturity Ogives and provide the data and method on the DATRAS webpage generic approach

Status: Not Started

- There is a planning for second knowledge exchange exercises between Thuenen institute and ICES DC, to develop Baltic products as well as a generic approach applicable to all surveys.
- Maturity base product discussion will be part of IBTSWG meeting, mainly focussing on North Sea standard species maturity and sex data availability in DATRAS.

Further development and bug fixing of pilot automated service base data submission project with IMARES

Status: Started

- There were two online web meetings organised for planning to resolve current task issues. Two different type of web services base file upload procedure developed (WCF and Rest) ,so either or can be use in Python platform.
- October 25 to 27, project workshop where plan to develop and finalise base tasks.

2.3 Acoustic data portal

ICES Acoustic data portal at <http://acoustic.ices.dk>.

Following the dedicated workshop in December 2016 for the Baltic on the use of the new acoustic formats and data portal, and the estimation procedures using the IMR software STOX. There was good support from the ICES Data Centre and IMR in supporting its uptake in the WGBIFS meeting, however WGBIFS are still in a transition to the new setup and the new system will not be fully adopted until the next assessment cycle in 2018.

In 2017 the main plans are to make additional quality control checks, implement a map in order for the users to view data within the database in addition to the grid

currently shown at the portal. And finally, to ensure as many ICES acoustic groups are using the system as possible.

2.4 VMS and Logbook data

In 2017 the provision of the data products for OSPAR and WGDEC (among other end users) has run as a ICES technical service rather than advice. A great deal of effort from both the Secretariat and WGSFD has been spent on quality control scripting and procedures. This has resulted in very extensive quality control reports that are provided back to the member countries well in advance, and has addressed data issues well before the planned meeting and use of the data. This model would be advantageous to follow for all working groups that are using data in their assessments, but it is recognised that this takes a substantial effort to achieve and manage the process. In 2017, the coverage and quality of data are better than previous years, with Iceland now also providing a full set of VMS/logbook data.

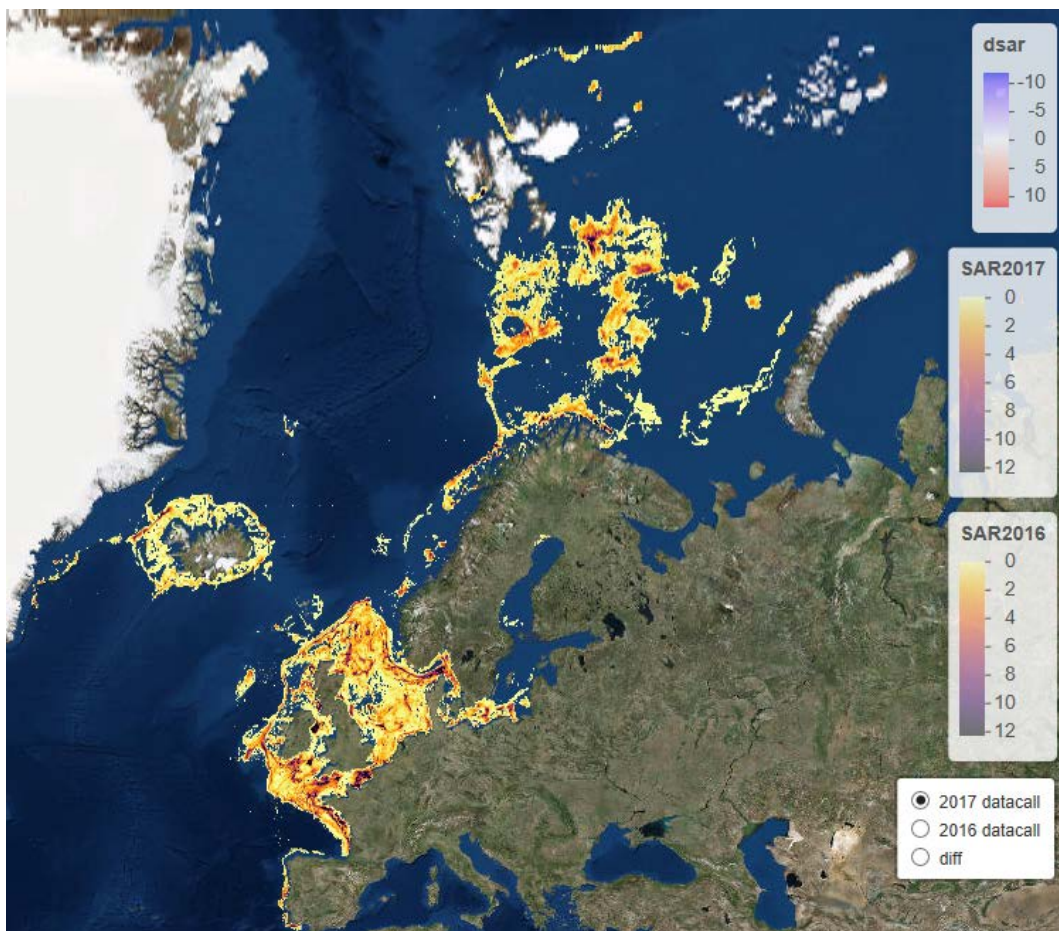


Figure 1 Swept area plots, WGSFD 2017

2.4.1 NEAFC data quality

In the January bilateral between ICES and NEAFC, the current arrangement of provision of VMS and Catch information from NEAFC to ICES was discussed.

ICES has identified and communicated¹ a number of improvements to the data flow/data gaps that would greatly increase the quality of the resulting outputs that ICES use the data for in provision of advice to NEAFC. ICES are still waiting on a response from NEAFC, to make progress on improving the quality and resolution of data, which will improve the advice delivery both for NEAFC but also other partners.

2.5 Bycatch (of protected species)

The bycatch database is being populated in connection with the WGBYC meeting (12-16 June, 2017). There is still some discussion needed on how these data are connected to the existing data policy(s) that ICES operate under as the group were unable to conclude this at their June meeting. However, it is likely that they will be accommodated under the existing RDB data policy in some form.

2.6 SmartDots – Otolith annotation and reading software

Since February, there has been a rapid development of the SmartDots framework, with ILVO, DTU-AQUA, IMR and ICES Data Centre working in collaboration. This software is intended to help and improve the age reading process and to manage the metadata associated with the otoliths sampled. The project has four main objectives: data quality, efficiency, validation and traceability always with Data Collection (DFC) needs in mind, and to optimise and automatize age reading.

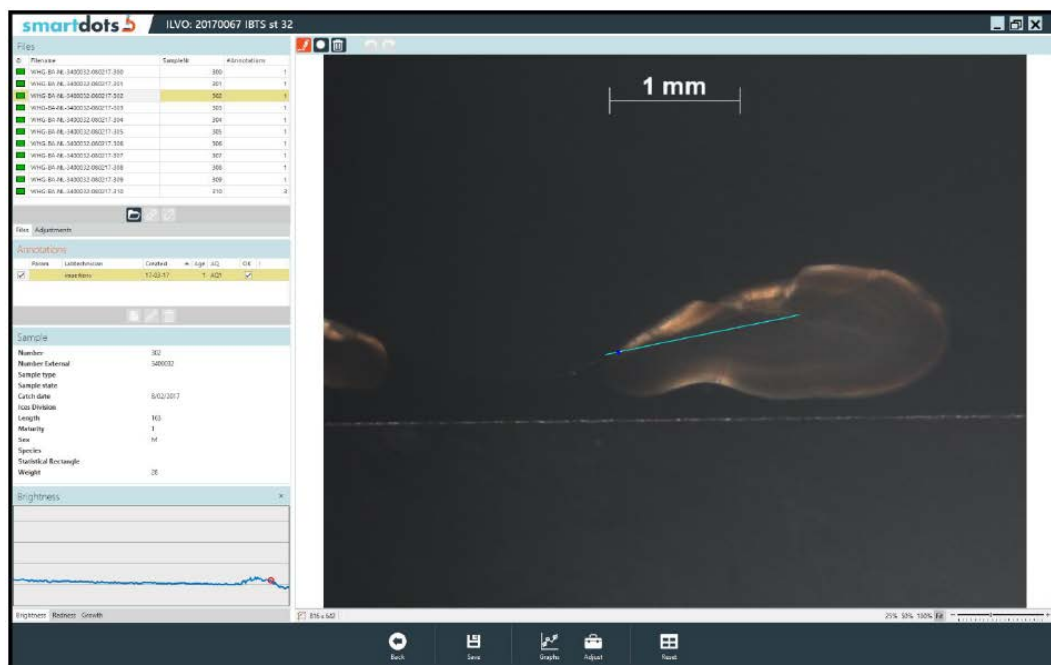


Figure 2 SmartDots Age reading annotation, courtesy of ILVO

Smartdots was presented at WGBIOP (Biological Parameters) 2017, the group officially adopted the Smartdots platform as the tool for age reading exchanges

¹ See Letter to NEAFC Council document Annex 1.

and workshops from 2018 onwards and expressed wishes that it will also be used for maturity exchanges and workshops in the future. By January 2018, Smartdots will be hosted by ICES and will be ready to “go live”. The North Sea Norway Pout age reading exchange will be the first official ICES age calibration exercise to be set up, annotated and analysed using the Smartdots tool. The group decided to go live with the most recent version of Smartdots that was presented at WGBIOP 2017, however in order for the tool to be fully operational by then a number of developmental and deployment steps need to be completed by the core development team (ILVO, ICES, DTU Aqua and IMR).

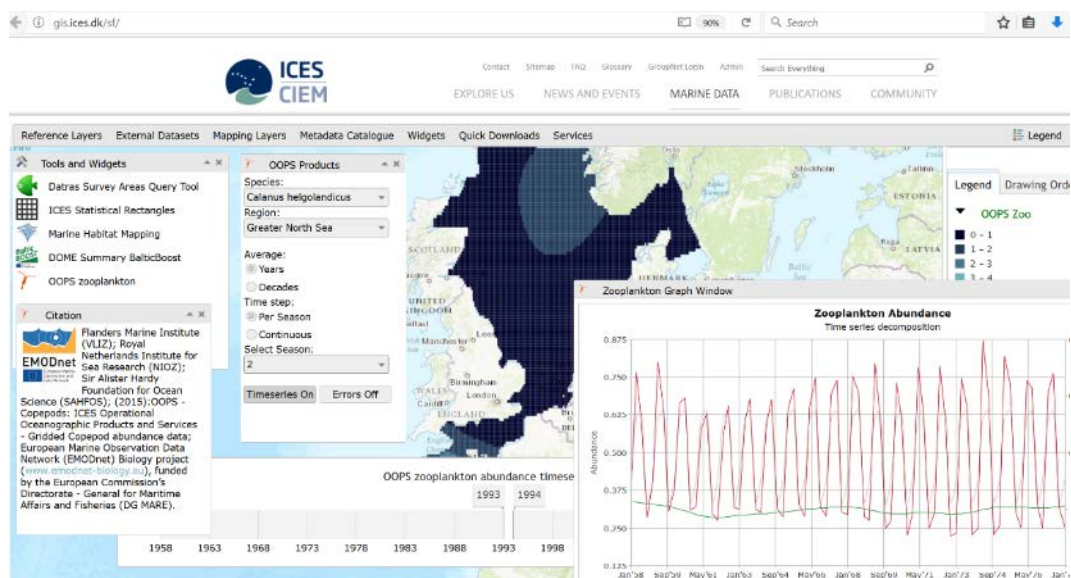
2.7 European Seabirds at Sea (ESAS)

The ESAS steering group met at ICES in Copenhagen in September 2017 to facilitate discussions on the potential for ICES to act as hosts of the ESAS database currently at the JNCC (UK). The meeting touched on the issues of data access and future development needs. Both ICES and the ESAS steering group were positive and at the next meeting of JWGBIRD in November there will be an opportunity to further discuss the specifics.

2.8 Operational Oceanographic Products and Services (OOPS)

OOPS Biology

Working through EMODnet Biology, ICES have now published the operational product that maps and charts data related to the 6 most abundant zooplankton species in the ICES Ecoregions. The resulting product is plugged directly into the ICES Spatial facility and can be dynamically queried to display time series by different species/time intervals. The data product was extensively reviewed by the EMODnet partners involved (VLIZ, SAHFOS and NIOZ) and an additional review was instigated by ICES using a number of prominent community experts. Generally, ICES need to think about the process of review for such products that sit outside the normal ICES system. <http://gis.ices.dk/sf/index.html?widget=oops>



OOPS Physics

ICES is still pursuing the product related to Copernicus (CMEMS). It has proven difficult to get exactly the product and service from Copernicus, partially as they work in a federated system, and partly because they will need a support project to deliver the required project – which may be some time away. Representatives will visit Copenhagen in November to discuss the specifics with the ICES Secretariat.

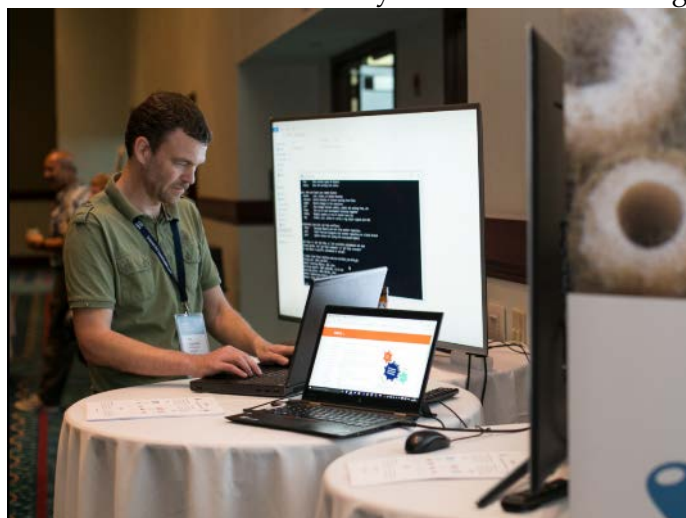
2.9 Quality control online database

In February 2016, ICES released its first compendium of quality control checks performed across all datatypes managed at ICES (<http://ices.dk/marine-data/tools/Pages/quality-control.aspx>). The significance of this once again refers back to a transparent assessment, which includes knowing what actions have been performed on incoming data. The overall goal of the QC checks is to provide the documentation necessary, in an easily accessible way for data end users, so that ICES could additionally provide a quality flagging system to all data managed at ICES. Quality flagging would greatly increase the utility of ICES managed datasets to machine interfaces and scripted programmes, such as packages developed by ICES working groups in the R environment.

3 Assessment Framework (the middle cog)

3.1 Transparent Assessment Framework (TAF)

The development of the ICES Transparent Assessment Framework (TAF) is progressing successfully. The system will make all ICES stock assessment input data, analyses, and results available online². TAF will pipeline the data flow, starting from the ICES fisheries and survey databases and ending by submitting



the results to the ICES stock assessment graphs database. By making the analysis

² See TAF flyer Council Document Annex 2

open and reproducible, TAF will also make it easier to prepare and run update assessments with a new year of data.

The first online version of TAF was demonstrated as a "live poster" at the ICES ASC in Florida during the poster session. It attracted a good number of viewers

The screenshot shows a web interface for the TAF system. At the top left is a '<Back' button. The main title is 'Haddock (Melanogrammus aeglefinus) in Division Va (Iceland grounds)'. Below the title is a table of metadata:

AnalysisKeyLabel	2015_had-iceg
Stock Code	had-iceg
Stock Database ID	0 NEED TO FIX
Data Category	1
Assessment Type	Adapt-type model (in ADMB)
Ecoregion	Greenland Sea Ecoregion, Iceland Sea Ecoregion
Expert Group	North-Western Working Group (NWWG)

Below the metadata are two tabs: 'Scripts' (selected) and 'Data'. Under the 'Scripts' tab, there are sub-tabs: 'raw', 'data', 'input', 'model', 'output', 'report', and 'utilites'. The 'report' sub-tab is active, showing 'Tables and Figures' and 'Scripts to produce the tables and figures included in the report.' Below this is a code block for 'report_tables.R':

```

report_tables.R
1 ## Prepare tables for report
2
3 ## Before: catage.csv, smh.csv, wstock.csv, wcatch.csv, maturity.csv,
4 ##         summary.csv, natage.csv, fatage.csv (data, output)
5 ## After:  catage.csv, smh.csv, wstock.csv, wcatch.csv, maturity.csv,
6 ##         summary.csv, natage.csv, fatage.csv (report)
7
8 library(icesTAF)
9
10 mkdir("report")
11

```

and was well received by young scientists, stock assessors, and senior scientists involved in fisheries advice. This demonstration will be repeated for ACOM, WGCHAIRS, and for the assessment working groups in 2018.

Figure 3 TAF online workflow and assessment run

Currently, there are now five stocks in the TAF system, undergoing continual development. In the coming year, in collaboration with the stock assessment scientists, assessments from several ICES working groups will be introduced in a stepwise manner to allow for gradual (agile) development of TAF system components: user interface, R packages, and web services.

The current status of these stocks in relation to their inclusion in TAF:

- Completed: North Sea spotted ray, Icelandic haddock
- In testing: Eastern Channel plaice, North Sea cod
- In progress: Icelandic ling

The TAF team have been working primarily on making the data connections and structure between the input side and the assessment model. In addition,

discussions and collaboration with the DTU hosted Stockassessment.org, as well as the IMR equivalent project, and the DFO in Canada are ongoing. The aim being to share and make use of, as much as possible, the existing software and methods developed within these systems to allow TAF to exploit these systems, but with some flexibility for other software and models to be incorporated as the ICES assessment community see fit.

4 Assessment and Indicator outputs (the last cog)

The stock assessment results provided by <http://standardgraphs.ices.dk> have now been further developed to provide stock status summaries automatically – both through the web page interface and programmatically through web services. This allows automation to the information in [Fisheries overviews](#) and has also been successfully mapped to Descriptor 3 reporting for the 2018 MSFD 1st assessment cycle, which was presented as a prefilling exercise to aid member states intending to refer to these assessments directly as part of their reporting obligation.

	Fishing pressure			Stock size						
	2014	2015	2016	2015	2016	2017				
Maximum sustainable yield	F _{MSY}	✓	✓	✓	Below	MSY Btrigger	✗	✗	✓	Above trigger
Precautionary approach	F _{pa} ,F _{lim}	✓	✓	✓	Harvested sustainably	B _{pa} ,B _{lim}	✗	⚠	✓	Full reproductive capacity
Management plan	F _{MGT}	—	—	—	Not applicable	B _{MGT}	—	—	—	Not applicable

Figure 4 Stock status summary, no longer locked in a PDF and can be queried and outputted by different criteria

The configuration of stocks and all of their related settings has been compiled in a companion database to the stock assessment results, known as the stock database, has now also gone into production and is seen as a key piece of the transparent assessment that ICES is striving to deliver.

5 Data and Information Group

The [DIG report](#) highlights a proposal on a data governance initiative, briefly summarized below (see also DATRAS section above).

This was the first year in which DIG was working towards a data governance framework and reporting model after receiving positive feedback from SCICOM. This year, activities focussed on evaluating the format, and creating oversight of how the framework will assist in achieving greater integration across the ICES Data portfolio.

Specifically, DIG carried out an exercise in locating data across multiple systems to answer broad/integrated questions, and located a number of strengths and weaknesses around how data systems are presented. Generally speaking, individual systems are highly competent at providing expert level insight to data, but less good at facilitating more generalist access, or to locate data across multiple systems.

DIG also did an initial trial of using a data governance framework to evaluate performance in specific data collections, and compared this approach to other

metrics-based approaches such as accreditation and quality management frameworks.

Overall DIG and members of staff from the ICES Data Centre are now positive and confident that a governance framework and reporting format can be adopted for ICES data products. This will help provide more structured reporting to SCICOM and ACOM when relevant, by giving a 'dashboard' view of the relative strengths and weaknesses of various ICES data outputs and products.

The exercise did however also identify that formation of governance groups is necessary to deal with the largest data collection. Specifically, DIG is setting up a governance group for the DATRAS portal to implement this reporting framework.

6 WISE-Marine

The flagship information portal for the MSFD, hosted by the EEA and supported by the Commission was launched at the Our Oceans conference in Malta in October <https://ourocean2017.org/>. The portal is now online on this link:

<http://water.europa.eu/marine>



ICES Data Centre and Communications department have been heavily involved in the conceptualisation and implementation of the web portal. The EEA, through the drafted letter of understanding with ICES, is keen to ensure that ICES has a prominent position in the both the showcasing of information into the system, but also the governance of the portal as it develops.

7 Blue Science Cloud and outlook past 2020

With the EU Commission's initiative towards a European Open Science Cloud <https://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud> there is a push to consolidate the various marine related cloud infrastructure and services projects into one coherent pilot. There will be a great deal of focus from the Commission on this in the coming 1-2 years as they elaborate a Blue Science Cloud.

ICES does not, as yet, have a strategy towards the Cloud initiatives. So far we have engaged with individual initiatives and projects (i.e. BlueBridge), which may be using cloud infrastructure, that have offered solutions/resources that can be related back to the ICES Strategic Plan. At present, this would seem to be a sensible approach to continue as ICES primary interest is in the products, services and standardisation that may be related to a cloud project/infrastructure but essentially will exist/be required irrespective of whether it is provided via the cloud or not.

To further this, the Head of Data and Information and DIG chair have drafted an outline of the major challenges/opportunities facing the Data landscape in the next 5 years. This will be fully presented at the SCICOM mid-term for further discussion and ultimately incorporation into the next ICES Strategic plan.

Stefan Amundsen
NEAFC Secretariat
44 Baker Street
London, W1U 7AL
UK

Our Ref: G.10/NH/2017

Subject: NEAFC provision of fisheries data to ICES

6 March 2017

Dear Stefan,

Recalling the meeting at ICES in Copenhagen on 18th January between NEAFC Secretariat and representatives from your contracting parties, and ICES Secretariat and ACOM representatives. We opened a discussion centred around the provision of data from NEAFC to ICES, both in its quality and potential gaps. The provisions of these data are by formal arrangement as agreed in 2014¹. These data are used, for example, in the advice on the evaluation of vulnerable marine habitats within the NEAFC regulatory area.

We mutually agreed to explore some of the issues that ICES raised in the data provision via a correspondence. I would highlight that ICES are prepared to visit the NEAFC Secretariat, or the sub-contractors that manage the NEAFC data, if it is felt that it may be easier to work through the discussion in this way. ICES have narrowed down the issues, and hereby describe the provision as it is, and what ideally would be required:

1. **Present situation:** VesselID is randomised every 6 months (data sent twice per year)
Preferred: If data were transmitted annually, and the VesselID to only be randomised on an annual basis (i.e. in January)
2. **Present situation:** Catch information is provided aggregated to 6 months for each vessel/species
Preferred: Catch information (CATCH_DATA table) should include date information to a minimum of daily if possible, otherwise weekly by vessel/species catch
3. **Present situation:** No catch weight provided
Preferred: Catch information is mandatory in the NEAFC recommendation on reporting, so (CATCH_DATA table) should include catch weight information

¹ http://ices.dk/explore-us/Documents/Cooperation%20agreements/NEAFC/20140313_VMS_data_agreement.pdf



ICES
CIEM

International Council for
the Exploration of the Sea

Conseil International pour
l'Exploration de la Mer

H. C. Andersens Boulevard 44-46,
1553 Copenhagen V, Denmark

+45 33 38 67 00
info@ices.dk | www.ices.dk

4. **Present situation:** We suspect that ICES does not receive all available data. This issue was highlighted to us by other organisations and when examining AIS data. It is unclear whether this is a reporting issue (to NEAFC) or database issue.
Preferred: All vessel activity to be provided

Thank you for your consideration of these points, and I hope we can find ways to further improve the dataflow, to both NEAFC and ICES benefit.

Sincerely,

A handwritten signature in black ink, appearing to read 'Neil Holdsworth', with a stylized flourish at the end.

Neil Holdsworth
Head of Data and Information