THE SECOND WORKSHOP ON DESIGNING AN EEL DATA CALL 2 (WKEELDATA2)

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i Executive summary

The second Workshop on Designing an Eel Data Call (WKEELDATA2), chaired by Cedric Briand (France) and Jan-Dag Pohlmann (Germany), met in Rennes, France from 18 March–22 March 2019 to design a data call to all countries having natural production of European eel. Eight scientists representing five countries participated in this meeting.

The life cycle of the European eel is complex, with a unique spawning area in the Sargasso Sea and growth areas widely distributed across Europe and Northern Africa. The stock is genetically panmictic, but the continental eel stock shows strong local and regional differences in population dynamics and local stock structures (sex ratio, length and age distributions). Local impacts by fisheries with various gears may vary from almost nil to heavy exploitation. Other forms of anthropogenic mortality (e.g. hydropower, pumping stations) have an impact on eel too, and vary in distribution and local relevance. Data on stock and impacts are reported to the Working Group on Eels (WGEEL), which generates the advice. Data correspond to several different life stages, from juveniles to prespawning eels, in different habitats (from freshwater to saltwater environments).

To collect more efficiently those data, ICES and GFCM have started a process of data call in 2017. The ICES Workshop on Designing an Eel Data Call (WKEELDATA) defined the main step of this process, generated the first version of the data call and improved the WGEEL database to host the collected data. During the 2017 meeting of the WGEEL, the first data were collected and integrated into the WGEEL database. In 2018, a workshop on Tools for Eel (WKTEEL) improved the integration and use of the collected data. During this workshop the database was improved further, data call spreadsheets were adapted, enhanced and automated tools for extracting and visualizing data from the PostgreSQL database were developed.

This working group has further prepared for the next data call, by extracting data from the database to send back to national correspondents, by developing tools to enable access to the database to the working group through a local raspberry server, and by designing the data call sheets, database, integration tools and visualization for new types of data (Yellow eel standing stock series and silver eel series).

ii Expert group information

Expert group name	The Second Workshop on Designing Eel Data Call (WKEELDATA2)
Expert group cycle	Annual
Year cycle started	2019
Reporting year in cycle	1/1
Chair(s)	Cedric Briand, France
	Jan-Dag Pohlmann, Germany
Meeting venue(s) and dates	18–22 March 2019, Rennes, France, 8 participants

1 Introduction

1.1 Terms of reference

WKEELDATA (ICES, 2017b) along with WGEEL (ICES, 2017a) and WKTEEL (ICES, 2018) have implemented a Data call system for formalizing and standardizing the data provision to support WGEEL work. Data on recruitment, catches and landings from commercial and recreational fisheries, restocking, aquaculture production, rates of other human-induced mortalities on eel, biological characteristics of eel, etc. are provided by WGEEL participants in many complex spreadsheets.

WKEELDATA2 met to:

a) Review WGEEL data requirements and define data quality standards;
b) Define standards and guidelines for reported data, including analytical methods;
c) Modify WGEEL data call spreadsheets to make them more efficient for data entry and analysis, in particular create automated tools to extract current data from the PostgreSQL database and send it back to national data correspondents; Those will have to contain both actual and discarded data;
d) Integrate information on the public status of data. Include questions in the spreadsheet and information cover letter. Modify database and integrations scripts to ensure the storage of this information into the database;
e) Complete the database suitable for WGEEL data and associated shiny interface;
f) Draft proposal for eel data call working with ICES (ACOM), EIFAAC and GFCM. The data call to be announced with a submission deadline suitable for the 2019 meeting of the WGEEL, and future meetings;
g) Set up a server allowing distance access to the database to facilitate the (guided) data integration by the reporting countries. To facilitate this work we aim at: (1) set up a shiny / Postgres server hosted in one institute to give access to the shiny interface. This tool would help national representatives from each country to connect to the interface, load their data and apply the quality checks themselves; (2) Set up a raspberry pie to act as a router to get access to the database and shiny app to all users during WGEEL.

1.2 Organization and progress during the workshop

The meeting was held 18–22 March 2019 at the Inra / Agrocampus in Rennes, and was attended by eight experts, representing five countries.

The meeting started with a reminder of the progress made in WGEEL data integration and the overview of the most important issues that needed to be addressed following the 2018 data call.

Tasks were defined as corresponding to the ToRs c, d, e and g, including modification of the spreadsheets, integration of information on the public status of data and ensuring the usability of the Shiny interface for WGEEL. An additional task was defined to set up a Raspberry Pi to act as a router for accessing the database and Shiny app during WGEEL meetings. The priority was given to Tor dealing with the development of the next data call. ToR a and b, i.e. Quality standards and guidelines for reporting data, including analytical tools were discussed briefly but not fully addressed given the small number of participants and the fact that biomass and mortality indicators were not to be reported for the next two years. However, problems have arisen during data compilation, and ways to solve them are stored in the github scripts and issues.

All programs produced during the workshop are available in the WGEEL GitHub (https://github.com/ices-eg/wg_WGEEL).

2 Public or restricted access to data

A questionnaire in excel has been prepared for the next data call to ask about the "public" status of the data. This questionnaire asks for each type of data whether the status of data is public or restricted (Table 1).

Table 1. Questionnaire for public status of data.

Data type	Public Status	If restricted, please provide justification
Yellow Eel Abundance Indices (Annex 2)		
Silver Eel Abundance Indices (Annex 3)		
Landings (Annex 4)		
Releases (Annex 5)		
Aquaculture Production (Annex 6)		
Biomass Indicators (Annex 6 in 2018 data call)		
Habitat Wetted Area (Annex 7 in 2018 data call)		
Mortality Siler Equivalent Biomass (Annex 8 in 2018 data call)		
Mortality Rate Sigma (Annex 9 in 2018 data call)		

In the database, a column has been created to store the information about public or restricted access, so the status of each line can be easily accessed. Two types of status have been created "Public" or "Restricted". These statuses have been stored in a reference table (tr_dataaccess_dta). All data stored until now have been updated as "public" and will be updated according to the data call.

A limited access was added to the database roles to define permissions. This restricted login is limited to visualise the data (no update nor delete are allowed).

These developments are working, but the discussion during the workshop showed that the presence of "Restricted" data might be a complicated matter as it raises the issue of tables and graphs created with those data during the working group, which could not be made public. Additionally, as most working group are encouraged to go for a Transparent Assessment Framework, this process would be impossible.

Further developments in the shiny visualisation tool (e.g. additional filters) have been discussed and analysed. However, such development would require a large amount of work, and will depend on the amount of data with restricted status: all data for one country, all data from an area, all data from a type (e.g. landings, aquaculture, biomass indicators…). These developments have however been postponed, in the hope that all data could be made public, and also waiting to see which type of data could be restricted, as this conditions the developments that will have to be done.

3 Database update

The structure of the database was initially developed by WKEELDATA (ICES, 2017b) and modified by WKTEEL (ICES, 2018).

Some triggers inserted at the end of the last WGEEL, to ensure that no new data would be entered with errors on life stage or habitat type, prevented the integration of any new data, as some data were wrong in the database. The corresponding lines have been corrected as following:

- "Freshwater" habitat type cannot contain information on the ICES area division.
- The life stages "OG", "GY" and "QG" are not allowed for landing indicators and mortality.
- The type name in the type series reference table values have been turned to lowercase.
- The column qal_kept was added to the data quality reference table, with true corresponding to rows where data quality id is 1, 2 and 4 (data to keep) and false to all other cases (data to discard).

The script "database_edition_2019.sql" contains all the modifications to correct some of the problem detected in the database.

4 Data integration

4.1 Updated functions for data integration and visualisation

The method to import data to the database "loading_functions.R" has been modified to prevent the above-mentioned problems when submitters integrate this information:

- The life stages "OG", "GY" and "QG" are not authorised with recruitment, landings, biomass and mortality indicators (issue 59 in GitHub). For that, a function checks these values specified in each table and send an error to the user if the life stages are not correct.
- "Freshwater" habitat type cannot contain information on the ICES area division (issue 60). For that, a new function checks the ICES area division column and send an error if there is a value for the freshwater data.

In the data integration process, new data in the excel files are compared to the existing data in the database to avoid duplicates. As the type series names were switched to lowercase in the database, a function corrects this column from the excel file to lowercase to match the value in the database (issues 43 and 75).

For data integration or data visualisation, the "extract_data" function is used to retrieve data from the database. This function has now two more arguments (issue 45):

- quality (default values are 1,2,4 for good, modified or commented data respectively);
- quality_check (default value is TRUE). If TRUE, the function does a selection on the eel_qal_id column with the quality argument.

These arguments were added to the function where it is used in data_integration and data_visualisation scripts. As these functions use views, the views.sql and precodata.sql scripts were updated to make it work.

4.2 Silver eel and yellow eel standing stock series

When transferring yellow and silver eel index series data from old database to the new the duplicates in yellow eel index data were corrected (wg_WGEEL/SQL/yellow_silver_index.sql).

Table 2. Series for Silver eels transferred from the old database.

ser_nameshort	ser_namelong	ser_cou_code	ser_emu_nameshort	count	min	max
ImsS	Imsa Siver	NO		36	1975	2010
Pand	*Pandalus*			16	1984	2005
Shie	Shiledaig			8	1999	2010
NSIB	NS-IBTS			22	1988	2011
BadB	Baddoch Burn		GB_Scot	5	2006	2010
BIT1	BITS-1			16	1991	2011
BIT4	BITS-4			20	1991	2010
FreS	Frémur	FR	FR_Bret	15	1996	2010
GirB	Girnoch Brun		GB_Scot	21	1966	2009

Table 3. Series for Yellow eels transferred from the old database.

ser_nameshort	ser_namelong	ser_cou_code	ser_emu_nameshort	count	min	max
ska	Skagerrak Beach-seine Survey	NO		80	1925	2009
DenB	Den Burg fykenet survey	NL	NL_Neth	52	1960	2011

4.3 Data extraction and generation of excel files

To extract data from the database and create output files per country and data type (excluding recruitment) to be sent to the national correspondents, a function (asking_data_update_others.R) was created and stored in the WGEEL Github.

Data (t_eelstock_eel) were selected from the database with all the associated columns, and quality reference and data type reference tables were joined to the data. The former join provided categories to be used in the function to separate between kept and discarded data, while the latter join added a new column to the output files describing data type.

Finally, the function to create excel files per country and data type was developed. The first step included data selection based on country code and data type and creation of subfolders per country inside the working directory. The second step consisted of a set of if and else statements where data were selected based on their type to ensure the output files matched the input files. If no data are available for specific data type, then no file is created. The third step involved selecting data based on the quality information (keep and discard). The final step was creating excel files per country and data type with separate sheets for kept and discarded data.

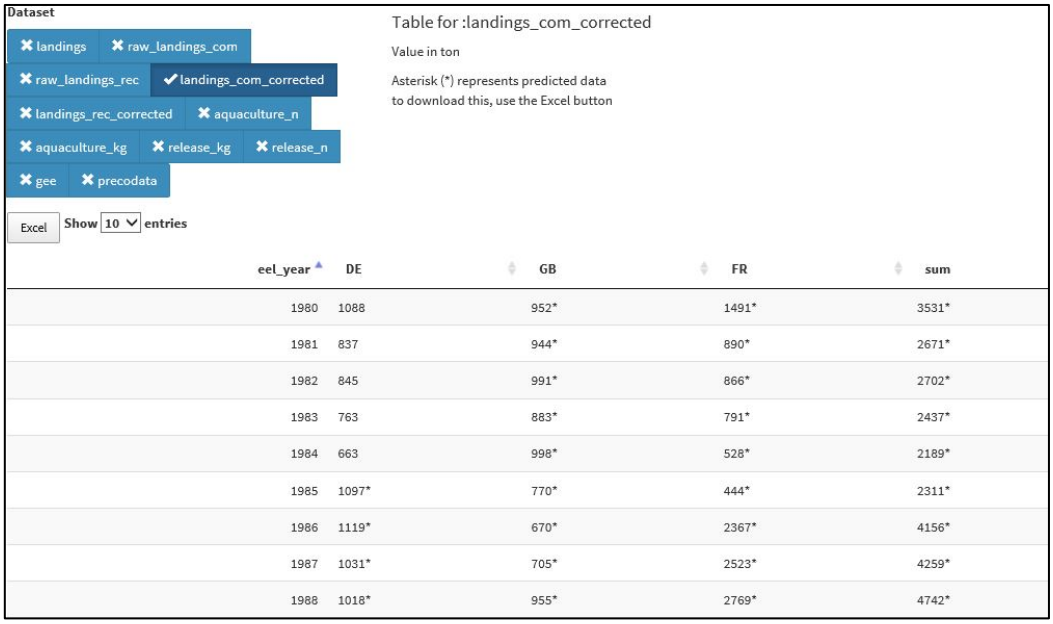
4.4 Data check (input vs.output) for Estonia, Germany and the UK

The input data were compared with the output files created by the above function for Estonia, Germany and the UK by the national correspondents. The functionality of the code was confirmed by all testers. The created excel files were provided to the stock coordinator to distribute to national correspondents and are also available at ICESsharePointWKEEKDATA2Data.

5 Data visualisation

Several data visualisation issues reported on github were resolved.

1. A column summing all the values per row was added to the corrected commercial and recreational landings tables (Row sums; Figure 1).
2. An asterisk was added to the corrected commercial and recreational tables to indicate predicted data (Adding asterisk for predicted data; Figure 1), with an associated legend (Adding legend; Figure 1).



eel_year	DE	GB	FR	sum
1980	1088	952*	1491*	3531*
1981	837	944*	890*	2671*
1982	845	991*	866*	2702*
1983	763	883*	791*	2437*
1984	663	998*	528*	2189*
1985	1097*	770*	444*	2311*
1986	1119*	670*	2367*	4156*
1987	1031*	705*	2523*	4259*
1988	1018*	955*	2769*	4742*

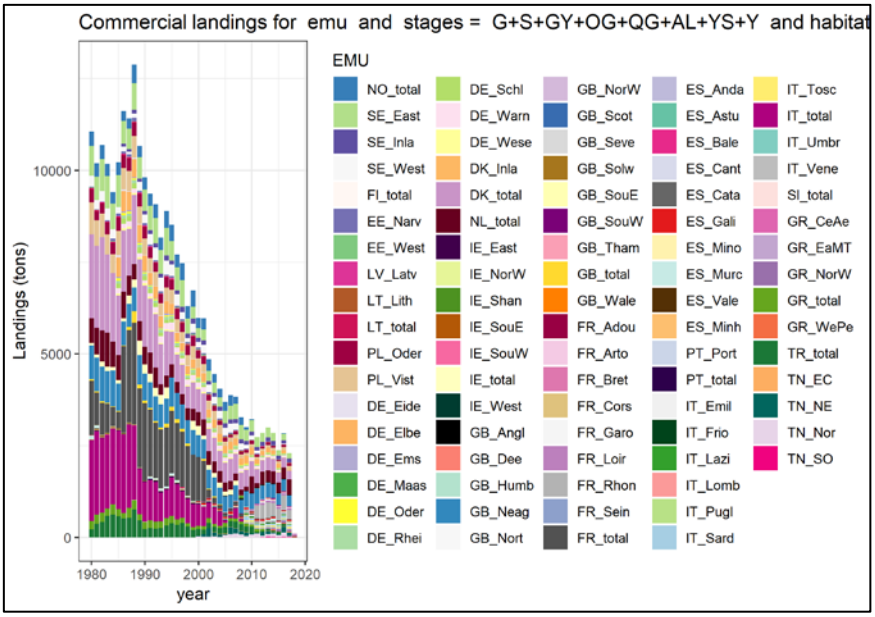
Figure 1. An example of the corrected commercial landings table for Germany, Great Britain and France (1980–1988) with the sum column, where asterisks (*) represents predicted data.

3. To create the raw landings plots per EMU, 14 colour pallets from the RColourBrewer package (Neuwirth, 2014; see below) were combined to produce unique colour codes per EMU (146 colour codes in total; Colour code). Due to a large number of EMUs, there was a high similarity between some of the colours utilised. However, it was ensured that distinct colours were used for the EMUs inside the same country. Figure 2 illustrates this standardisation protocol with the same colour representing each EMU in different figures.

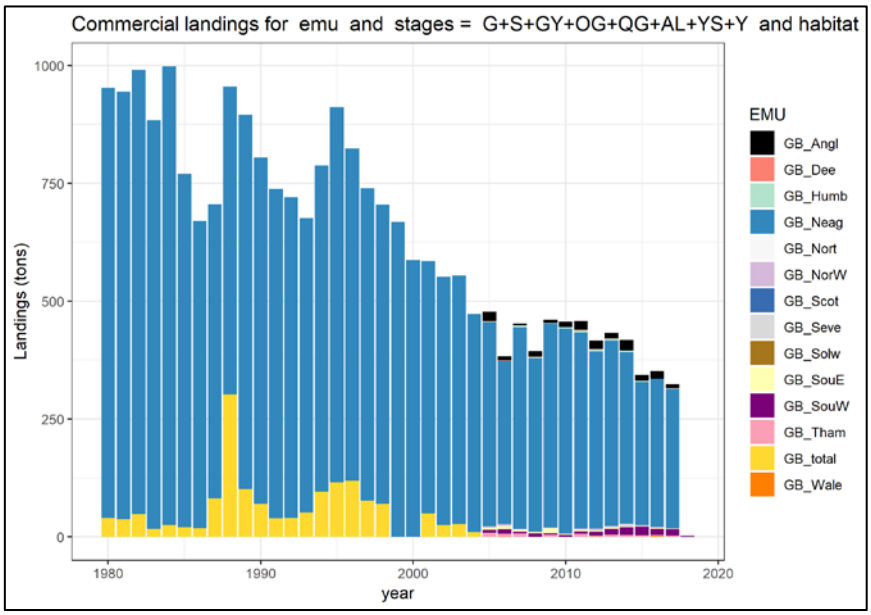
The palettes chosen from RColourBrewer (Neuwirth, 2014) include:

1. 'Set1'
2. 'Spectral'
3. 'PuOr'
4. 'Set2'
5. 'PRGn'
6. 'Set 3'
7. 'BrBG'
8. 'Greys'
9. 'RdPu'
10. 'PuRd'
11. 'Accent'
12. 'PiYG'
13. 'Pastel2'
14. 'Dark2'

To produce graphs for raw commercial and recreational landings by EMU, server function was updated to include an option to plot by EMU if input is not country and to indicate which colour codes to use for EMU plots (Graph raw landings by EMU).



a)



b)

Figure 2. An example of the landings plots per EMU and habitat, where a) raw commercial landings by all EMUs; b) raw commercial landings by EMUs in the Great Britain.

4. Output tables and figures required for the annual report were identified:
   a) Glass eel commercial landings time-series by Country; Table and Figure;
   b) Raw and corrected Glass eel commercial landings time-series by Country; Table and Figure;
   c) Yellow and Silver eel commercial landings time-series by Country; Table and Figure;
   d) Raw and corrected Yellow and Silver eel commercial landings time-series by Country; Table and Figure;
   e) Glass eel recreational landing; Table and Figure;
   f) Yellow and Silver eel recreational landings; Table;

g) Aquaculture production by Year and Country; Table and Figure;
h) Release of all stages by Year and Country; Figure;
i) Release of Glass eel by Year and Country; Table and Figure;
j) Release of Silver eel by Year and Country; Table and Figure;
k) Release of Yellow eel by Year and Country; Table and Figure;
l) Release of quarantined Glass eel by Year and Country; Table and Figure;
m) Release of Ongrown eel by Year and Country; Table and Figure.

To automate the creation of output tables and figures, a script was produced and stored in the WGEEL Github (). The script creates a word document with all the table and figures and associated captions, csv files for the tables and png files for the figures.

6 Data call files

A spreadsheet was added to the data call in order to assess the public status of data, asking national correspondents to define whether the data reported in the call (including past, present and future calls) are available for public access. This concerns their use for the visualization tool, which is to be hosted online, as well as the use of data to create graphs and tables for the WGEEL report.

Additional spreadsheets were added in order to collect data on yellow eel abundance and silver eel escapement surveys.

An additional tab was created in the data call spreadsheets to provide an option to input biometric data for recruitment, yellow eel and silver eel time-series.

The cover letter of the data call was updated, adjusted to the present data requests and additional explanations were given.

7 Raspberry Pi

The objective of having an easy way to handle data during WGEEL meetings led to setting up a Raspberry Pi (model Pi3 B+) to act as a router when accessing the database and the shiny app (Raspberry installation). The shiny application was updated so that it does not connect to the database to retrieve data every time a new user logs in to the application (GitHub). Router was tested during the workshop and was working properly.

The tests have shown that when several users try to access the shiny application, the raspberry has a slow response. However, we could use it successfully to share a working database, and run tests with access to the database during development. There might also be a further optimisation of code for low resource.

8 Conclusion

This workshop reviewed WGEEL data requirements, to modify the data call spreadsheets for more efficient data entry and analysis. Also, integration on the public status of the data was completed. Server data visualisation errors which were reported, were resolved. Excel files were generated for the data call.

ToR a and b were discussed but we hadn't the resource to fully resolve them given the number of attendees.

A list with tasks for future work was created in order to further develop the database, particularly concerning the use for WGEEL and hosting the visualisation tool online.

9 References

ICES. 2017a. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eel (WGEEL), 3–10 October 2017, Kavala, Greece. ICES CM 2017/ACOM: 15. 481 pp.

ICES. 2017b. Report of the Workshop on Designing an Eel Data Call (WKEELDATA), 28 February–2 March 2017, Rennes, France. ICES CM 2017/SGIEOM:30. 38 pp.

ICES. 2018. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL), 5–12 September 2018, Gdańsk, Poland. ICES CM 2018/ACOM:15. 152 pp.

ICES. 2018. Report of the Workshop on Tools for Eel (WKTEEL), 2–6 July 2018, Rennes, France. ICES CM 2018/ACOM:49. 23 pp.

Annex 1: List of participants

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Annex 2: Agenda

Monday, 18th March

08:00–10:00	Welcome, Reminder of ToRs, Objectives, etc.
10:00–11:00	Presentation on database (Cedric)
11:00–12:00	Task group assignment and breakout
12:00–12:45	Lunchbreak
12:45–17:30	All task groups breakout
17:30–18:00	Progress reports

Tuesday, 19th March

08:00–12:00	All task groups break out
12:00–12:45	Lunchbreak
12:45–17:30	All task groups break out
17:30–18:00	Progress reports

Wednesday, 20th March

08:00–12:00	All task groups break out
12:00–12:45	Lunchbreak
12:45–15:00	All task groups break out
15:00–End	Field Trip

Thursday, 21st March

08:00–12:00	All task groups break out
12:00–12:45	Lunchbreak
12:45–17:30	All task groups break out
17:30–18:00	Progress reports

Friday, 22nd March

Data Call agreement, Report agreement, Complete further tasks from the GIT List

Annex 3: Recommendations

Recommendation	Addressed to
If data on effort are to be collected during future data calls, a sound procedure for the collection and use of these data should be developed in advance	WGEEL