

Quantifying quality assurance in European fisheries biological data collection

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Aim

Quality assurance of fisheries data collection is an important topic however since some of the most important fisheries data (for example commercial fisheries data) is confidential it is often not possible to directly evaluate data quality at a European level. This paper focuses on the specific operational interpretation of quality assurance in EU fisheries biological data collection however broader reviews of the topic are also available – see [1] for example. EU countries have a requirement to submit annual reports which describe how they collected the data required under the EU Common Fisheries Policy. One element of this report is a summary of their biological data quality assurance for each of their sampling schemes where they specify general principles, methods and tools that can provide guidance and evidence of their work. Since there is no common framework in use for biological data quality assurance it is hard to compare the information that different countries supply. The aim of this work was to define indicators which would both allow comparison between countries and allow changes to be tracked over time.

Method

It was agreed that it would not be possible to evaluate the actual data quality tools, techniques, and manuals that countries are using. This was because: i) not all information is publically available, ii) the information that is available will often be in the native language of the country, iii) even when the information is publically available in a language that is understood by the authors it would be a difficult, specialised, and time-consuming task to decide whether the techniques were appropriate for the circumstances of the country. It was therefore decided that the authors would evaluate the existence, availability, recency and pertinence of the quality documentation – with the belief being that this will have a strong correlation with the overall quality of the sampling programme.

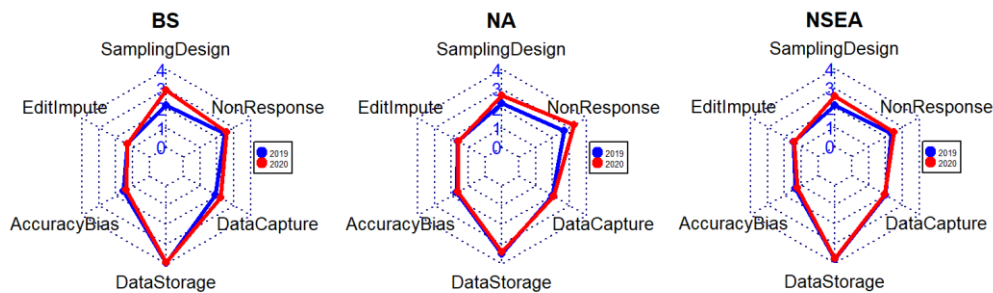
Within the annual report questions are asked on six quality assurance topics: **Sampling Design, Non-responses and Refusals, Data Capture, Data Storage, Accuracy and Bias, and Editing and Imputation**. For each of these topics an indicator was defined which had a range from 1 - 4 (with 1 being worst and 4 being the best). Not Applicable (NA) could also be allowed in certain cases.

To give an example of these indicators the “Sampling Design” topic has two related questions: 1) “*Is the sampling design documented?*”, and 2) “*Where can documentation on sampling design be found?*”. The indicator values for this topic were defined as: **Level 1**: Sampling design not documented; **Level 2**: Sampling design documented but either (i) not publically available, or (ii) the link to documentation doesn’t work, or (iii) the documentation is old (from earlier than 2014); **Level 3**: Sampling design is recently documented (2014 and later) and publically available; **Level 4**: Sampling Design is recently documented (2014 and later) and publically available and follows good/best practices (a clear reference to guidelines established by an Expert Group or similar is provided). This indicator could be allowed to have a value of NA (not applicable) in certain circumstances, for example in the case of census data collection.

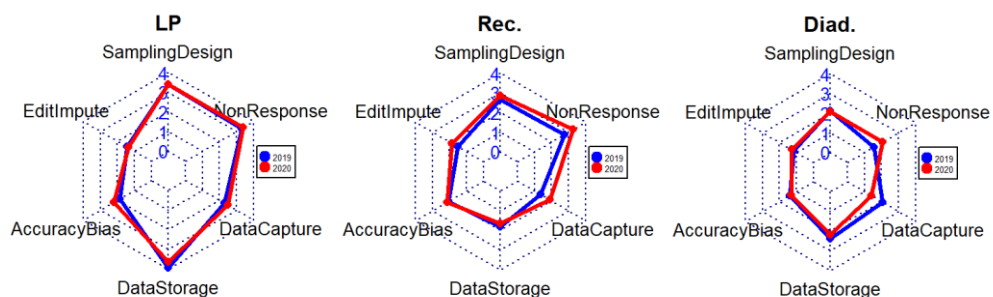
The overall method used was: i) the annual reports of each country were collated (the original annual reports can be downloaded from <https://datacollection.jrc.ec.europa.eu/wp-np-ar>); ii) for each row of the biological quality assurance section these indicators were assigned a score from 1 – 4; iii) each row in the collated reports was evaluated for each country which attends either the North Atlantic,

North Sea & Eastern Arctic, or Baltic Sea Regional Coordination Groups (RCG); iv) the mean of these indicators for different groupings (e.g. for all countries) was then calculated. This evaluation process has been performed for 2 years (2019 and 2020) with the intention to continue in the future.

Results and discussion



It was seen that the indicators varied significantly by country (results shown in [2]) - this was because the data for each country can include submissions by different institutes, different regions (e.g. North Sea and Baltic), and different sampling schemes (e.g. commercial and recreational). A more consistent picture emerged when means were calculated for different regional groupings. It was seen that the indicators aggregated by Regional Coordination Group (RCG) had very similar values – with all showing a characteristic “shield” shape on radar plots. Radar plots are shown above for the Baltic Sea (BS), North Atlantic (NA), and North Sea & Eastern Arctic (NSEA) RCGs. The bottom point of the shield was due to the fact that their commercial fisheries data is being uploaded to the Regional Database (RDB) which gives the highest indicator value. The weakest areas are the procedures around “Editing and Imputation”, “Accuracy and Bias”, and “Data Capture”. Radar plots for the Large Pelagic (LP), Recreational (Rec.), and Diadromous (Diad.) groups are shown below.



The Large Pelagic group had high scores because they were able to refer to internationally coordinated manuals from organisations like ICCAT. They showed a similar weakness in the areas of “Editing and Imputation”, “Accuracy and Bias”, and “Data Capture”. The Recreational data does not share the shield-shaped radar plot. Marine recreational data capture is still at the pilot stage in many countries which means many of the quality processes are not at the same maturity as the established commercial fishery sampling schemes. Recreational sampling is also more heterogeneous than commercial fisheries sampling which can make the quality procedures harder to document. Although typically data has been collected for longer time-series Diadromous programmes share some characteristics with the Recreational programmes in that there is not a single international database and that data collection is also more heterogeneous than for commercial sea fishery sampling programmes.

References

- [1] Scientific, Technical and Economic Committee for Fisheries – Quality Assurance for DCF data, 2017, doi:10.2760/680253
- [2] RCG North Atlantic, North Sea & Eastern Arctic and RCG Baltic Reports, 2020, <https://datacollection.jrc.ec.europa.eu/docs/rcg>