WORKING GROUP ON COMMERCIAL CATCHES (WGCATCH; OUTPUTS FROM 2020 MEETING)

VOLUME 4 | ISSUE 26

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ICES Scientific Reports

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i Executive summary

WGCATCH contributes to ensure the quality of commercial catch data, which underpins stock assessments and advice. In order to achieve this, the group documents sampling schemes and estimation methods, establishes best practice guidelines and provides advice on the uses of commercial fishery data. The group also evaluates how new data collection regulations, or management measures, may alter the way data needs to be collected and provides guidelines about biases and disruptions induced in time-series of commercial data. At this year´s WGCATCH meeting, all the proposed Terms of References were covered although some tasks were prioritized due to virtual nature and limited time available at the meeting.

Work under ToR a), guidelines and best-practices for catch sampling and estimation, mainly focused on the planning of work for the next three-year term.

The work carried out under Small Scale Fisheries (SSF) subgroup, continued to review developments in sampling and estimation practices for collection of fishing activity variables (landings by species and fishing effort) and biological data (discards, length and age distributions, other biological parameters) in small-scale fisheries (SSF), with the objective to ensure that the collection of fishing data from SSF across Europe is sufficient for main end-users needs, harmonised and comparable and to improve their quality. Based on the risk assessment methodology developed in 2018–2019 to evaluate the SSF transversal data quality, this evaluation was updated. In addition, the differences in data quality were also compared with the transversal data collected from the Large Scale Fleet and also with the scientific estimates obtained from scientific surveys.

Fishing effort data are regularly used by numerous ICES working groups, including WGBYC, and are one of the fundamental components in the production of bycatch mortality estimates and risk assessments, and along with bycatch rates estimated from sampling programmes and abundance estimates help to improve our understanding of the impacts of fishing activity on many non-commercial and protected species populations and in the development of bycatch management measures. Under the work carried out by the subgroup dealing with Protected, Endangered, and Threatened Species (PETS), the main focus during this year´s meeting was to analyse the differences found between the Regional Data Base (RDB) and WGBYC data base regarding effort data. With this aim in mind, a questionnaire was sent to all WGCATCH members about 3 weeks before their meeting in November 2020. Based on the responses provided, a first analysis of the results was realized to identify what are the main reasons for these discrepancies. The results of this analysis allowed to identify some possible measures (e.g., improvements in the data call) to avoid these differences in effort estimates as far as possible.

In addition, and in order to streamline the data handling towards Advice on incidental bycatch, ICES has developed a Roadmap, which was presented in plenary at the meeting by Henn Ojaveer. The roadmap gives the list of key expert groups in the process and outlines their main expected roles and tasks. WGCATCH feeds into the internal workflow and system for creating the evidence base for the bycatch advice by developing sampling protocols.

WGCATCH continued to support the development of the RDBES, ToR d), e.g. the proposed series of practical workshops on estimation procedures will support the future development of estimation methods within the RDBES. Further, WGCATCH has played an active role in developing and reviewing the updated RDBES codes for none-probabilistic methods for selecting a sample. The purpose of the new codes is to communicate the diverse ways of past and present none-probabilistic selection with a few numbers of code that unambiguous inform on method used and convey relevant information to end-users.

Under the ToR e), 'Collaborate in the advisory process, liaising with assessment groups and benchmarks on commercial catch issues', ToR e), the involvement of WGCATCH in the development of a check list for benchmarks for topics relevant for commercial catches e.g. LPUE / CPUE was discussed and accepted. A recommendation for data calls including commercial catches, which could raise the quality of commercial catch data in future assessments and benchmarks, was formulated, including a time line for data requests and involvement of data submitters and WGCATCH. Further, the former work on how to communicate relevant information about sampling design and estimation to end-users was picked up based on a recommendation from WGNSSK.

And, as always a lot of presentation from other ICES expert groups was held in plenary to inform on other relevant work within the community, ToR f).

Finally, the group discussed the possibility of including a special issue under the ICES Journal of Marine Science, considering the topics that are worked on within WGCATCH. The chairs will make the first contacts with the editors of this journal about how to launch WGCATCH research topics to start developing the proposal.

ii Expert group information

Expert group name	Working Group on Commercial Catches (WGCATCH)
Expert group cycle	Multiannual fixed term
Year cycle started	2020
Reporting year in cycle	1/3
Chairs	Kirsten Birch Håkansson, Denmark
	Estanis Mugerza, Spain
Meeting venue and dates	9–13 November 2020, online (36 participants)

1 ToR a) Review and update guidelines and best-practices for implementation of statistically sound catch sampling and estimation thereof

Planning of future workshops and intersessional work

1.1 Review and update of guidelines

Not much progress was achieved during the WGCATCH 2020 meeting in respect to updated guidelines for sampling and it was decided to start the process intersessionally with the following draft ToRs

a) Collate existing guidelines – take the work done by WKDSG into account
b) Start to outline the guidelines and highlight missingness
c) Develop a questionnaire for WGCATCH 2021 for people to report back practical issues

1.2 Planning of estimation work shops

WKRATIO

The workshop on ratio estimation was planned for 2020, but postponed to 2021. The resolution from WGCATCH 2019 was briefly revisited and agreed on, see Annex 5.

WKRARE

WKRARE was discussed in plenary, see Annex 5 and under ToR c) Section 3.3.

The workshop is planned for 2022.

WKPOST

The plan was to have the workshop in 2022, but since the two other workshops have been postponed a year that seemed unrealistic. Therefore, it was decided not to spent time on the planning during WGCATCH 2020.

1.3 WKBIOPTIM

The plan was to review the final R-packages developed for optimization of length and age data in WKBIOPTIM4 and discuss results at the meeting, but WKBIOPTIM4 is postponed to late 2021, so the group decided to postpone the review to 2022.

Triggered by a recommendation from WKBIOPTIM, 2019, asking for feedback on the usefulness and potential improvements of the tools, an overview of tools developed at WKBIOPTIM was given at WGCATCH 2020 and afterwards discussed in the TOR a) subgroup. More than half of the group have never used the tools, but around half of these are using optimization tools developed at their own institute and / or in other projects e.g., fishPi2, the rest use some of the tools developed.

In conclusion, WGCATCH encourage everyone to test the tools and provide input to WKBIOP-TIM. Further, WGCATCH encourage members developing their own tools to participate in WKBIOPTIM so ideas can be discussed and potentially included in the common tools. WGCATCH encourage WKBIOPTIM to attract survey people and to adopt the tools to the RDBES format.

2   ToR b) Review developments in sampling and estimation practices of catch, effort, length and age distributions and other biological parameters of Small Scale Fisheries (SSF)

WGCATCH continued to review developments in sampling and estimation practices for collection of fishing activity variables (landings by species and fishing effort) and biological data (discards, length and age distributions, other biological parameters) in small-scale fisheries (SSF), with the objective to ensure that the collection of fishing data from SSF across Europe are sufficient for main end-users needs, harmonised and comparable and to improve their quality. In 2020, WGCATCH SSF subgroup conceived a work plan to cover the following issues:

Update and refine risk assessment for transversal data quality methodology developed in 2018/2019 *(comparison with Large Scale Fleets and scientific estimates)*
Document sampling effort of biological data on SSF
Peer-review publication on SSF

The group agreed to focus this year on these three first topics as we were in a virtual mode. Consequently, the two following *(also initially scheduled for 2020)* work plan points have not been addressed this year, postponed for next years.

Continue to develop best practices guidelines on sampling and census data for SSF transversal variables and evaluate its implementation *(focus on sampling approach)*
Following development of RDBES database and making recommendation for the proper integration of SSF data and their specificities into

The three topics were covered during the week. The group *(13 participants)* worked on them during four WGCATCH SSF subgroup dedicated sessions in the week. The agreed agenda was defined on the first day of the week and first results were presented and discussed in plenary on Friday morning. First session was dedicated to a TOR' introduction, agenda agreement and, as a reminder, 2019 WGCATCH results were presented and discussed. Second session was dedicated to the peer review paper. Finally, the two last sessions were dedicated to the two first topics for which questionnaires were populated before the meeting. The group worked in two subgroups to look into the questionnaires' replies. The work began during the week and was organized for the next weeks to complete/finalize the tasks, analysis and 2020 report writing for the beginning of 2021 year.

The following presentation took place during the WGCATCH 2020 meeting:

- **Sébastien Demanèche:** 2019 WGCATCH' principal results

The presentation was followed by a discussion of the practical and theoretical aspects involved especially on the risk assessment transversal data quality methodology developed which will be updated this year.

2.1   ToR b1) Update and refine risk assessment transversal data quality methodology developed in 2018/2019 (comparison with Large Scale Fleets and scientific estimates)

In 2019, WGCATCH SSF subgroup finalised the development of a risk assessment transversal data quality methodology based on 2018 SSF questionnaire replies and especially concentrated on the evaluation of the coverage/completeness and accuracy/reliability of SSF fishing activity data *(landings and fishing effort)* collected via a census approach. The objective pursued was the assessment/evaluation/determination of a level of incomplete data issues' risk regarding the different type of indicators calculated *(e.g. define indicators' patterns which present low, medium or high risk of incomplete data issues).*

The risk assessment transversal data quality methodology developed was based on two basic indicators calculated by precise vessel length ranges:

1.   1st indicator comparing the number of vessels registered in the official national fishing fleet register against the number of vessels with a minimum of one declarative data available

2.   2nd indicator concentrating on vessels with declarative data and investigating the completeness of their transversal data regarding the number of trips they declared

2020 WGCATCH SSF subgroup work began with a summary of the methodology developed in 2019, principal outcomes and intended perspectives for 2020.

In 2019, WGCATCH SSF subgroup developed an amended the version of the 2018 SSF questionnaire to update the replies with more recent years data, complete them with same indicators calculated for the Large Scale Fishery (LSF) and add the possibility to provide scientific estimates when they are different from control regulation estimates. The intended purpose was to confirm the potentiality of the risk assessment data quality methodology *(indicators and risk map associated)* developed in 2018/2019 to be used as a sensor to detect possible risk of data incompleteness issue or over declaration.

The questionnaire developed in 2019 WGCATCH was populated before the 2020 meeting and completed by 15 countries updating the 2018 replies for 14 of them. Only three countries did not update their data when data from Estonia have been newly-collected *(details available in Table 1 hereunder).*

Country	2018 WGCATCH questionnaire	2020 WGCATCH questionnaire	Comments
BEL/Belgium	X	NO	only one vessel less than 12m.
CYP/Cyprus	X	X	
DEU/Germany	X	X	
DNK/Denmark	X	X	
ESP/Spain	X	X	without mediterranean & canary islands vessels
EST/Estonia	NO	X	
FIN/Finland	X	X	
FRA/France	X	X	without tropical seiners and mediterranean bluefin tuna seiners for 24-40 & >=40m vessels
GBR/Great britain	X	X	Northern Ireland, Wales, Scotland, England, (2018&2020) + Jersey, Guernsey & Isle of Man (2020)
GRC/Greece	X	X	GSA 22 (2018&2020) + GSA 20-23 (2018)
IRL/Ireland	X	NO	
LTU/Lithuania	X	X	
LVA/Latvia	X	X	
NLD/Netherlands	X	NO	
NOR/Norway	X	X	
POL/Poland	X	X	
PRT/Portugal	X	X	without Maderes (2018&2020) and Azores (2018) vessels
SWE/Sweden	X	X	

Table 1: Summary of 2018 and 2020 WGCATCH SSF questionnaire replies[1]

For some countries, data are available by country regions or partially. The list of 32 country*areas*year available are[2]: Belgium (BEL_27 2017), Cyprus (CYP_37 2017&2019), Germany (DEU_27 2017&2019), Denmark (DNK_27 2017&2019), Spain – Cantabrian Sea (ESC_27 2017&2019), Spain – Gulf of Cadiz (ESG_27 2017&2019), Estonia (EST_27 2019), Finland (FIN_27 2017&2019), France (control & scientific estimates (sc)[3]): Atlantic, Northeast (FRA_27 2017&2019), Mediterranean and Black Sea GSA7/Gulf of Lion (FRA_GSA7 2017&2019), Mediterranean and Black Sea GSA8/Corsica (FRA_GSA8 2017&2019), Atlantic, Western Central - Guadeloupe island (FRG_31 2017&2019), Atlantic, Western Central - Martinique island (FRM_31 2017&2019), Atlantic, Western Central & Atlantic, southwest - French Guyana (FRG_3141 2017&2019), Indian Ocean, Western - La Réunion island (FRR_51 2017&2019) and Indian Ocean, Western - Mayotte island (FRM_51 2017&2019), United Kingdom: England (GBE_27 2017&2019), Scotland (GBS_27 2017&2019), Wales (GBW_27 2017&2019), Northern Ireland (GBN_27 2017&2019), Jersey (GBJ_27 2019), Guernsey (GBG_27 2019) & Isle of Man (GBI_27 2019), Greece (control & scientific estimates (sc)) Mediterranean and Black Sea GSA22 (GRC_GSA22 2019)[4], Lithuania (LTU_27 2017&2019), Latvia (LVA_27 2017&2019), Netherlands (NLD_27 2017), Norway (NOR_27 2017&2019), Poland (POL_27 2017&2019), Portugal continental area (PRT_27 2019)[5], Portugal Azores islands' vessels (AZO_27 2019) and Sweden (SWE_27 2017&2019).

Qualitative information available in the first part of the questionnaire ("SSFtransvariables sampling info" excel sheet) were compiled and summarised updating the information collected in 2018. On this basis the overview (and summarizing tables) of the different fishing activity' data collection methods currently applied in ICES Countries for SSF has been refreshed (see Section 2.1.1 hereunder).

Quantitative information available in the second part of the questionnaire ("No_vessels" and "No_vessels_per_trip" excel sheets) were also compiled (aggregated with the 2018 quantitative information) and analysed in order to refine the risk assessment transversal data quality methodology extending them to Large Scale Fisheries to compare SSF and LSF status (Section 2.1.3).

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[1] 2016-estimates from Ireland have not been further considered as they were incomplete and there was issues in.

[2] LSF data are available for 28 of the 32 country*area. Belgium and Netherlands indicators have not been provided for LSF' vessels whereas in "Atlantic, Western Central - Guadeloupe island" and "Indian Ocean, Western - Mayotte island", there is no LSF' vessels registered in the fishing fleet register *(except some tropical seiners for Mayotte Island for which data has not been provided)*.

[3] Scientific estimates *(different from control regulation estimates)* are calculated for vessels less than 12 meters length in Mediterranean *(GSA 7&8)* and Other Regions *(French Guyana, Guadeloupe, Martinique, La Réunion & Mayotte)*.

[4] 2016-estimates provided in 2018 have been deleted as there were issues.

[5] 2017- estimates provided in 2018 have been deleted as there were issues.

Comparison between scientific and control regulation estimates (if available/different) has been also performed, outcomes from the analysis are presented in Section 2.1.2.

As last years, first step of the analysis was to clean/validate and eventually revised (when issues were identified) the quantitative information collected in the 2020 questionnaire replies (e.g. convert data from Greece and Cyprus into precise vessel length ranges, update Finland and Germany questionnaires with LSF data …). This first step was completed comparing data provided in the 2020 and 2018 questionnaire replies and also with the official EU fleet register data maintained by the commission (https://webgate.ec.europa.eu/fleet-europa/search_en). These comparisons allowed either to validate them or to highlight some issues which require to revise them (e.g. Germany) or to not consider them in the analysis (e.g. Ireland). R scripts developed last year have then been renovated and adapted to this new input file/dataset for the following steps including: 1) renewing the graphical outputs presenting the basic indicators, 2) converting the data into a percentage matrix, 3) redoing the factor analysis/classification integrating LSF and scientific estimates as illustrative individuals in the risk map to compare their status with the SSF control regulation estimates.

Based on the EU fleet register data, it was also possible to refresh the graphical outputs presenting the structure of ICES[6] EU fleets by country and precise vessel length ranges (Figure 1 hereunder).

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[6] EU fleets data extracting from the 2019 official EU fleet register data (https://webgate.ec.europa.eu/fleet-europa/search_en) completed with Norway data extracting from the 2020 WGCATCH questionnaire replies.
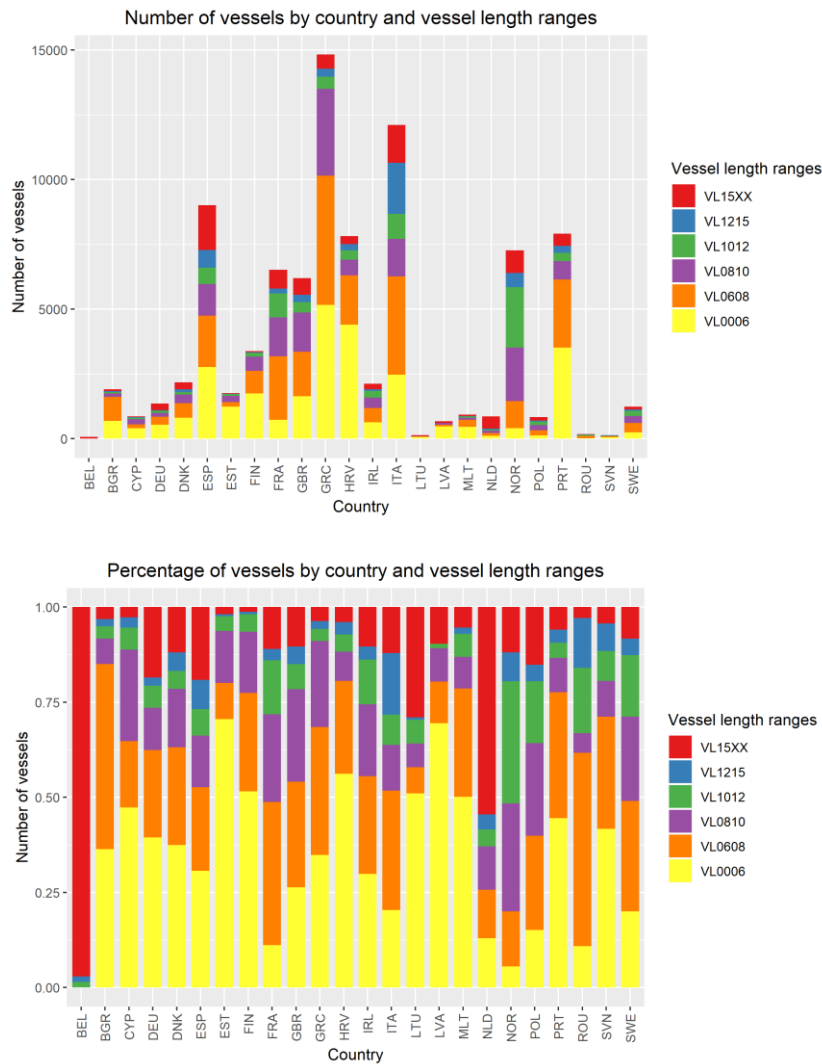
Figure 1: Structure of ICES EU fleets by country and vessel length ranges (Source: _https://webgate.ec.europa.eu/fleet-europa/search_en_).

These graphs confirm again that SSF are an important component in nearly all ICES European countries (no particular north/south distinction). Around 71 000 SSF (less than 12 meters) operate in ICES EU countries which amounts to 85% of the total ICES EU fishing fleet (91% counting the 12–15 meters vessels). Data from the 2020 and 2018 WGCATCH questionnaire replies are available for almost all the ICES European countries listed above except _BGR-Bulgaria, HRV-Croatia, IRL-Ireland, ITA-Italy, MLT-Malta, ROU-Romania and SVN-Slovenia._

2.1.1 Overview of the different fishing activity data collection methods currently applied in ICES Countries for SSF

First outputs of the questionnaires were to update the overview done in 2015 and reviewed in 2018 and assess the importance of the different approach in used in MS for fishing activity SSF data collection. Two summary tables were compiled from the questionnaires received (_in some cases the relevant DCF work plans available at https://datacollection.jrc.ec.europa.eu have been consulted for clarifications). Table 2 focus on the vessels under logbooks requirement (_vessels more than 10 meters, 8 meters in Baltic) and Table 3 on the others vessels. Information issued from the "Sampling info Excel sheet" were considered updating the principal outcomes and key outputs derived from the 2018 questionnaire which was more complete on this aspect.

The common sources for SSF effort and catch data collection used by the countries are the ones required under EU Control Regulation, i.e. Fleet register, Sales notes and EU logbooks for vessels >=10 m (>=8 m in Baltic Sea). At national level, in addition to the declarative requirements under the control regulation, different sources of declarative data to monitor SSF are used, especially for vessels <=10 m length, at census or reference fleet/fisheries specific/area level.

More precisely, for **vessels that are under logbooks requirement** *(vessels more than 10 meters, 8 meters in Baltic, Table 2))*, logbooks *(hardcopy and/or electronic)* are the most common source *(almost available in all the countries surveyed)* of declarative data used to assess SSF fishing activity variables. Consequently, census approach *(18 countries)* is the most common approach used by countries to collect data on SSF.

For the other vessels *(vessels less than 10 meters, 8 meters in Baltic, not under logbooks requirement) (Table 3)*, census approach *(14 countries)* remains the most common approach used but the situation is more diverse.

The group highlight that the different methodologies and data formats existing across countries, stored in different ways, create challenges to the standardization of calculation of fishing activity variables and encouraged countries, for sake of consistency and comparability, to share procedures and principles in used in order to pursue this objective.

Table 2: Summary of SSF data collection by country, vessels under logbooks requirement *(vessels more than 10 meters, 8 meters in Baltic)*

SSF - Fleet 10-12meters (8-12meters in Baltic Sea)										
Sources of declarative data collected	BEL_27	CYP_37	DEU_27	DNK_27	ESP_27 (Basque)	ESP_27 (Others)	FIN_27	FRA_27, 37	FRA_31, 41, 51	GRC_37
Fleet register				x				x	x	
EU Logbooks (landings declaration)	x	x	x	x	x	x	x	x		x
Sales notes	x	x	x^2	x	x	x		x		
Sales notes from fishermen association					x					
On-site sampling program *(Catch assessment survey)*					x				x	
Vessels sampling program *(Reference Fleet)*										
New technology program *(new apps, geolocalization devices)*				x*	x			x*		x*
SSF census survey *(Fishing activity calendars)*								x	x	
SSF official' fishing activity data collection type	Census	Census	Census	Census	Combined	Census	Census	Census	Sampling	Census

² *In development (DEU: new database in order to cross-check EU logbooks (Landings declaration) / Sales note)*

***** *Additional data to improve "census data"* (DNK: BlackBox system for mussel dredgers ; FRA: GPS devices for specific fleets ; GRC: VMS device for special licences (LLD, LHM large pelagic, SB) ; IRL: iVMS for some specific fisheries/species ; NOR: Catch assessment survey for Cod, Haddock, Saithe ; NOR: Reference Fleet: 7 vessels <12m)

+ *Extended data* (NOR: Main gear and Main fishing area declared in sales note)

Continuation Table 2

SSF - Fleet 10-12meters (8-12meters in Baltic Sea)										
Sources of declarative data collected	IRL_27	LTU_27	LVA_27	NLD_27	NOR_27	POL_27	PRT_27	SWE_27	UK_27 (Scotland)	UK_27 (Others)
Fleet register										
EU Logbooks (landings declaration)	x	x	x	x		x	x	x	x	x
Sales notes	x			x	x+		x	x	x	x
Sales notes from fishermen association										
On-site sampling program *(Catch assessment survey)*					x*					
Vessels sampling program *(Reference Fleet)*	x				x*					
New technology program *(new apps, geolocalization devices)*	x*									
SSF census survey *(Fishing activity calendars)*										
SSF official' fishing activity data collection type	Census	Census	Census	Census	Census	Census	Census	Census	Census	Census

² *In development (DEU: new database in order to cross-check EU logbooks (Landings declaration) / Sales note)*

***** *Additional data to improve "census data"* (DNK: BlackBox system for mussel dredgers ; FRA: GPS devices for specific fleets ; GRC: VMS device for special licences (LLD, LHM large pelagic, SB) ; IRL: iVMS for some specific fisheries/species ; NOR: Catch assessment survey for Cod, Haddock, Saithe ; NOR: Reference Fleet: 7 vessels <12m)

+ *Extended data* (NOR: Main gear and Main fishing area declared in sales note)

Table 3: Summary of SSF data collection by country, vessels not under logbooks requirement *(vessels less than 10 meters, 8 meters in Baltic)*

SSF - Fleet <10meters (<8meters in Baltic Sea)										
Sources of declarative data collected	BEL_27	CYP_37	DEU_27	DNK_27	ESP_27 (Basque)	ESP_27 (Others)	FIN_27	FRA_27, 37	FRA_31, 41, 51	GRC_37
Fleet register				x				x	x	
SSF adapted declarative forms *(Monthly landings declaration, Coastal fishery forms, Monthly declarative forms, Monthly catch reports, Coastal logbooks, Coastal journal, Weekly landings declaration, …)*			x				x	x		
Sales notes		x	x^2	x	x	x		x		
Sales notes from fishermen associations						x				
On-site sampling program *(Gear/Gear dimension survey, Catch assessment survey)*		x			x				x	
Vessels sampling program *(Questionnaires, Reference Fleet)*										x
Economic sampling program *(fishing effort)*			x							
Vessels self sampling *(monthly self reporting in loal fisheries inspection)*										x
New technology program *(new apps, geolocalization devices)*				x*	x			x*		
Fisheries/Fleets specific regulations for data provision		x*								x*
Vessels fishing licenses data										
Indirect reporting of vessels activity (gears/area) *(via merchants/local knowledge, vessel by vessel basis)*										
SSF census survey *(Fishing activity calendars)*								x	x	
SSF official' fishing activity data collection type	**NA**	Combined	Census	Census	Combined	Census	Census	Census	Sampling	Sampling

² *In development* *(DEU: new database in development in order to cross-check Monthly landings declaration / Sales note ; UK (Others): introduction of weekly landings declaration for other UK vessels, as it is done in Scotland, in development)*

* *Additional data to improve "census data"* *(CYP: Census landings declaration for the Category C' fleet (low rate fishing fleet) ; DNK: BlackBox system for mussel dredgers and AIS (test phase) ; FRA: GPS devices for specific fleets ; GRC: Logbooks/VMS device for special licences (LLD, LHM large pelagic, SB) ; IRL: iVMS for some specific fisheries/species ; IRL: Shellfish gatherers dockets for bivalve fisheries ; NOR: Catch assessment survey for Cod, Haddock, Saithe ; NOR: Reference Fleet: 7 vessels <12m ; POL: Logbooks for Baltic Cod fishing ; SWE: EU logbooks for vessels <10m using active gears ; UK (Others): Monthly Shellfish Activity return (MSAR) for shellfish licences vessels, UK (Others): Introduction of low-cost vessel monitoring system for SSF*

\+ *Extended data* *(NOR: Main gear and Main fishing area declared in sales note)*

\- *Limited data* *(POL: <8m no catch composition since 2017, data has to be estimate on 2016 + 8-10m vessels data basis)*

Continuation Table 3

SSF - Fleet <10meters (<8meters in Baltic Sea)										
Sources of declarative data collected	IRL_27	LTU_27	LVA_27	NLD_27	NOR_27	POL_27	PRT_27	SWE_27	UK_27 (Scotland)	UK_27 (Others)
Fleet register										
SSF adapted declarative forms *(Monthly landings declaration, Coastal fishery forms, Monthly declarative forms, Monthly catch reports, Coastal logbooks, Coastal journal, Weekly landings declaration, …)*		x	x			x-		x	x	x²
Sales notes	x			x?	x+		x	x	x	x
Sales notes from fishermen associations										
On-site sampling program *(Gear/Gear dimension survey, Catch assessment survey)*					x*					
Vessels sampling program *(Questionnaires, Reference Fleet)*	x				x*					
Economic sampling program *(fishing effort)*										
Vessels self sampling *(monthly self reporting in loal fisheries inspection)*										
New technology program *(new apps, geolocalization devices)*	x*									x*
Fisheries/Fleets specific regulations for data provision	x*					x*		x*		x*
Vessels fishing licenses data								x		
Indirect reporting of vessels activity (gears/area) *(via merchants/local knowledge, vessel by vessel basis)*										x
SSF census survey *(Fishing activity calendars)*										
SSF official' fishing activity data collection type	Combined	Census	Census	Census	Census	Census	Census	Census	Census	Census

² *In development* (DEU: new database in development in order to cross-check Monthly landings declaration / Sales note ; UK (Others): introduction of weekly landings declaration for other UK vessels, as it is done in Scotland, in development)

* *Additional data to improve "census data"* (CYP: Census landings declaration for the Category C' fleet (low rate fishing fleet) ; DNK: BlackBox system for mussel dredgers and AIS (test phase) ; FRA: GPS devices for specific fleets ; GRC: Logbooks/VMS device for special licences (LLD, LHM large pelagic, SB) ; IRL: iVMS for some specific fisheries/species ; IRL: Shellfish gatherers dockets for bivalve fisheries ; NOR: Catch assessment survey for Cod, Haddock, Saithe ; NOR: Reference Fleet: 7 vessels <12m ; POL: Logbooks for Baltic Cod fishing ; SWE: EU logbooks for vessels <10m using active gears ; UK (Others): Monthly Shellfish Activity return (MSAR) for shellfish licences vessels, UK (Others): Introduction of low-cost vessel monitoring system for SSF

+ *Extended data* (NOR: Main gear and Main fishing area declared in sales note)

- *Limited data* (POL: <8m no catch composition since 2017, data has to be estimate on 2016 + 8-10m vessels data basis)

2.1.2 Scientific estimates provided vs control regulation estimates

The EU definition (Commission Implementing Regulation (EU) No 404/2011) of active and inactive vessels is:

"(a) Active vessels: vessels referred to in Articles 16 and 25 of the Control Regulation that have been engaged in any fishing operation (more than 0 days) during a calendar year. A vessel that has not been engaged in fishing operations during a year shall be considered 'inactive'.

In 2020, WGCATCH requested for an update of the SSF questionnaires developed for the 2018 WGCATCH meeting with two new columns asking by precise vessel length ranges the number of "active" fishing fleet register vessels regardless if they have or not declarative data available. The objective was to give the possibility to countries to present the 'scientific' estimates they evaluate regardless the declarative (control regulation) data available.

Most countries (13 out of 15) provided same numbers for the number of national fishing fleet register vessels with a minimum of one declarative data available and the number of national "active" fishing fleet register vessels as the most common approach used by countries (see 2018 WGCATCH report) is to consider a vessel without any declarative data as an inactive vessel.

Nevertheless, two countries provided different numbers basing the numbers of national "active" fishing fleet register vessels on 'scientific' estimates calculated from complementary/supplementary data.

France uses a census fishing activity survey[7] to identify vessels that could be classified as active even though they have no declarative data. This survey is also used to evaluate potential control data incompleteness issues by fleet segment and in the case of proven issue to either, depending of the level of severity, 1) re-evaluate on this basis the declarative data available or, 2) develop a catch assessment survey[8].

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[7] Annual fishing activity survey is conducted by fishing observers yearly in France on the basis of preliminary documentation provided by available data *(fleet register, logbooks, monthly declarative forms, sales note data, geolocalisation data, on-site samplings data)*. It covers the whole of the reference population *(also vessels not cover by available data)*, take place every year in the first month of the year on the previous year and aim at characterizing each year the inactivity or activity of all the vessels each month of the year and, in the latter case, the métiers practiced and the main fishing areas *(Berthou et al., 2008, ICES CM 2008/K:12)*. They are particularly useful to provide information on the part of fishing activity not included in available declarative data *(completeness check of the available declarative data)* and constitute the exhaustive basis, if necessary *(for the fleets who need it)*, to re-evaluate available fishing activity data estimates *(in case of incomplete data for example)* or for doing estimation based on on-site sampling complementary data *(for the fleets where such data has to be collected)*.

[8] Complementary on-site sampling of trips *(catch assessment survey)* is used to estimate fishing activity variables estimates of vessels for which the coverage and precision of their available declarative data are insufficient to meet the end-users needs. The sampling scheme is based on the frame survey *(Calendar activity survey)* useful to optimise the strategy of the spatio-temporal on-site sampling plan. Fishing trips features, effort and catches and weekly activity calendar *(effort)* are sampled directly on-site, when the fishers come back to the harbour. The raising method is based on a post-stratification of the fishing trips and weekly calendar sampled. Percentile bootstrap methodology is used to calculate the precision' estimate. In 2020 and 2021, this will be applied for vessels under 12 meters in La Réunion, Mayotte, French Antilles and French Guiana *(other regions, less than 12 meters)*.

Greece evaluates scientifically the numbers of active vessels on the basis of an "Effort/Catch" assessment survey[9] conducted for vessels <12 meters as control data (logbooks and VMS data) are available only for a small fraction[10] of the existing SSF fleet.

WGCATCH highlighted in the previous meetings that the coverage/completeness of the estimates reached by the data collection is a specific issue that will require specific attention. Previous examples advise the usefulness of such tools or complementary data to address it. They also highlight how such incompleteness data issue could affect fishing activity estimates; see following figures comparing for the two intended basic indicators[11] the status of their "control regulation estimates" against "scientific estimates" (sc) for the informed "country*area".
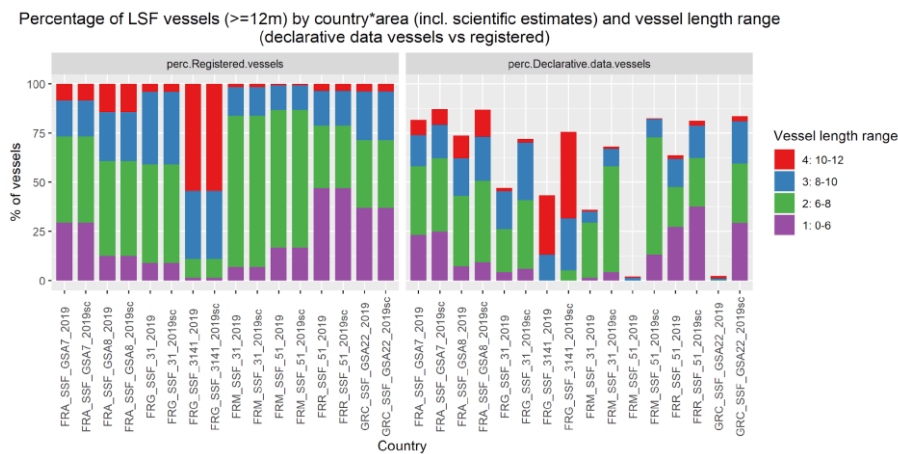
Figure 2 Percentage of vessels registered in the official national fishing fleet register (left) and percentage of vessels with a minimum of one declarative data available (right), by country, area and vessel length range for SSF' vessels (i.e. <12 meters vessels) and informed country*area, control regulation and scientific estimates are plotted side by side regarding the 1st indicator.

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[9] Spatially and technically stratified sampling scheme which include 355 vessels <12 meters. It is used to estimate effort and landings per species. The relevant data *(days at sea, net length, number of hooks, number of traps, landings per species)* are collected through structured questionnaires via personal interviews with the fishers.

[10] Vessels >10 meters and vessels with a special fishing licence as vessels targeting large pelagic species or boat seiners.

1) [11] 1st indicator comparing the number of vessels registered in the official national fishing fleet register against the number of vessels with a minimum of one declarative data available

2) 2nd indicator concentrating on vessels with declarative data and investigating the completeness of their transversal data regarding the number of trips they declared

Figure 3. Percentage of vessels with a minimum of one declarative data by vessel length range, in each country*area for SSF' vessels (i.e. <12 meters vessels) and informed country*area, control regulation and scientific estimates are plotted side by side regarding the 1st indicator.

In informed country*area, scientific estimates improve in all cases the completeness of the control regulation' fishing activity data available (see figures 2 and 3 above), for all the vessel length ranges and in some cases on large scale (e.g. Greece-GSA22 (GRC_SSF_GSA22) or France-Mayotte Island (FRM_SSF_51)). Having 'scientific information' for these country*area improve therefore the estimates' precision and the fishing activity knowledge in the regions concerned.
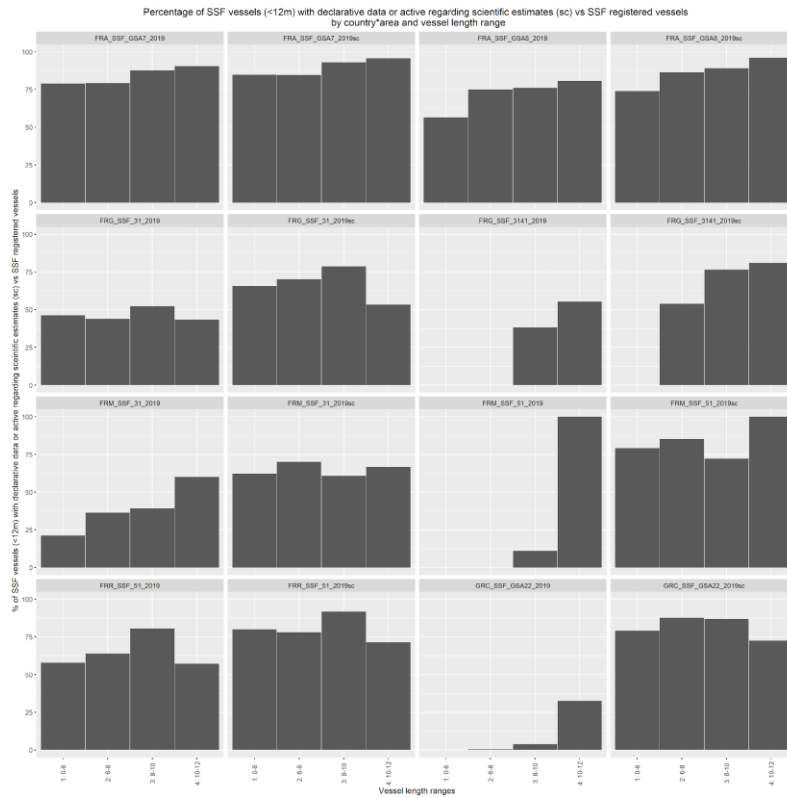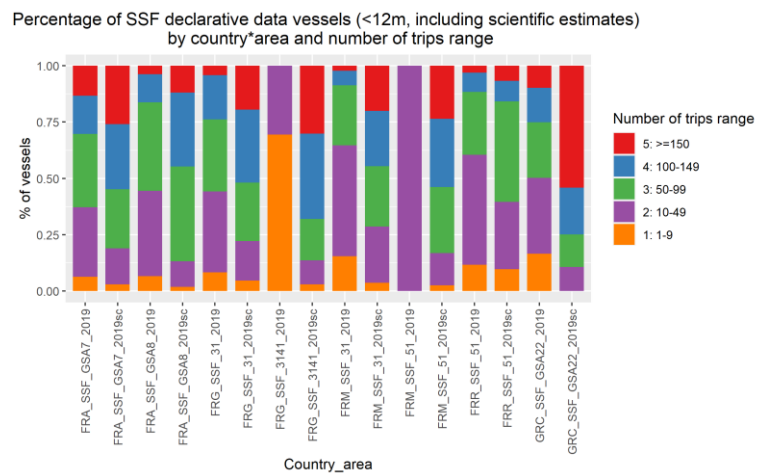

Figure 4. Percentage of vessels with a minimum of one declarative data by number of trips ranges and country*area for SSF' vessels (i.e. <12 meters vessels) and informed country*area, control regulation and scientific estimates (sc) are plotted side by side regarding the 2nd indicator.

Same conclusion applied regarding the 2nd indicator concentrating on 'active' vessels (estimated from control regulation or scientific information) and investigating the number of trips they declared (see Figure 4 above). In informed "country*area" number of trips estimated through the "scientific information" are, in all cases, larger than the one collected through control regulation confirming that scientific information complete the fishing activity information initially available via the control regulation. Analysis of the two indicators confirm the affect that incompleteness issues could have on fishing activity estimates and following these examples it could be suggested that in case of a suspected incompleteness data issue, at minimum cross-validation of the declarative data with complementary data to evaluate its severity level should be promoted as a fundamental best practice.

Tools presented after defining a risk assessment transversal data quality methodology; especially concentrated on the evaluation of the coverage of SSF fishing activity collected via a census approach; aim to provide ways to support this evaluation (low, medium, or high level of incompleteness data issues risk).

Links should be made also here with the group's work conducted last year about the impact the new technology (e.g. geolocalisation data) could have to improve the reliability/completeness of SSF data in the future.

Finally, Greece and France' scientific estimates will be included as illustrative individuals in the risk' map (result of the risk assessment transversal data quality methodology) to compare their status with the control regulation estimates (a priori, they should improve the position of the country*area concerned on the map).

2.1.3 Risk assessment transversal data quality methodology

2.1.3.1 Comparison of the number of vessels against number of vessels with a minimum of one declarative data available

Following graphical output (Figure 5) update those of 2019 taking into account the 2020 questionnaire replies (if available). It presents the 1st intended indicator comparing the number of vessels registered in the official national fishing fleet register against the number of vessels with a minimum of one declarative data available by country*area. Only SSF (less than 12 meters vessels) and control estimates are plotted.
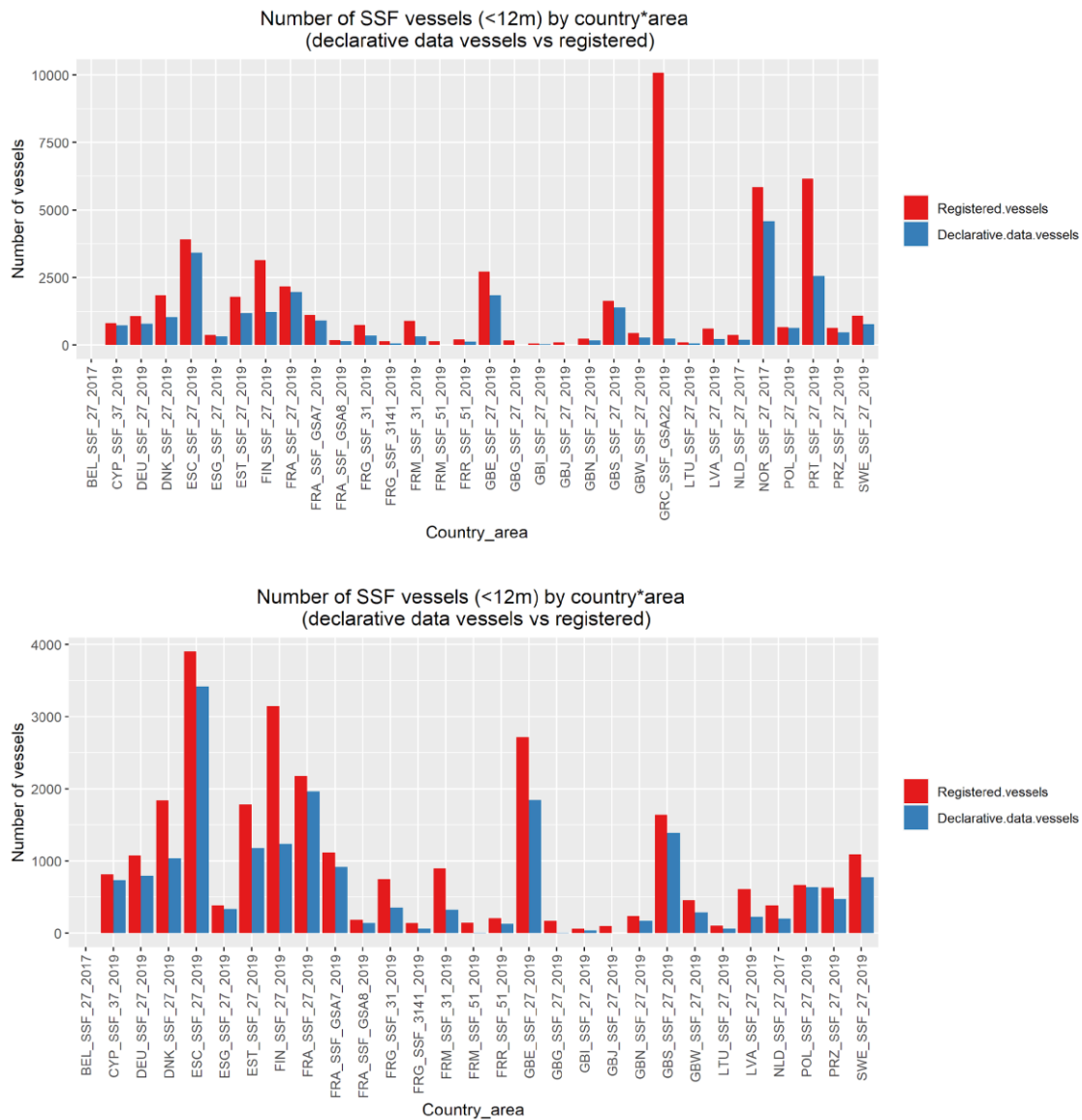
Figure 5. Number of vessels registered in the official national fishing fleet register (<12 meters vessels) against number of vessels with a minimum of one declarative data available, by country and area. In the bottom plot, Greek, Norwegian and Portuguese data was removed as SSF Greek vessels (<12 meters) account for more than 10 000 vessels, SSF Norway and continental Portugal vessels for more than 5000 vessels when the other "country*area" identified less than 4000 SSF vessels.

The size of the national SSF fleet (i.e. <12 meters) differs largely between country*area (from one unique vessel in Belgium to over 10 000 vessels in Greece-GSA 22). Among the 32 country*area which provided data, the total number of SSF vessels (i.e. <12 meters) in the national fleet registers was around 49 500, whereas the total number of vessels with a minimum of one declarative data available was around 26 000, with this difference representing potential inactive vessels – which overall represent circa 50% of the registered vessels but differ largely between country*area *(from more than 90% for Poland, Cyprus or France-FAO 27' vessels to less than 5% for Greece, Jersey, Guernsey or France-Mayotte Island' vessels)*. In comparison and for the 28 *(on the 32)* country*area with LSF data available, total number of LSF vessels (i.e. >=12 meters) in the national fleet registers was around 6800 against 6000 with a minimum of one declarative data available (~88%).

The same indicator in percentage by country*area and vessel length ranges for SSF (i.e. <12 meters) and LSF (i.e. >=12 meters) is presented in Figure 6 hereunder.

Percentage of SSF vessels (<12m) by country*area and vessel length range
(declarative data vessels vs registered)
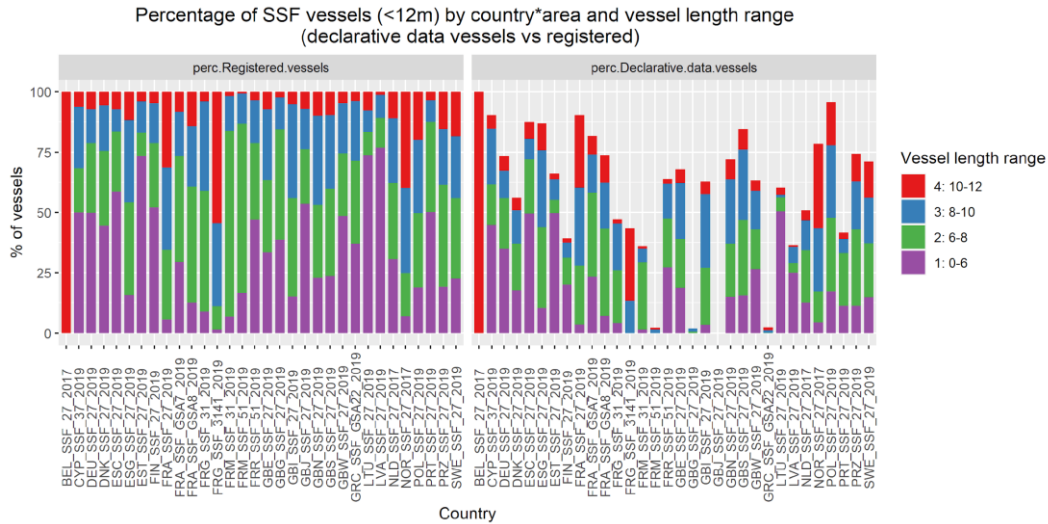
Figure 6. Percentage of vessels registered in the official national fishing fleet register (left) and percentage of vessels with a minimum of one declarative data available (right), by country, area and vessel length range for SSF' vessels (i.e. <12 meters vessels).

Percentage of LSF vessels (>=12m) by country*area and vessel length range
(declarative data vessels vs registered)
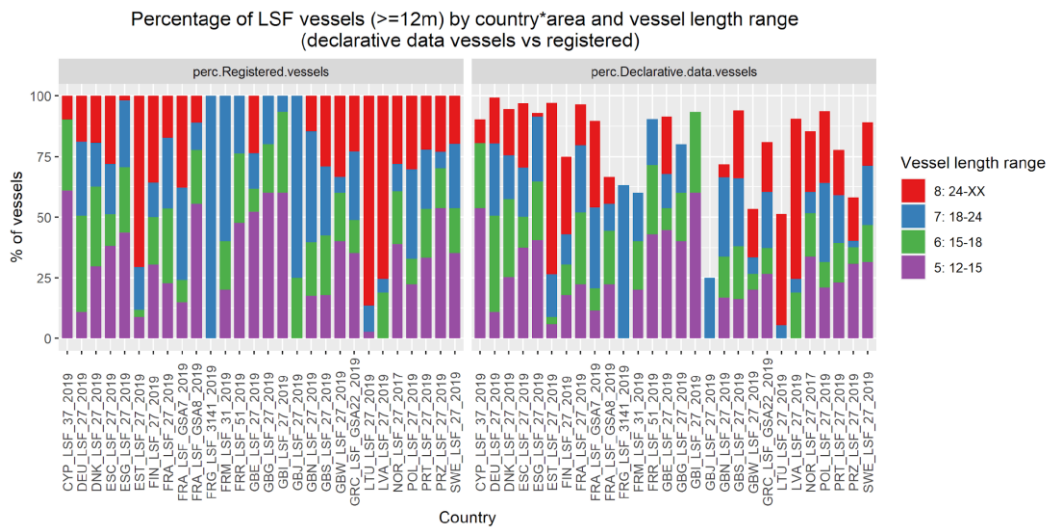
Figure 7. Percentage of vessels registered in the official national fishing fleet register (left) and percentage of vessels with a minimum of one declarative data available (right), by country, area and vessel length range for LSF' vessels (i.e. >=12 meters vessels).

The percentage of vessels without any declarative data differs significantly from one country to another or from one vessel length range to another (Figure 7.). 6 country*area *(Belgium, Cyprus, Spain (Cantabrian Sea and Gulf of Cadiz), France (FAO area 27) and Poland)* present a percentage of SSF vessels without any declarative data around 10%, whereas in 8 country*area *(Finland, France (Martinique and Mayotte Islands), Great Britain (Jersey and Guernsey islands), Greece (GSA 22), Latvia and Portugal (Continental area))* more than 3/5 of the registered SSF vessels have no declarative data available and could be considered as potential inactive vessels. Other country*area present a percentage of SSF' vessels without any declarative data between 10% and 40%. LSF vessels present generally lower percentage of vessels without any declarative data even if significant differences still appear between country*area. Furthermore, the percentage of vessels without any declarative data could differ significantly for some countries from one vessel length range to another, following figures (figures 8 and 9) illustrate these differences.
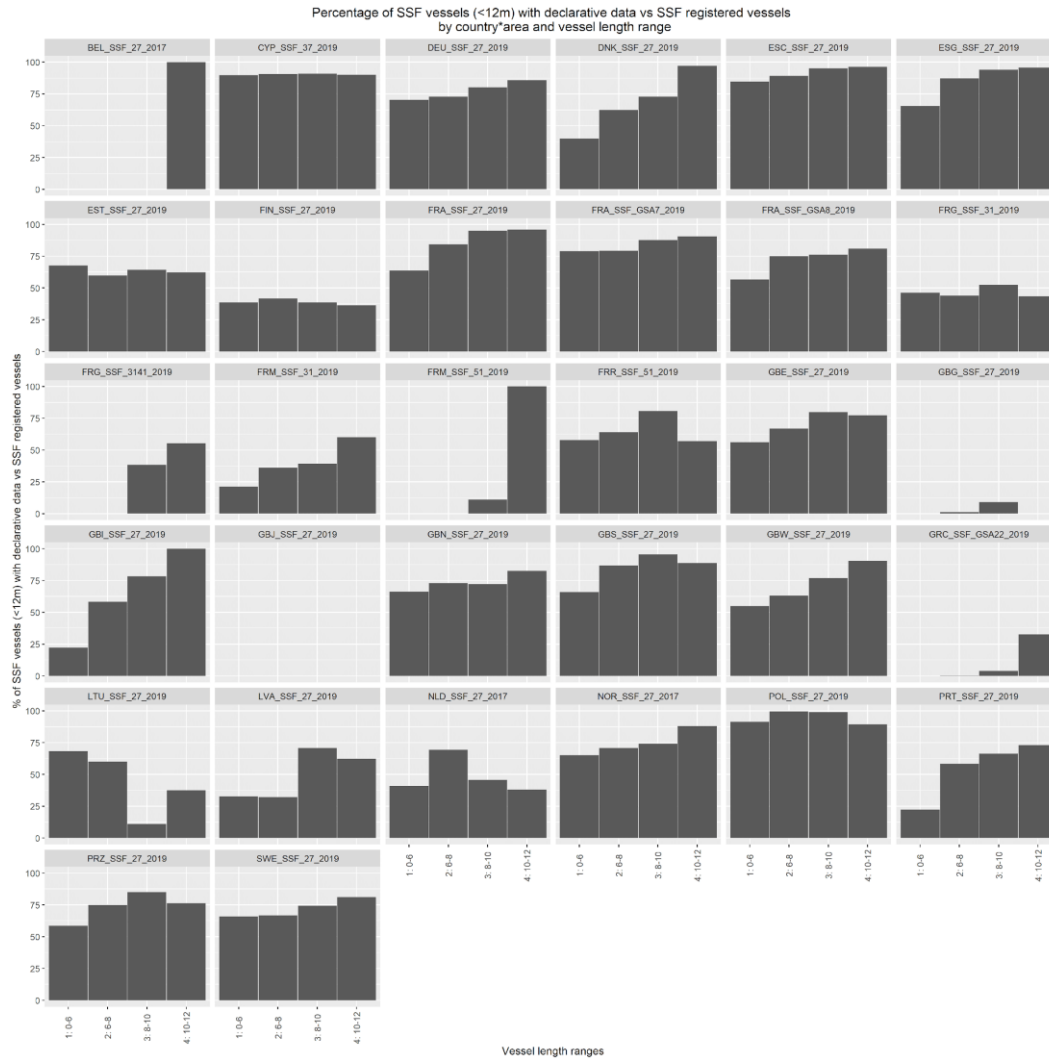
Figure 8. Percentage of vessels with a minimum of one declarative data by vessel length range, in each country*area for SSF' vessels (i.e. <12 meters vessels).

In many country*area the percentage of SSF vessels with declarative data increased from the smaller (<6 m) to larger vessel length category (10–12 m) *(step curves to a greater or lesser degree)*. Only 7 country*area *(Cyprus, Estonia, Finland, France (Guadeloupe Island), Lithuania, Netherlands and Poland)* present a different distribution pattern with a flat curve except for Lithuania and Netherlands which present a distribution pattern where larger vessels are more impacted by a high percentage of vessels without any declarative data than smaller vessels (Figure 9).
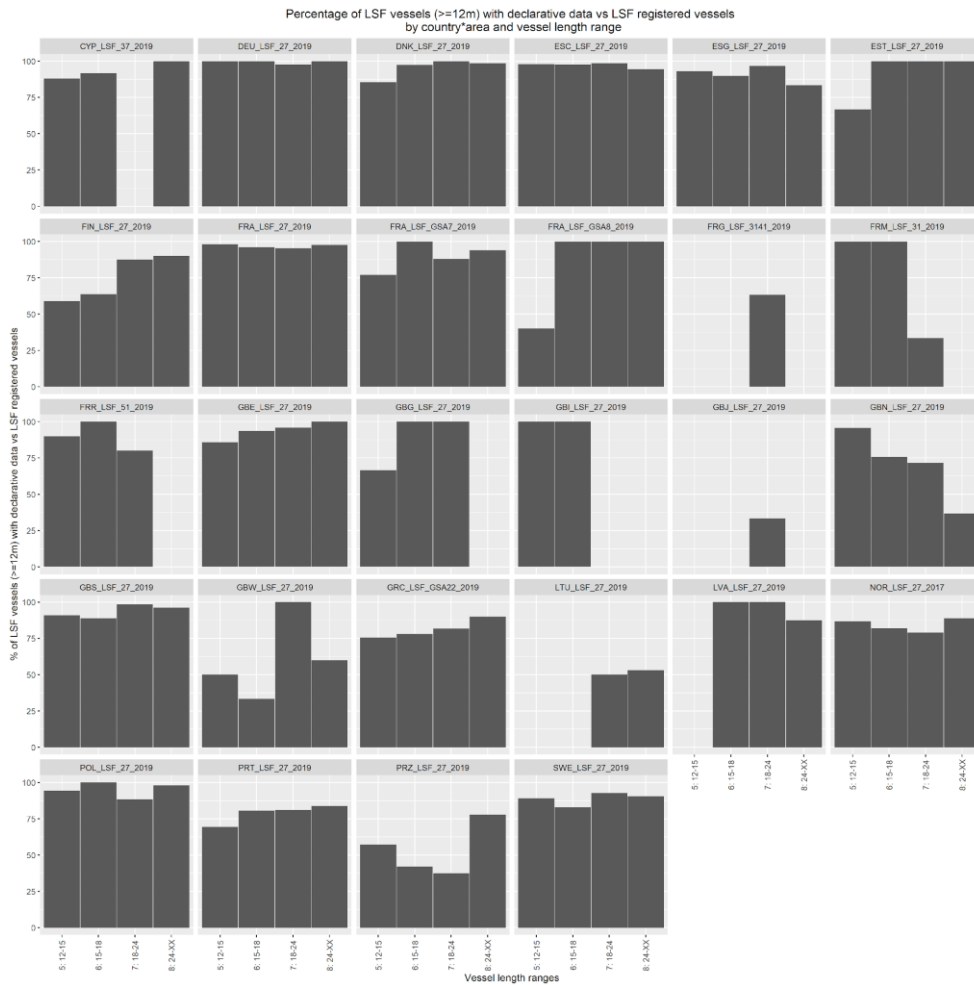
Figure 9. Percentage of vessels with a minimum of one declarative data by vessel length range, in each country*area for LSF' vessels (i.e. >=12 meters vessels).

For LSF vessels, in many country*area the percentage of vessels with declarative data is similar from one vessels length category to another *(flat curves)*, i.e. no percentage difference is observed between vessel length ranges in general. Only 4 country*area *(Finland, Great Britain (Northern Ireland and Wales) and Portugal (Azores islands))* present a different distribution pattern.

Based on the available data and for this first indicator calculated by precise vessel length range, the country*area SSF vessels present a large panel of distribution pattern globally significantly different from the LSF vessels distribution. Accordingly, based on the different graphical outputs, it is difficult to resume for each country*area its position against the others and the potential level of risk *(regarding this first indicator)* of declarative data incompleteness. Factor analysis *(PCA - principal component analysis)* based on the indicator' distribution pattern was performed in order to classify country*area to each other and to build a first risk' map where each country*area is positioned.

Variables factor map (PCA)
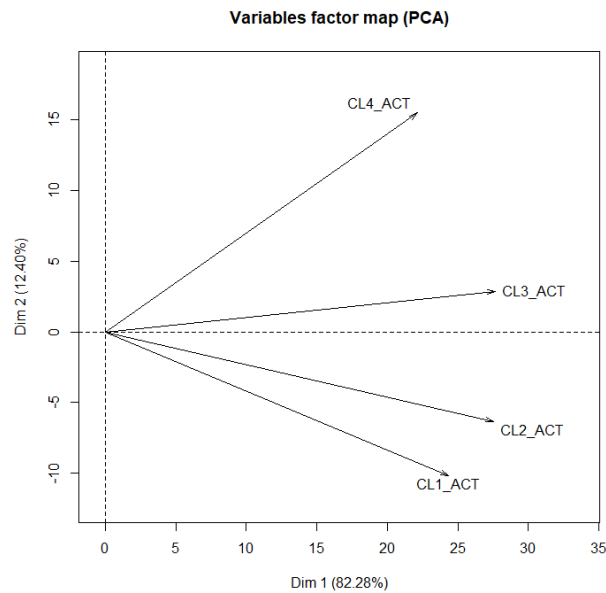
The PCA has been applied on the 32 country*area SSF' vessels *(active individuals)*, scientific estimates and LSF' vessels information will be included in the analysis further as illustrative individuals. The following active variables were taken into account: CL1_ACT (% of less than 6 meters SSF vessels with a minimum of one declarative data against registered), CL2_ACT (id. for 6–8 meters SSF vessels), CL3_ACT (id. for 8–10 meters SSF vessels) and CL4_ACT (id. for 10–12 meters SSF vessels).

First principal component (dim. 1 axis) explains the largest dataset variance (~82 %) and constitutes a **"size effect"** axis opposing country*area with a significant percentage of declarative data SSF vessels *(vessels with a minimum of one declarative data available)* against country*area with a smaller percentage. Second principal component (dim. 2 axis) explains ~12% of the dataset variance and oppose up country*area with higher percentage of declarative data SSF vessels for larger vessels (>=8 m) (comparatively of all others country*area) than for smaller (>8 m) and inversely down. It illustrates the degree of percentage difference between larger and smaller SSF vessels, the **scale of the step curves' slope** from smaller to larger vessels *(cf. Figure 10)* and inversely down. Ascending Hierarchical Classification (AHC) associated to the PCA results were then performed to classify the country*area in clusters presenting similar distribution pattern for this first indicator.
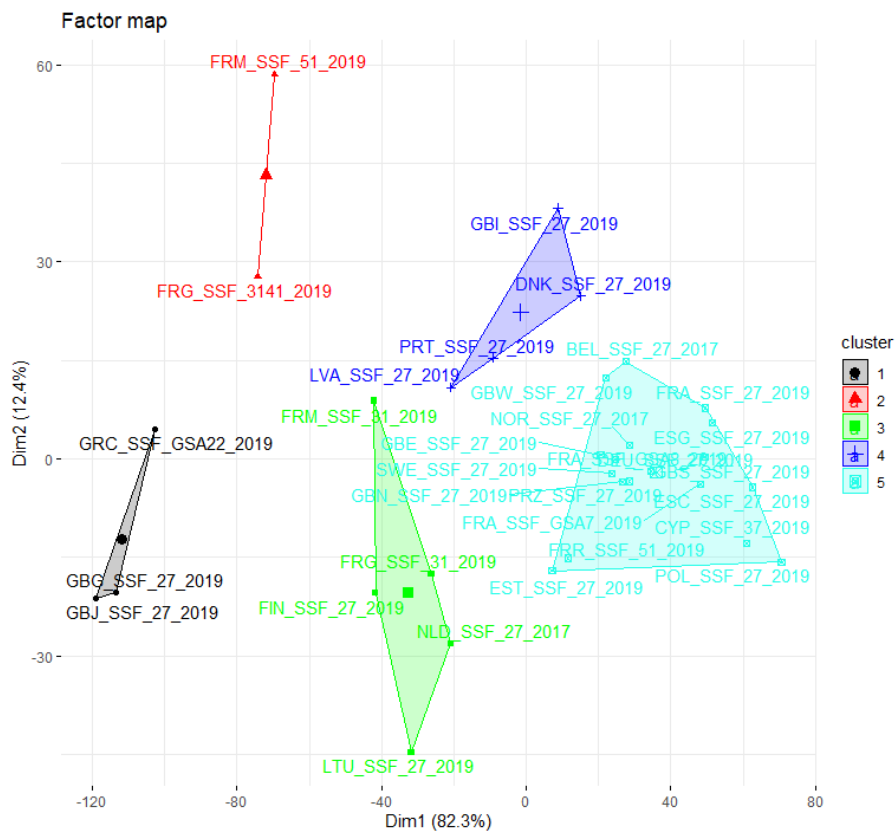
Cluster 1 *(Greece Mediterranean and Black Sea GSA22, United Kingdom: Guernsey and Jersey))*: is characterized by a very small percentage of declarative data SSF vessels with no distinction between smaller or larger one. Very high potential risk of data incompleteness issue.

Cluster 2 *(France: French Guyana and Mayotte Island)*: is also characterized by a very small percentage of declarative data SSF vessels but less significant for larger SSF vessels (>=8 m.). High potential risk of data incompleteness issue.

Cluster 3 *(France: Guadeloupe island and Martinique island, Finland, Netherlands and Lithuania)*: is characterized by a smaller percentage of declarative data SSF vessels against the average of all country*area together, which is more evident for the larger SSF vessels (>=8 m). Medium potential risk of data incompleteness issue.

Cluster 4 *(United Kingdom: Isle of Man, Denmark, Portugal continental area and Latvia)*: is characterized by a smaller percentage of declarative data SSF vessels against the average of all country*area together, which is more evident for the smaller SSF vessels (<8 m). Presented potential risk of data incompleteness issue.

Cluster 5 *(Belgium, Cyprus, Germany, Spain: Cantabrian Sea and Gulf of Cadiz, France: Atlantic Northeast, Mediterranean and Black Sea GSA7 & GSA8 and La Réunion Island, United Kingdom: England, Scotland, Wales and Northern Ireland, Norway, Poland, Portugal Azores islands and Sweden)*: present a distribution similar to the average of all country*area together with no real distinction between smaller or larger ones. Low potential risk of data incompleteness issue.

A first classification of the country*area is therefore possible on the basis of the first indicator. However, a significant percentage of SSF vessels with a minimum of one declarative data during the year does not mean that no potential risk of data incompleteness issues should arise. Second intended indicators concentrate on vessels with declarative data and investigate the completeness of their data regarding the number of trips they declared.

2.1.3.2 Analyses on vessels with declarative data and assessment of their completeness regarding the number of trips they declared

A balanced distribution between each range of number of trips is expected for the declarative data SSF vessels *(vessels with a minimum of one declarative data)*. However, some country*area stand out for their high percentage of vessels with a low (<50 trips) number of trips declared per year *(Germany, Denmark, France (French Guyana and Mayotte Island), Great Britain (Northern Ireland, Scotland and Wales) and Norway).* The other country*area distribution patterns are more balanced except for 5 country*area *(Spain (Cantabrian Sea and Gulf of Cadiz), France (FAO area 27), Netherlands and Poland),* with a very low percentage of vessels that declare few trips *(less than 10)* per year (Figure 11). Same balance distribution is observed for LSF vessels (Figure 12) but with more country*area which present a predominance of declarative data LSF vessels with more than 50 trips declared per year.
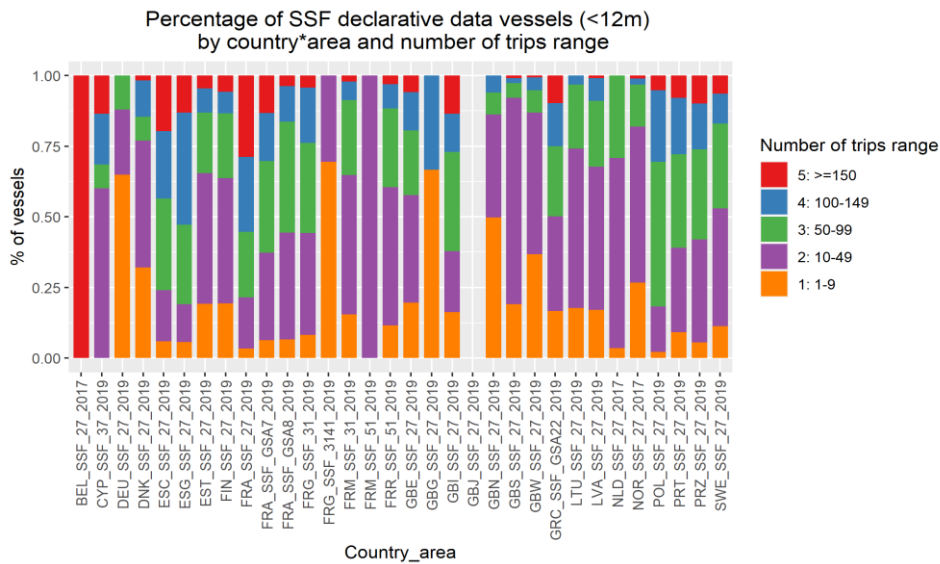
Figure 11. Percentage of vessels with a minimum of one declarative data by number of trips ranges and country*area for SSF' vessels (i.e. <12 meters vessels).
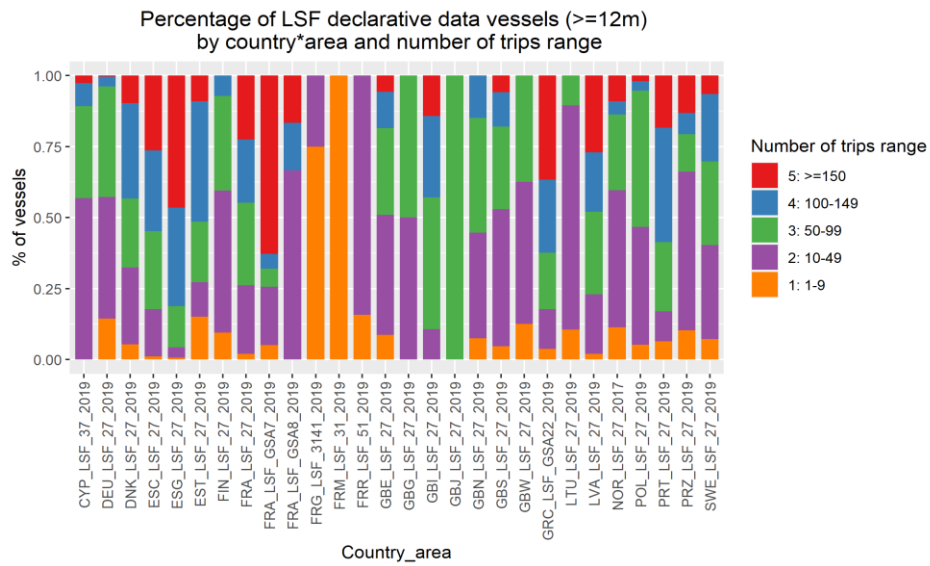
Figure 12. Percentage of vessels with a minimum of one declarative data by number of trips ranges and country*area for LSF' vessels (i.e. >=12 meters vessels).

The following graphical output add the "vessel length range" dimension (Figure 13 and Figure 14). Larger SSF vessels are expected to perform more trips per year than smaller. The distribution patterns are very diverse from one country*area to each other and do not reflect always what was expected. Furthermore, within this large panel it is difficult to resume for each country*area its position against the others and inferred about a potential level of risk (regarding this second indicator) of declarative data incompleteness issues. Consequently, factor analysis (PCA - principal component analysis) based on the indicator' distribution pattern calculated by precise vessel length ranges were performed to better understand the dynamic of these distributions and to propose a classification of the "country*area", positioning them on a 2nd risk map.
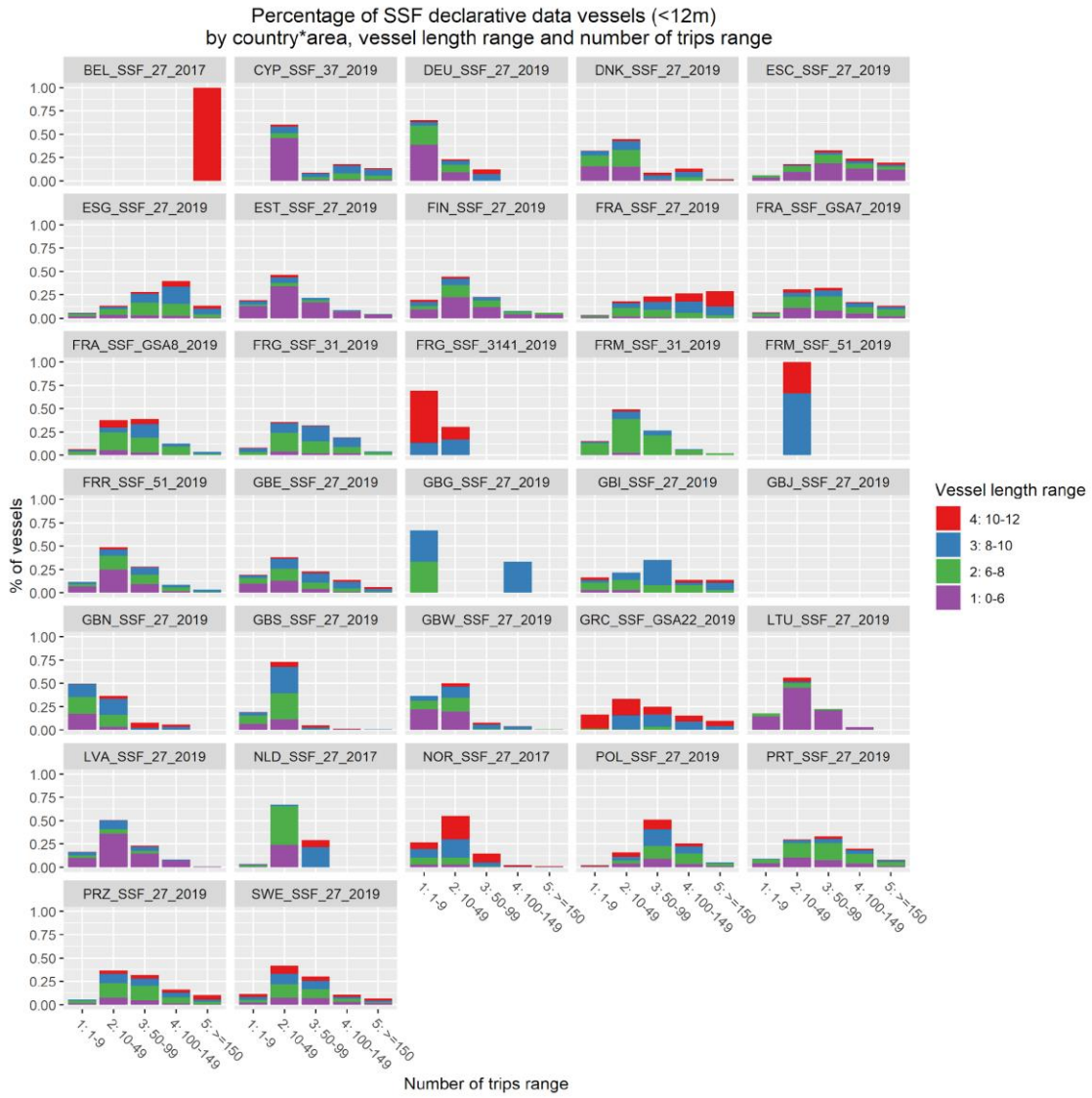
Figure 13. Percentage of vessels with a minimum of one declarative data by number of trips ranges and vessel length ranges, for each country*area and SSF' vessels (i.e. <12 meters vessels).
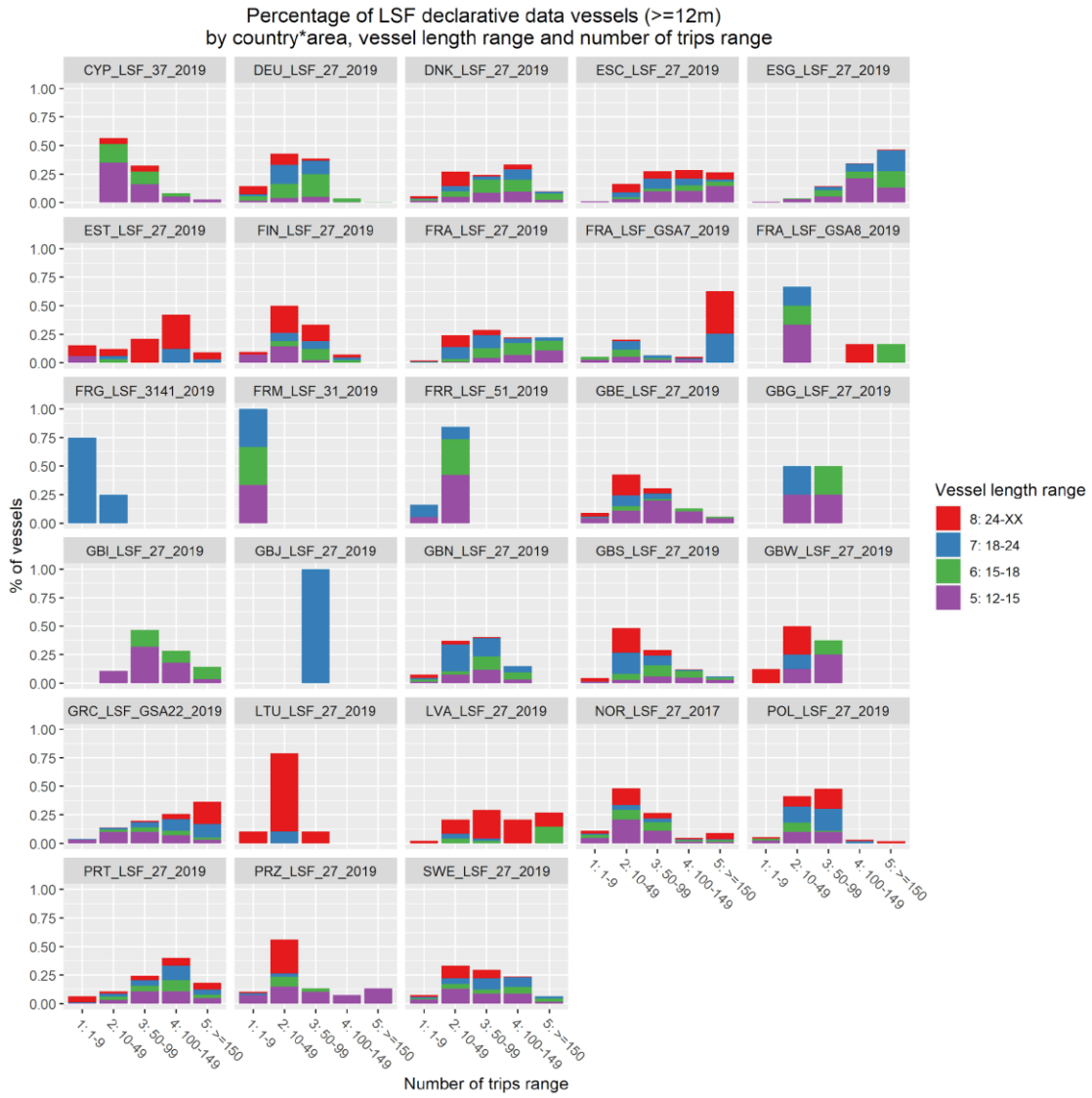
Figure 14. Percentage of vessels with a minimum of one declarative data by number of trips ranges and vessel length ranges, for each country*area and LSF' vessels (i.e. >=12 meters vessels).
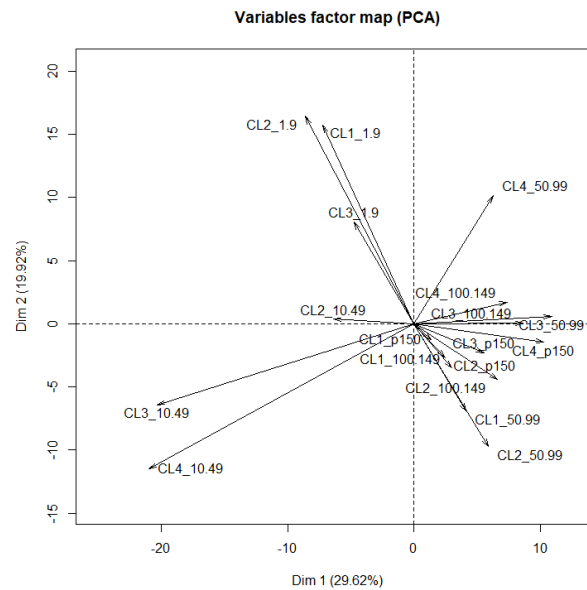
Variables factor map (PCA)

The PCA was applied on the 32 country*area SSF' vessels *(active individuals)*, scientific estimates and LSF' vessels information was included in the analysis further as illustrative individuals. The following active variables were taken into account: CL1_1.9 (% of less than 6 m SSF declarative data vessels with less than 10 fishing trips performed), CL1_10.49 (id. with 10–49 fishing trips performed), CL1_50.99 (id. with 50–99 fishing trips performed), CL1_100.149 (id. with 100–149 fishing trips performed), CL1_p150 (id. with more than 150 fishing trips performed) and the same variables for the 6–8 m (CL2), 8–10 m (CL3) and 10–12 m (CL3) vessel length ranges.

First principal component (dim. 1 axis) explains the largest dataset variance (~30%) and set country*area with a higher percentage of SSF declarative vessels with more than 50 trips registered during the year *(comparatively of all others country*area)* against country*area with a higher percentage of SSF declarative vessels with less than 50 trips registered. Second principal component (dim. 2 axis) explains ~20% of the dataset variance and oppose up 1) on the left side *(country*area with over-represented SSF declarative vessels counting less than 50 trips registered)*, country*area with over-represented SSF declarative vessels with less than 10 trips registered against country*area with over-represented SSF declarative vessels with 10–49 trips registered and 2) on the right side *(country*area with over-represented SSF declarative vessels counting more than 50 trips registered)*, country*area with the over-represented SSF declarative vessels counting more than 50 trips registered especially true for the larger SSF vessels *(8–10 and 10–12 m vessels)* against country*area this over-representation is especially true for the smaller SSF vessels *(<6 and 6–8 m)*. Ascending Hierarchical Classification (AHC) associated to the PCA results were then performed to classify the country*area in clusters presenting similar distribution pattern for this second indicator.
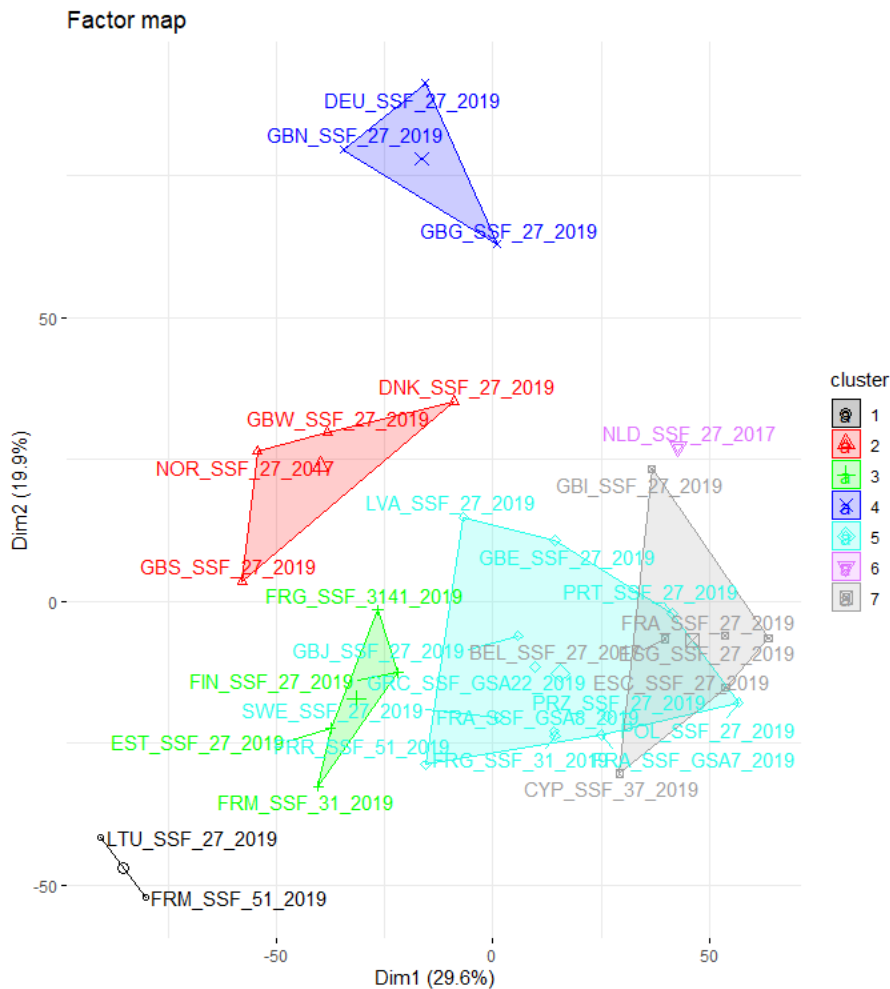
Cluster 1 *(Lithuania and France: Mayotte island):* aggregates two country*area for which declarative data SSF vessels registered to a great extend less than 50 fishing trips during the year, the 10–49 number of trips range being especially over-represented for the larger SSF' vessels. Medium potential risk of data incompleteness issue.

Cluster 2 *(Denmark, United Kingdom: Scotland and Wales and Norway):* aggregates four country*area for which declarative data SSF vessels registered to a great extend less than 50 fishing trips during the year with a balance distribution between the 1–9 and 10–49 number of trips ranges. Medium potential risk of data incompleteness issue.

Cluster 3 *(France: French Guyana and Martinique island, Finland and Estonia):* aggregates four country*area for which declarative data SSF vessels registered to a great extend less than 50 fishing trips during the year, the 10–49 number of trips range being especially over-represented. Medium potential risk of data incompleteness issue.

Cluster 4 *(Germany, United Kingdom: Northern Ireland and Guernsey):* aggregates three country*area for which declarative data SSF vessels registered to a great extend less than 50 fishing trips during the year, the 1–9 number of trips range being especially over-represented. High potential risk of data incompleteness issue.

Cluster 5 *(Latvia, United Kingdom: England and Jersey, Portugal: continental area and Azores islands, France: Mediterranean and Black Sea GSA7 & GSA8, La Réunion island and Guadeloupe island, Greece Mediterranean and Black Sea GSA22, Poland and Sweden):* aggregates twelve country*area for which a balance distribution is observed between declarative data SSF vessels registering less or more

than 50 fishing trips during the year, the 50–99 number of trips range is especially over-represented. <u>Low potential risk of data incompleteness issue.</u>

Cluster 6 *(Netherlands):* aggregates a unique country*area which present a very specific distribution, almost all less than 8m SSF declarative vessels registering 10–49 fishing trips when all the more than 8m SSF declarative vessels registering 50–99 fishing trips during the year. <u>Low potential risk of data incompleteness issue.</u>

Cluster 7 *(France Atlantic Northeast, Belgium, United Kingdom: Isle of Man, Cyprus and Spain: Cantabrian Sea and Gulf of Cadiz):* aggregates six country*area for which declarative data SSF vessels registered to a great extend more than 50 fishing trips during the year, the 100–149 and >150 number of trips ranges being especially over-represented. <u>Very low potential risk of data incompleteness issue.</u>

Classification of the country*area is therefore possible on the basis of the second indicator. However, this indicator does not take into account the percentage of non-declarative data SSF vessels which could be in some cases high and be seen as an indicator of high potential risk of data incompleteness issue.

2.1.3.3 Combined analysis based on the two indicators

Factor analysis (PCA - principal component analysis) based on the two indicators were then performed in order to combine information provided by each of them and to propose a final classification of the "country*area", positioning them on a risk' map.
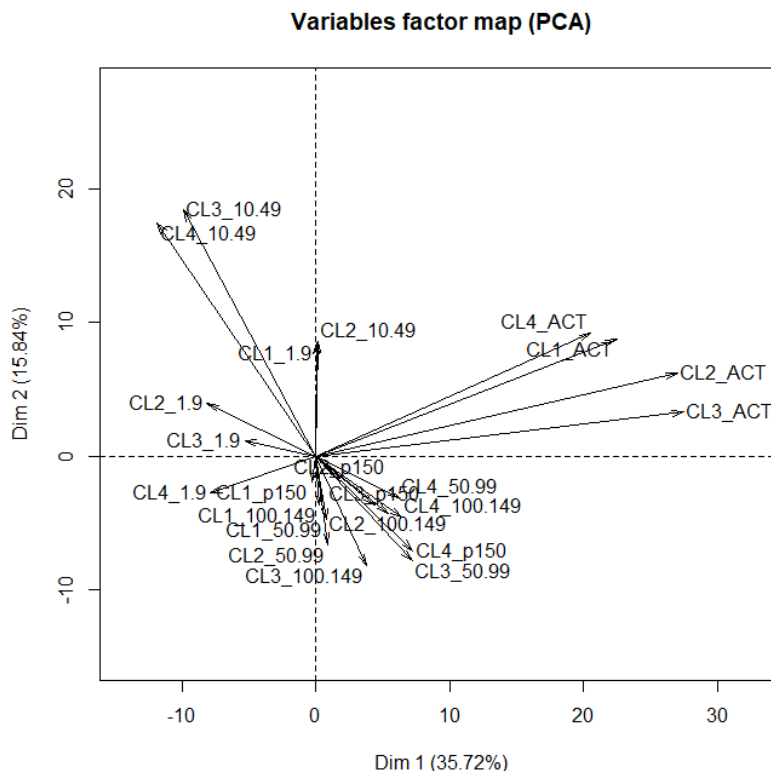
Variables factor map (PCA)

The PCA was applied on the 32 country*area SSF vessels *(active individuals)*, scientific estimates and LSF' vessels information was included in the analysis further as illustrative individuals. The following active variables have been taken into account: 1) % of SSF vessels with a minimum of one declarative data available for the following vessel length ranges less than 6 meters *(CL1)*, 6–8 m. *(CL2)*, 8–10 m. *(CL3)* and 10–12 m. *(CL4)*_and 2) % of SSF declarative data vessels with less than 10 fishing trips performed *(1.9)*, 10–49 fishing trips *(10.49)*, 50–99 fishing trips *(50.99)*, 100–

149 fishing trips *(100.149)* and more than 150 fishing trips *(p150)* for the same vessel length ranges *(e.g. CL1_1.9 = % of less than 6 m. SSF declarative data vessels with less than 10 fishing trips performed)*.

First principal component (dim. 1 axis) explains the largest data set variance (~36%) and constitute a **"size effect"** axis opposing country*area with a significant percentage of declarative data SSF vessels *(vessels with a minimum of one declarative data available)* against country*area with a smaller percentage combining with the opposition of SSF declarative vessels with more than 50 trips registered during the year *(comparatively of all others country*area)* against country*area with a higher percentage of SSF declarative vessels with less than 50 trips registered. This **"size effect"** contributes also strongly to the explained variance (~16%) of the second principal component (dim. 2 axis) combining here with the opposition of SSF declarative vessels with less than 50 trips registered during the year *(comparatively of all others country area)* against country*area with a higher percentage of SSF declarative vessels with more than 50 trips registered.

Finally, the risk map developed could be resumed as follow *(comparatively of all others country*area)*:

✔   On the top right part of the map will be positioned country*area which have a **significant percentage of declarative data vessels** with a **significant percentage** of them registering l**ess than 50 trips**

✔   On the top left part of the map will be positioned country*area which have a **significant low percentage of declarative data vessels** with a **significant percentage** of them registering **less than 50 trips**

✔   On the bottom right part of the map will be positioned country*area which have a **significant percentage of declarative data vessels** with a **significant percentage** of them registering **more than 50 trips**

✔   On the bottom left part of the map will be positioned country*area which have a **significant low percentage of declarative data vessels** with a **significant percentage** of them registering **more than 50 trips**

The following figure resumes this analysis.
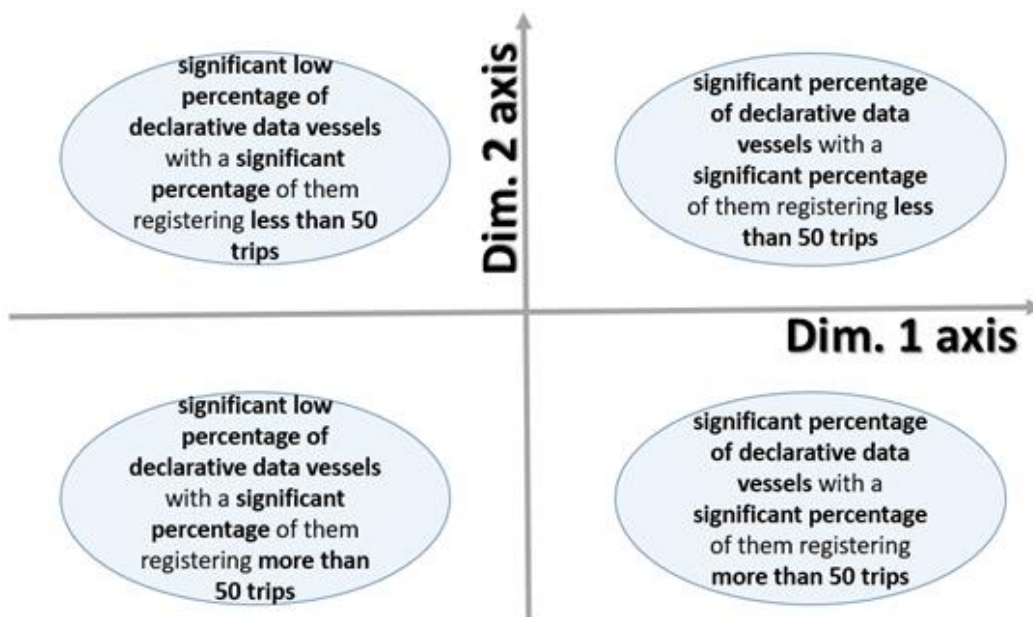
Ascending Hierarchical Classification (AHC) associated to the PCA results were then performed to classify the country*area in clusters presenting similar distribution pattern for these two indicators.
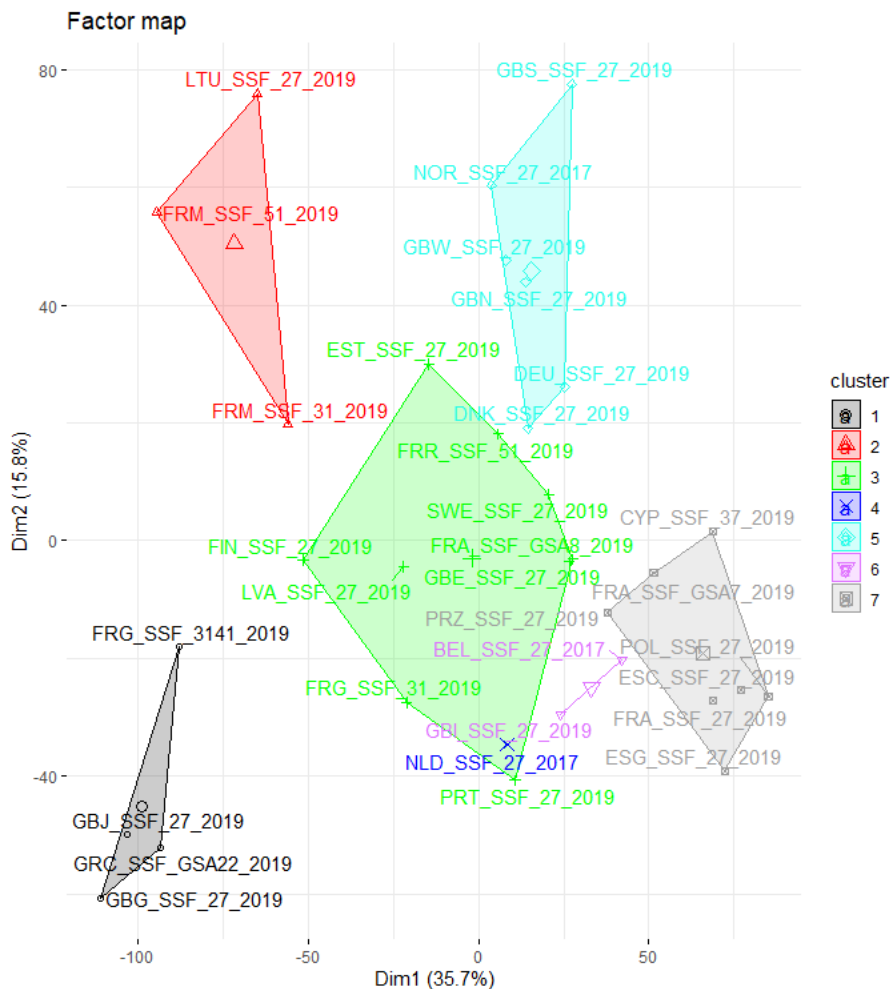
Cluster 1 *(France: French Guyana, United Kingdom: Jersey and Guernsey and Greece Mediterranean and Black Sea GSA22)*: is characterized first by a small percentage of declarative data SSF vessels. These few declarative data SSF vessels present in contrast a distribution between vessels registering less or more than 50 fishing trips during the year not over-balanced with especially no over-representation of vessels registering less than 50 fishing trips during the year. **High potential risk of data incompleteness issue.**

Cluster 2 *(France: Mayotte and Martinique island and Lithuania)*: is also characterized first by a small percentage of declarative data SSF vessels. These few declarative data SSF vessels present in addition an over-representation of vessels registering less than 50 fishing trips during the year. All of that being especially over-represented for the larger SSF vessels. **Very high potential risk of data incompleteness issue.**

Cluster 3 *(Estonia, France: La Réunion and Guadeloupe Island and Mediterranean and Black Sea GSA8 Corsica, Finland, United Kingdom: England, Latvia, Portugal continental area and Sweden)*: is characterized by a percentage of declarative data SSF vessels similar to the average of all country*area together with no real distinction between smaller or larger ones. These declarative data SSF vessels present in addition a balance distribution between declarative data SSF vessels registering

less or more than 50 fishing trips during the year *(similar to the average of all country*area together)*. **Presented <u>potential risk of data incompleteness issue.</u>**

Cluster 4 *(Netherlands)*: aggregates a unique country*area characterized by a percentage of declarative data SSF vessels relatively "low" but globally similar to the average of all country*area together; the declarative data SSF vessels presenting a very specific distribution, almost all less than 8m vessels registering 10–49 fishing trips when all the more than 8 m vessels registering 50–99 fishing trips during the year. **Presented <u>potential risk of data incompleteness issue.</u>**

Cluster 5 *(Denmark, United Kingdom: Scotland, Northern Ireland and Wales, Germany and Norway)*: is characterized by a percentage of declarative data SSF vessels similar to the average of all country*area together. These declarative data SSF vessels present though an over-representation of vessels registering less than 50 fishing trips during the year. **Medium <u>potential risk of data incompleteness issue.</u>**

Cluster 6 *(Belgium and United Kingdom: Isle of Man)*: aggregates two country*area characterized by a percentage of declarative data SSF vessels relatively larger than the average of all country*area together; the declarative data SSF vessels presenting in addition a small over-representation of vessels registering more than 50 fishing trips during the year. All of that being especially true for the larger SSF vessels. **Low <u>potential risk of data incompleteness issue.</u>**

Cluster 7 *(Spain: Cantabrian Sea and Gulf of Cadiz, France Atlantic Northeast and Mediterranean and Black Sea GSA7, Portugal: Azores islands, Cyprus and Poland)*: is characterized first by a higher percentage of declarative data SSF vessels than the overage of all country*area together. These declarative data SSF vessels present in addition an over-representation of vessels registering more than 50 fishing trips during the year *(and inversely less vessels registering less than 50 fishing trips during the year)*. **Low <u>potential risk of data incompleteness issue</u>** *(especially true for Poland, Spain and France Atlantic Northeast)***<u>.</u>**

2.1.3.4   Conclusion (comparison with Large Scale Fleets and scientific estimates)

On the basis of two basic indicators calculated by precise vessel length ranges[12], it is possible 1) to classify country*area to each other into groups and to attribute to each of them a potential risk of data incompleteness issue *(very high, high, medium, presented and low)* and 2) to build a risk map where each country*area could be positioned. This constitutes a potential risk assessment methodology for transversal data quality especially concentrated on the evaluation of the coverage/completeness and accuracy/reliability of SSF fishing activity data (landings and fishing effort) collected via a census approach. Objective pursued by this methodology is the assessment/evaluation/determination of a level of incomplete data issues risk regarding the indicators calculated *(e.g. define indicators' patterns which present low, medium or high risk of incomplete data issues)* i.e. used the risk map developed as a sensor to detect possible risk of data incompleteness issue.

In 2020, same indicators were calculated and provided for the Large Scale Fishery (LSF) and the possibility was given to countries to provide scientific estimates when they are different from control regulation estimates. LSF and scientific estimates were integrated in the analysis as illustrative individuals in order to compare their status with the SSF control regulation estimates.

The following map compares the status of control and scientific estimates for the eight country*area (France: Mediterranean and Black Sea GSA7 and GSA8, La Réunion, Mayotte,

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[12] 1st indicator comparing the number of vessels registered in the official national fishing fleet register against the number of vessels with a minimum of one declarative data available and 2nd indicator concentrating on vessels with declarative data and investigating the completeness of their transversal data regarding the number of trips they declared.

Martinique and Guadeloupe islands and French Guiana, and Greece Mediterranean and Black Sea GSA22) which provided such information. As expected scientific estimates improve significantly the position of the country*area pulling them towards part of the risk' map which present globally lower potential risk of data incompleteness issue that the other parts (near cluster 7; centres of the different cluster described hereunder are also represented on the map).
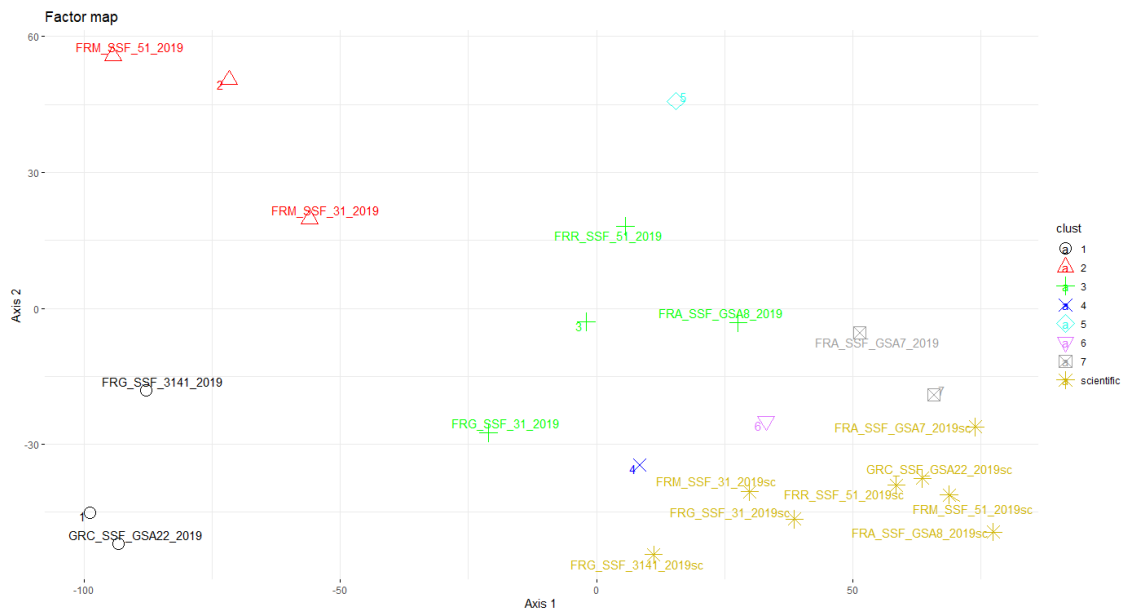
The following map presents the position on the risk map of the 28 "country*area" which provided indicators for their LSF vessels against the position of the centres of the different clusters described hereunder. Precise vessel length ranges considered for these vessels were the following: 12–15 meters LSF vessels *(CL1)*, 15–18 meters LSF vessels *(CL2)*, 18–24 meters LSF vessels *(CL3)* and more than 24 meters *(CL4)*. As the scientific estimates, they present in average a position in part of the risk' map which present overall lower potential risk of data incompleteness issue that the other parts *(between clusters 7 and 5)*. They are however on the whole positioned a little higher on the map than the cluster7, nearest the cluster5 *(comparing with the scientific estimates)* regarding the fact than LSF vessels performed generally fewer fishing trips than SSF vessels but their fishing trips have a longer duration.

Some country*area presents specificities: LSF vessels from *Portugal: Azores island and Lithuania (near the cluster 2)* are characterized by a small percentage of declarative data vessels with a significant percentage of them registering less than 50 fishing trips during the year. LSF vessels from *United Kingdom: Jersey Island (between clusters 1 and 4)* are also characterized by a small percentage of declarative data vessels but registering between 50 and 99 fishing trips during the year. LSF vessels from *United Kingdom: Northern Ireland & Wales and France: French Guiana*, present also for some vessel length ranges smaller percentage of declarative data vessels than the average and are therefore positioned near the cluster3, more in the middle of the map. Finally, LSF vessels from *Portugal: continental area, Spain: Gulf of Cadiz and Greece Mediterranean and Black Sea GSA22* present a significant percentage of declarative data vessels with in addition a significant percentage of them registering more than 100 fishing trips which explain their position on the map *(below the cluster 7)*.

Factor map
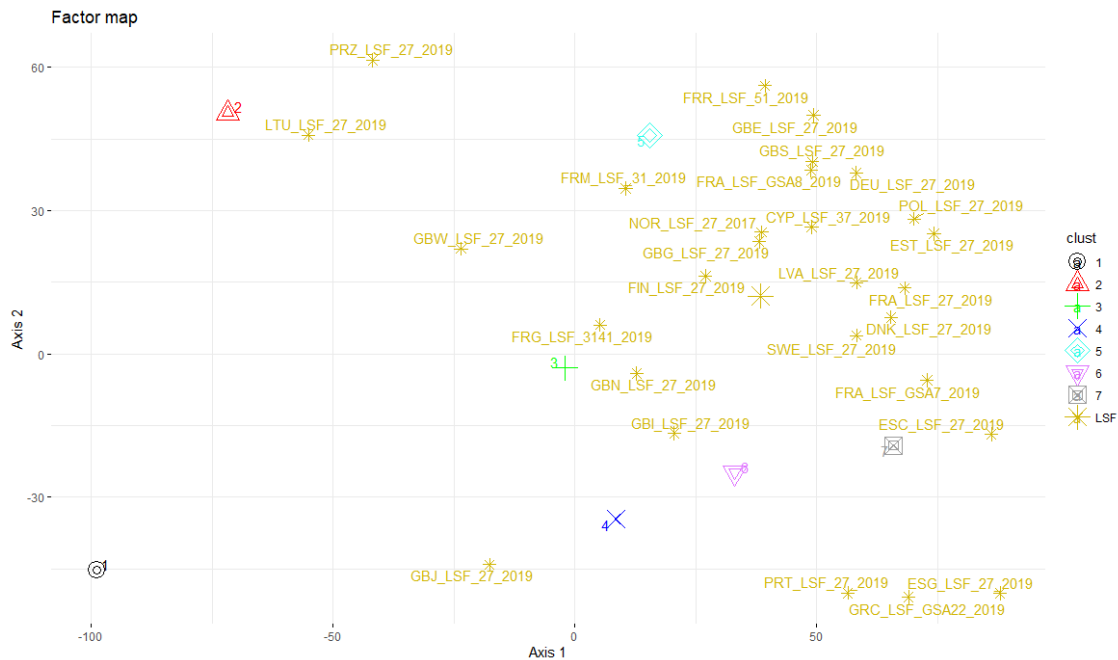
The update and refine of the risk assessment transversal data quality methodology with more recent years based on 2020 SSF questionnaires' replies combined with its extension to Large Scale Fisheries and scientific estimates as illustrative individuals *(in order to compare their status with the SSF control regulation estimates)* appears to confirm its potentiality to be used as a sensor detector of possible risk of data incompleteness issue, especially concentrated on the evaluation of the coverage/completeness and accuracy/reliability of fishing activity data collected via a census approach *(very high, high, medium, presented and low).* The objective pursued to propose a methodology to assess/evaluate/determine the potential level of incomplete data issues risk regarding different basic indicators *(e.g. define indicators' patterns which present low, medium, presented, high or very high risk of incomplete data issues)* seem to be achieved. Furthermore in 2021, it is planned to continue the work on this methodology and in particular to collect feedbacks from all WGCATCH members on it and discuss its potential more wide spread implementation.

In case of confirmed potential risk of data incompleteness issue, country*area should assess their declarative system and eventually consider alternative methodology to improve their SSF data quality. Possibly, each new country*area *(or for a new year)* could be positioned on this map as soon as the distribution of the two indicators are calculated which easily allows to detect a potential risk of data incompleteness data issue.

2.2 ToR b.2) Sampling effort of biological data of Small-Scale Fisheries (SSF) versus Large-Scale Fisheries (LSF)

ToR B identified the need to document sampling of biological data in the SSF fleet compared to the LSF fleet. The main concern is to identify if there is insufficient coverage of smaller vessels, and if this means that there is insufficient coverage, at least, of species/areas for which these vessels are important.

In preparation for WGCATCH 2020 a questionnaire was sent out to WGCATCH participants regarding how sampling effort of commercial fisheries (on-shore and on-board) is distributed across different vessel length classes in each country/region. The objective was to

identify/highlight any issues in the coverage of SSF and identify if there is a dedicated sampling program for SSF (since in general they have lower landings than LSF).

The questionnaire requested data on: Number of vessels, Number of fishing trips and Total landings (tonnes) from the fleet; and also Number of sampling distinct vessels achieved on-shore, Number of sampling observer trips achieved on-shore, Number of sampling fishing trips achieved on-shore, and the equivalent for on-board (Number of sampling distinct vessels achieved on-board, Number of sampling trips achieved on-board). These were requested for the most recent as possible reference year, and by Country, Supra Region, Vessel length class ([0-6[m, [0-8m[, [8-12[m, [12-15[m, >=15m)) and Metier EU level 5 (Gear + Target group of species).

Based on the data from the questionnaires submitted by the countries a series of preliminary analysis were done, which are presented next.

As a note, although the questionnaire is discriminated at metier level 5, such level of detail presents some difficulties: when considering all countries, there are many combinations (which makes the interpretation of results more difficult), and raises issues of confidentiality (since some combinations of "Country"-"Supra Region"-"Vessel Length Class"-"Metier Level 5" have very few vessels). Therefore, the analyses shown here do not specify each Metier Level 5. On the other hand, Metier Level 4 (Gear) could be used as an alternative to Metier level 5, since it resolves these two issues. However, this alternative limits the type of analysis that can be done in the case of the variable "Number of vessels" (because the methodology used by some of the countries implies that the same vessel can be considered in more than one Metier Level 5).

Also, as a note, during preliminary analysis of the questionnaires it became evident that one additional question not included in the questionnaire would be important to allow answering the objectives of the questionnaire. This would be: if sampling is planned for each of the lines of the questionnaire (i.e. for each combination of Country, Supra Region, Vessel length range and Metier EU level 5) - and this question should be answered for on-shore and on-board separately. The agreement was that it would not be possible to ask countries for this additional information during the meeting or even after the meeting in time for the report. This is an aspect to be developed in WGCATCH 2021.

Most countries submitted questionnaires before the meeting or before the report was closed [CYP, GRC, ESP, PRT (separately Mainland-IXa and Azores-X), FRA, GBR (separately England, Wales, Scotland), BEL, NLD, DEU (separately Baltic Sea, North Sea), DNK, FIN, SWE, POL, LTU, LVA]. Since NLD submitted incomplete data, this data was not included in the analysis. The following text results from analysis of the data submitted in the questionnaires. The analysis was structured in a series of topics/questions (these were not questions from the questionnaire, but rather relevant questions to be answered based on the questionnaires).

Quantitative section of the questionnaire:

1. **Are vessel size classes equally covered by sampling? i.e. in terms of percentage of sampled trips**

The questionnaire data has been separated into Supra-region 27 (Baltic Sea, North Sea, Eastern Arctic, North Atlantic) and 37 (Mediterranean Sea and Black Sea).

Larger vessels have a higher proportion of sampled trips than smaller vessels, both on-shore and on-board. This might reflect that the larger vessels have larger landings, and in relation to on-board sampling the practical problems with safety and space for observers on-board smaller vessels. The proportion of trips sampled varied between on-shore and on-board. The percent trips

sampled on-shore have a large variation, with the Azores and Latvia having a higher percentage of trips sampled than other countries. Therefore, the graphs have been split up, so that the Azores and Latvia are shown separately.
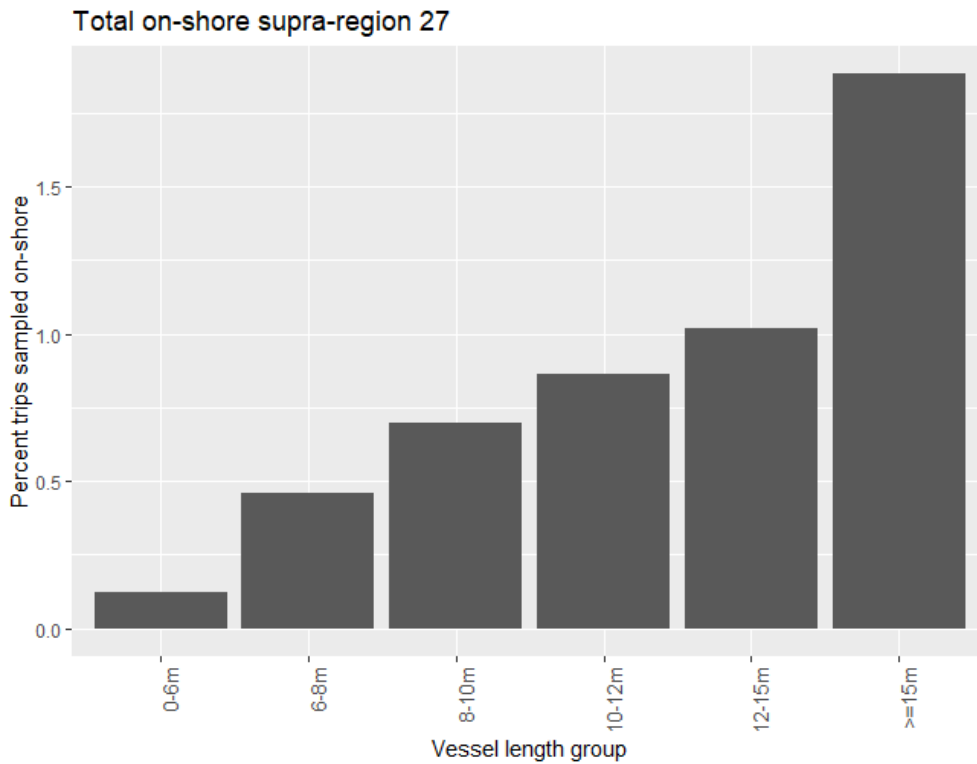
Figure 15 1a. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Mean percentage of trips sampled on-shore per vessel size class.
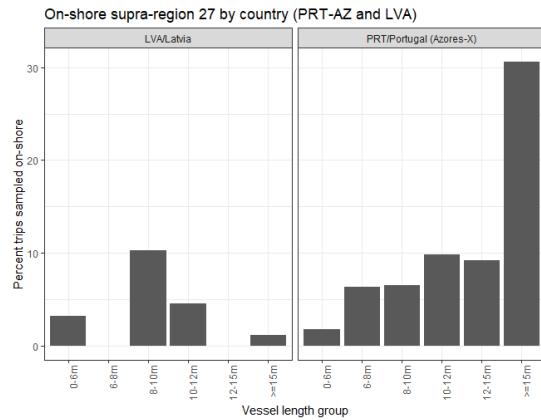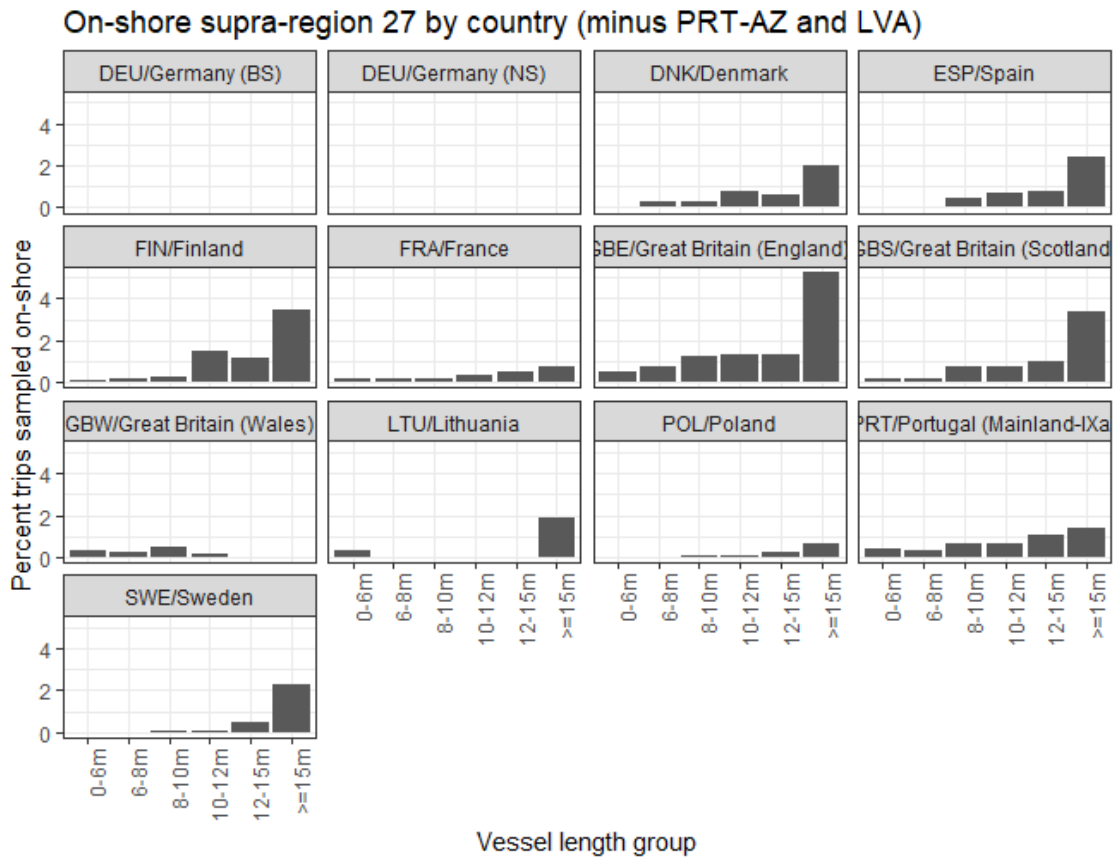
Figure 15b. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Mean percentage of trips sampled on-shore per vessel size class and country. There is no on-shore sampling in Germany (Baltic Sea and North Sea).

Figure 15c. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Mean percentage of trips sampled on-board per vessel size class.

Figure 15d. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Mean percentage of trips sampled on-board per vessel size class and country. There is no on-board sampling in Finland.

Figure 15e. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Mean landings per vessel size class.

Figure 15f. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 37. Mean percentage of trips sampled on-shore per vessel size class.

Figure 15g. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 37. Mean percentage of trips sampled on-shore per vessel size class and country.

Figure 15h. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 37. Mean percentage of trips sampled on-board per vessel size class.

Figure 15i. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 37. Mean percentage of trips sampled on-board per vessel size class and country.

Figure 15e. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 37. Mean landings per vessel size class.

This may be due to the larger number of smaller vessels in the national fleets so that it is more likely to go onboard of different vessels. In the larger and largest vessels, trips take longer and it

is unlikely that observers are sent to sample more than one trip from a larger vessel during a year.

Does the percentage of vessels sampled differ across size classes?

2i. Number of unique vessels in the fleet - Supra-region 27 and 37

Each boxplot shows the variation in the (log) number of vessels in the fleet per metier level 5 within a vessel size class.

In Supra-region 27 and 37, in most countries the number of unique vessels in the fleet decreases with vessel size, but in many of these countries this decrease only occurs from 0–6 m to 12–15 m and is then followed by an increase in the larger size class (≥15 m).

Data were also submitted for other Supra-regions, but were not analysed.

Figure 16a. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Number of distinct vessels in the fleet per métier level 5 grouped by vessel size class and country. This number (in y-axis) has a log applied for visualization purposes.
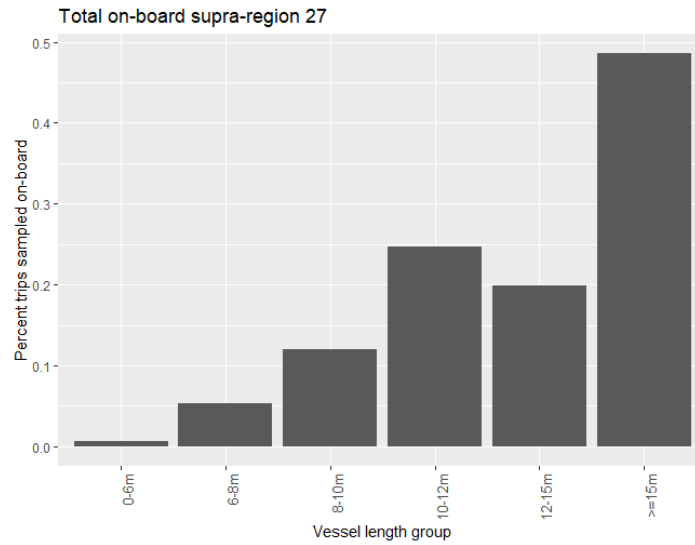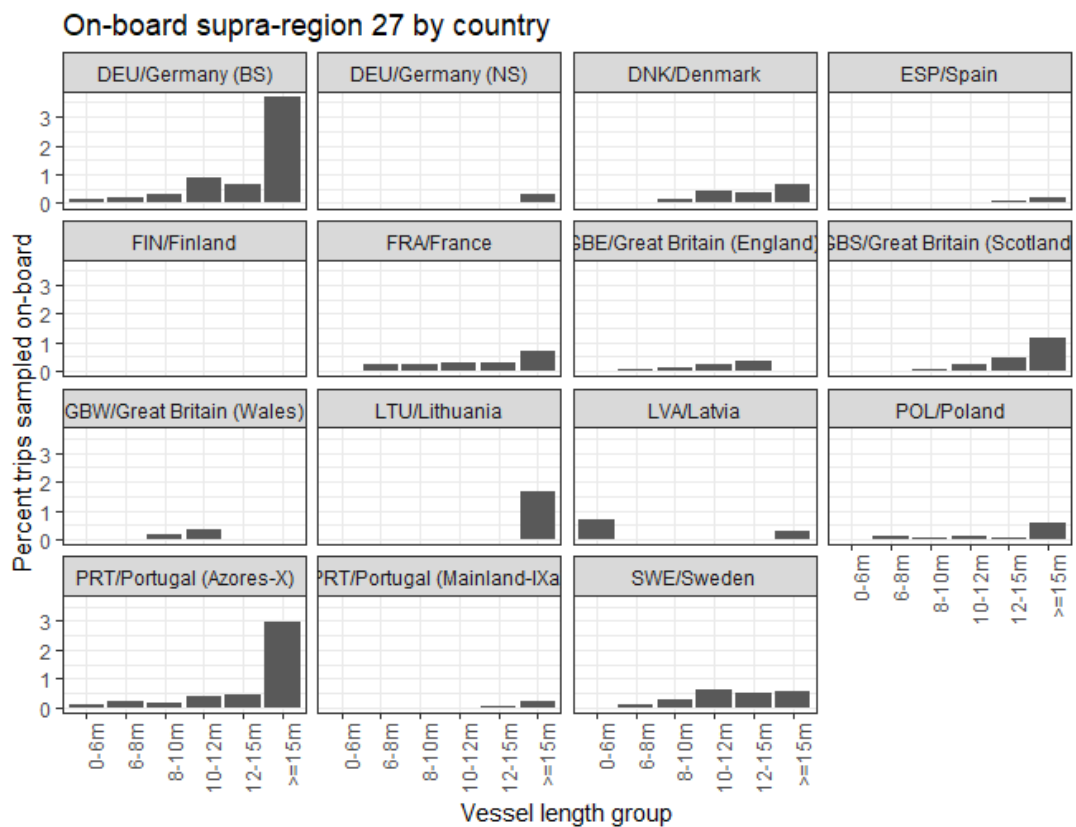
Figure 16b. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 37. Number of distinct vessels in the fleet per métier level 5 grouped by vessel size class and country. This number (in y-axis) has a log applied for visualization purposes.

2ii. Proportion of vessels sampled in on-shore and on-board sampling - Supra-region 27 and 37

Each boxplot shows the variation in the percentage of vessels sampled per metier level 5 within a vessel size class (red for on-shore sampling and blue for on-board sampling).

In both Supra-region 27 and 37, the same trend is observed for most countries, and both for on-board (red) and on-shore (blue) sampling: in general, the proportion of vessels sampled from the fleet seems to increase with vessel size class. This is likely related to a decrease in the number of vessels with increasing vessel size class in the national fleets [although in many of these countries this decrease only occurs from 0–6 m to 12–15 m and is then followed by an increase in the larger size class (≥15 m)]. Note that some countries do not have on-shore sampling (e.g. Germany) and others do not have on-board sampling (e.g. Finland).

As a note, Great Britain and Germany-Baltic Sea had three and one case of over 100% of vessels sampled, respectively, which in the case of Great Britain was due to some mismatch between metier assignment in transversal data and biological sampling data. These values above 100% are not shown in the Figure 2c.
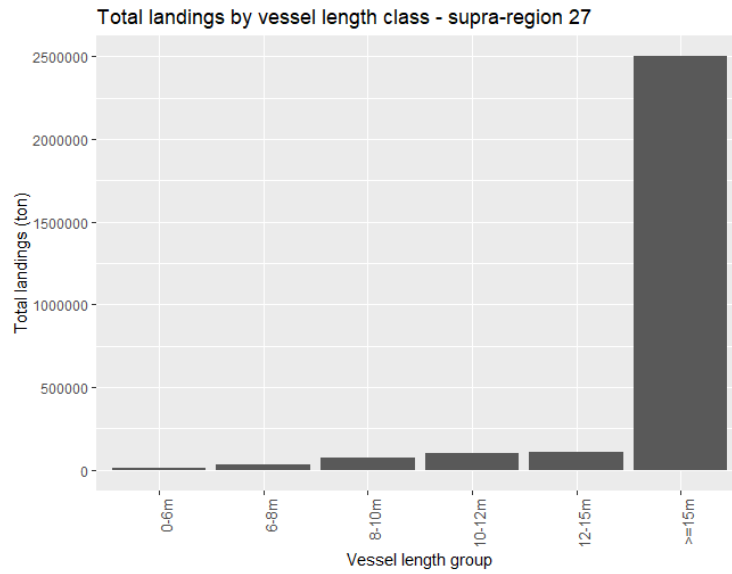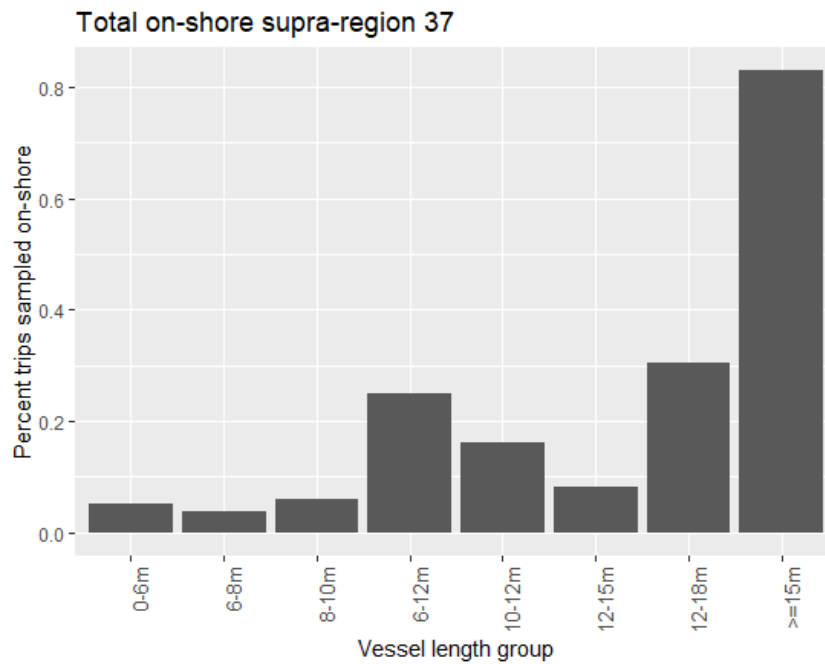
Figure 16c. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Percentage of vessels sampled per métier level 5, presented in box-plots by vessel size class and country. Red box plots represent on-shore sampling, blue box plots represent on-board sampling. There is no on-shore sampling in Germany (Baltic Sea and North Sea) and no on-board sampling in Finland.
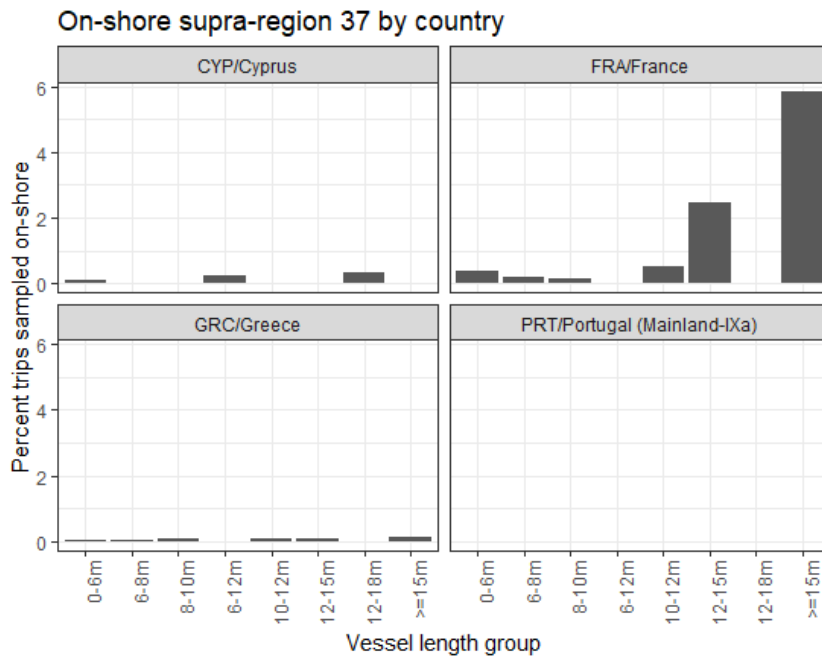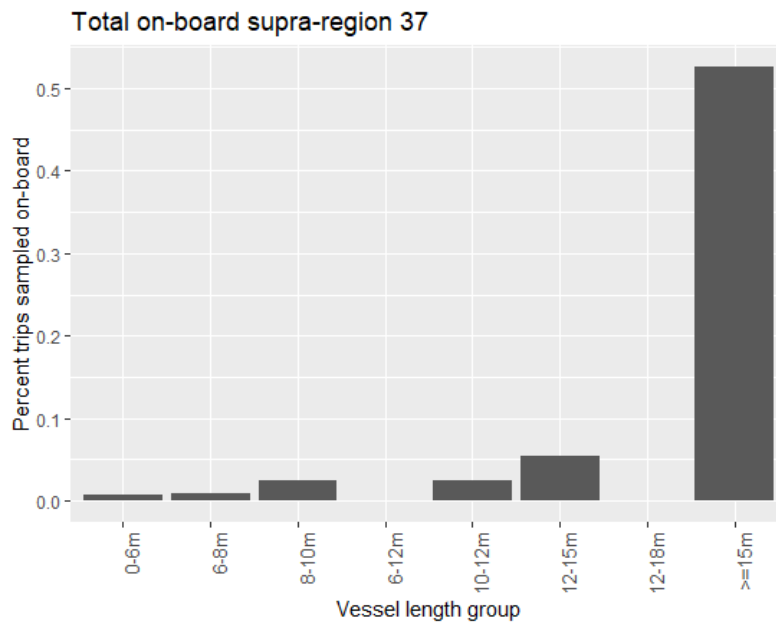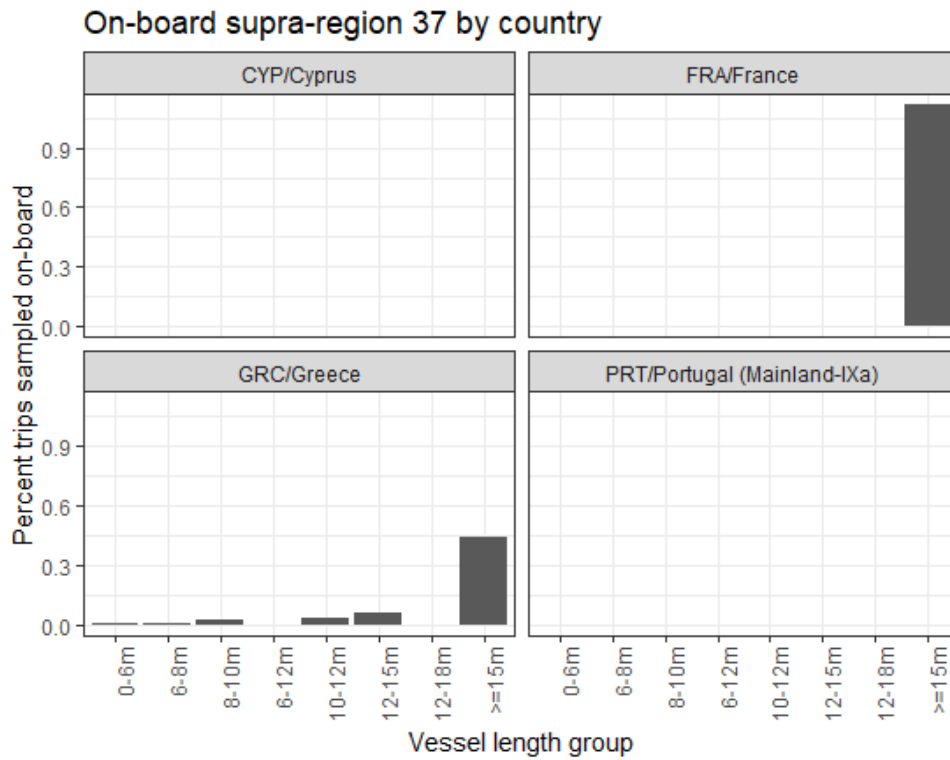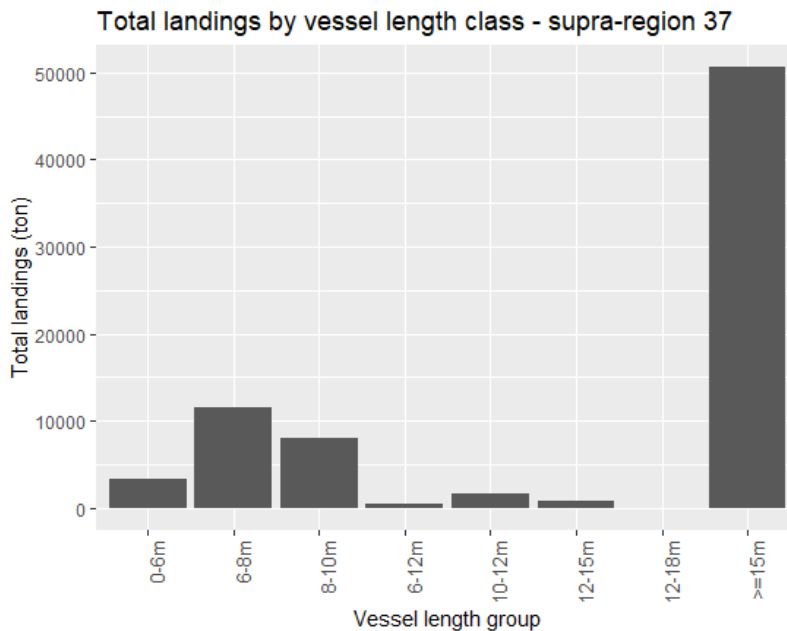
Figure 16d. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra region 37. Percentage of vessels sampled per métier level 5, presented in boxplots by vessel size class and country. Red box plots represent on-shore sampling, blue box plots represent on-board sampling.

Does the ratio number of trips sampled/number of vessels sampled differ across size ranges? (i.e. the average number of trips per vessel)

The ratio between the number of sampling trips and the number of unique vessels sampled is an indicator that characterizes the national vessel selection process and, to some degree, the representativity of the operating fleet into the sample. Its minimum value is 1 when every sampling trip is conducted on a different vessel, the ratio increases above 1 as different sampling trips are conducted on the same set of vessels again and again. For example, a ratio above 2 means than every unique vessel was sampled at least twice. The greater the indicator the more likely it is that few vessels provide the samples and that therefore, the national sampling maybe biased and not representative. The calculation was done at a national level, separately for on board and shore sampling, and by classifying the sample based on vessel length and fishing gear.

The ratio is depicted by country (operating at Supra region 27) and length class, via box plots summarizing the information coming from the different metiers (Metier level 5). Various countries exhibit different patterns through the vessel size classes. In Germany (Baltic Sea), Spain, Great Britain (Wales) and Portugal (Mainland and Azores) the ratio increases as the vessel length increases, probably due to the decline of the available vessels in the fleet. The opposite trend is noticed in Denmark, Finland and Great Britain (Scotland), while in Poland a peak of the ratio is observed in the middle classes (6 to 12 meters). On the other hand, the ratio is higher in on-board than on-shore sampling in Denmark, while the reverse is true for Portugal (Azores). Mixed trends are observed in the rest of the countries.
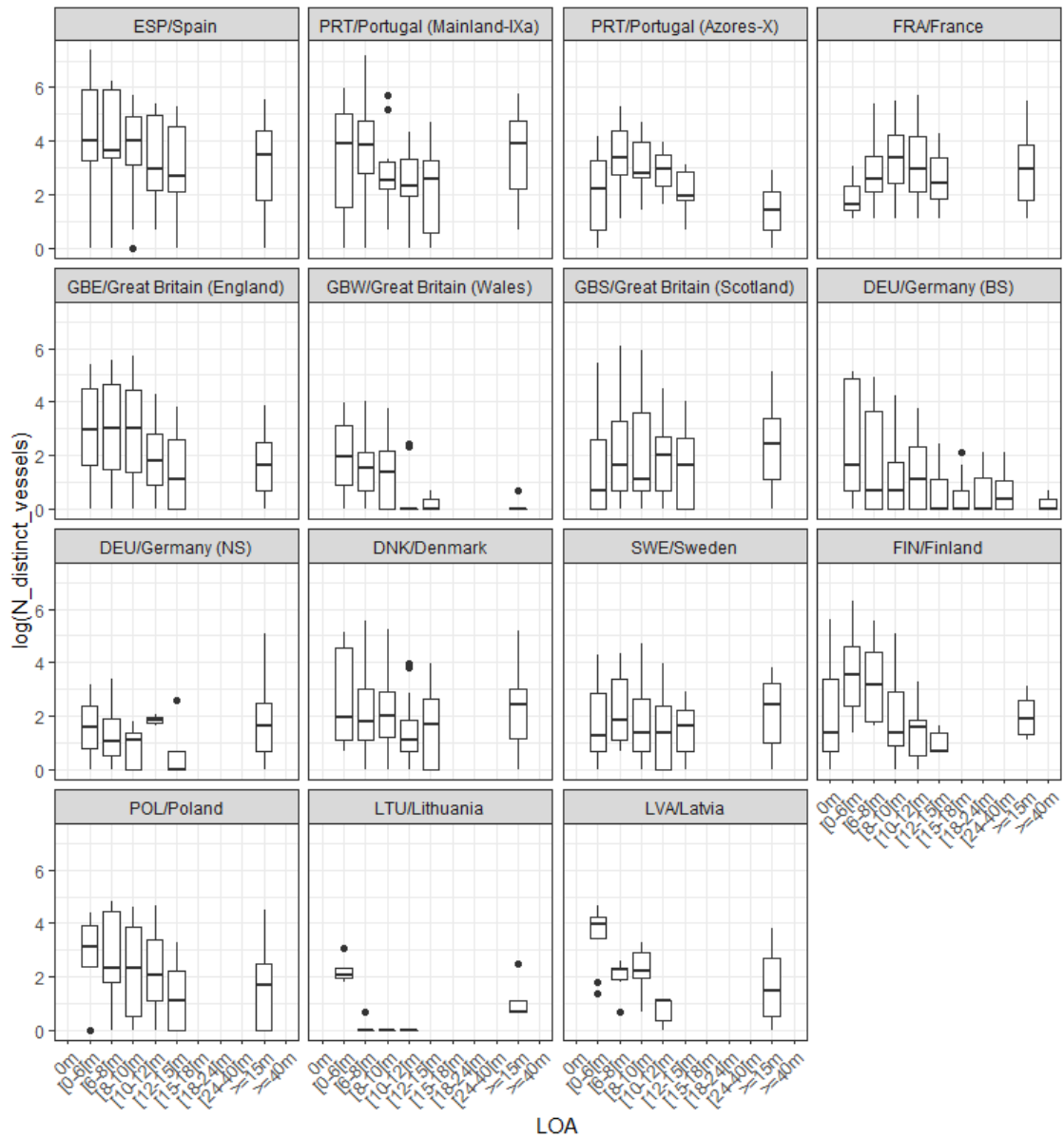
Figure 17a. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Ratio of the number of sampled trips / number of unique vessels sampled per métier level 5 grouped by vessel size class and country. Red box plots represent on-shore sampling, blue box plots represent on-board sampling.

The same ratio was calculated for countries operating in Supra-region 37. Both France and Greece exhibited lower values in the small-scale fleet (vessels <15 meters) than in the large-scale fleet. In Greece and France, higher values were calculated for on shore sampling than on-board, while Cyprus conducted all their sampling with on-board observers.
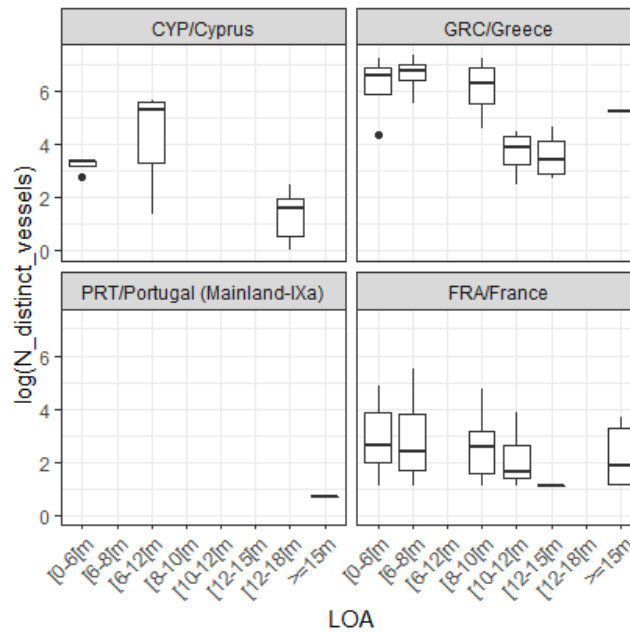
Figure 17b. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 37. Ratio of the number of sampled trips / number of unique vessels sampled per métier level 5 grouped by vessel size class and country. Red box plots represent on-shore sampling, blue box plots represent on-board sampling.

Other FAO regions:

France was the only country with available data for sampling conducted on vessels operating in FAO regions other than 27 and 37 (31,41 and 51, France Outermost regions). In these vessels, only onboard sampling is conducted. In general terms, the index increases slightly with vessel length.

Figure 17c. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region other than 27 and 37. Ratio of the number of sampled trips / number of unique vessels sampled per métier level 5 grouped by vessel size class and country. Blue box plots represent on-board sampling.

Does the ratio number of unique vessels sampled/number of trips sampled differ across size ranges?

This indicator is the reverse of the previous one since it is the ratio of the number of unique vessels to the number of total sampling trips. Here, the maximum value of the ratio is 1 when every sampling trip is conducted on a different vessel and it decreases below 1 as the number of sampling trips increasing disproportional to the unique vessels. For example, a ratio below 0,5 means than every unique vessel was sampled at least twice. The value of this index is presented separately for FAO region 27, 37 and other FAO regions.

The overall pattern resembles the one described for the previous question, however, the scaling is slightly different.

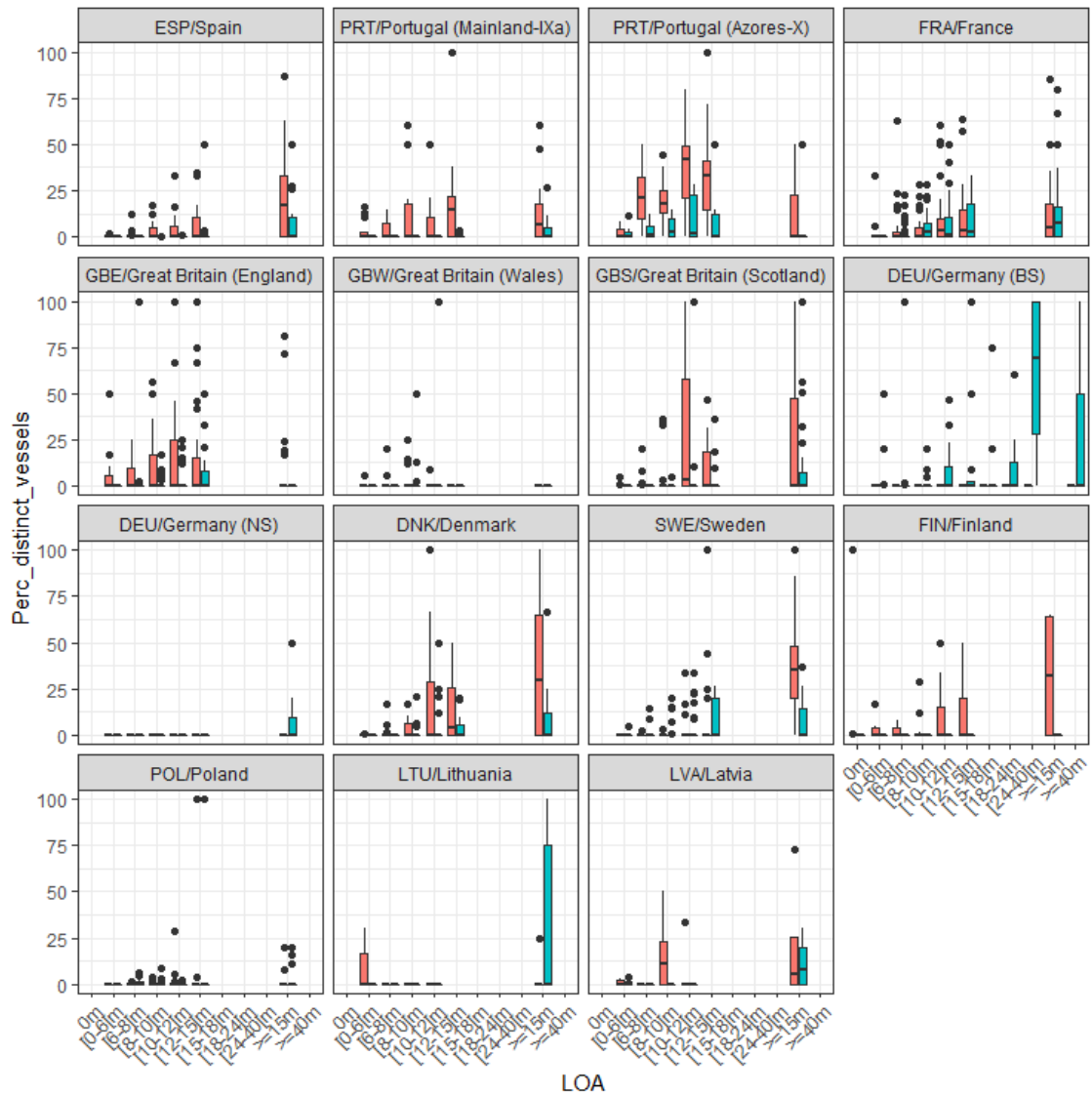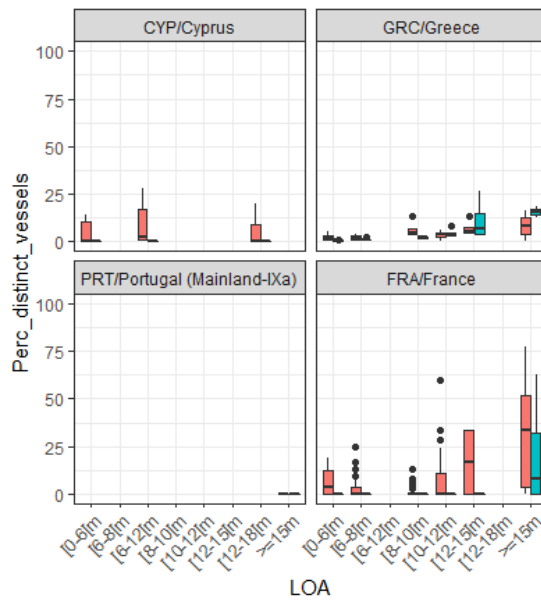**Figure 18a. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 27. Ratio of unique vessels sampled / number of trips sampled per métier level 5 grouped by vessel size class and country. Red box plots represent on-shore sampling, blue box plots represent on-board sampling.**

Figure 18b. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region 37. Ratio of unique vessels sampled / number of trips sampled per métier level 5 grouped by vessel size class and country. Red box plots represent on-shore sampling, blue box plots represent on-board sampling.
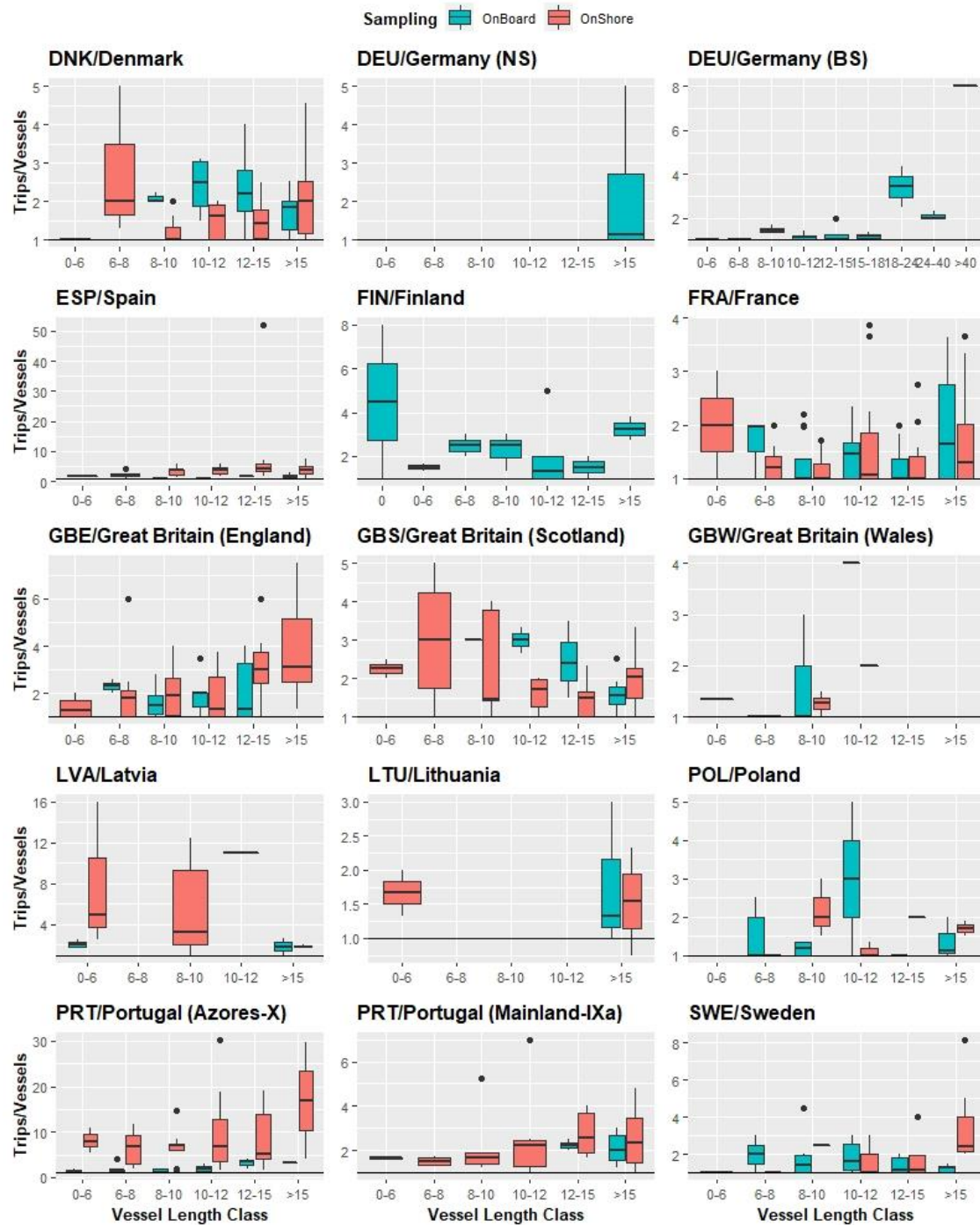
Figure 18c. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Supra-region other than 27 and 37. Ratio of unique vessels sampled / number of trips sampled per métier level 5 grouped by vessel size class and country. Blue box plots represent on-board sampling.

Qualitative section of the questionnaire

The qualitative questionnaire was composed to capture what biological sampling of small-scale fisheries was being carried out and identify how extensive the sampling of these fleets might be and to help provide any explanations apparent in the quantitative analysis. However, this qualitative part of the questionnaire was done with open questions, and although the outcome is interesting and raises interesting cues/hypothesis for further exploration it is limited and the topic deserves further investigation with a different approach in the future.

In summary, 15 countries responded. Most of the countries incorporated the sampling of the small-scale fisheries in their general sampling schemes where vessels fell within gear or broad vessel size strata (e.g. over and under 8m, 10m or 12m). And it is from these strata that landings to sample were selected irrespective of vessel size, or that vessels were selected for on-board at sea sampling. There is some directed sampling of some SSF (from small-scale pelagic fisheries in England to small-scale net and trap fisheries in Lithuania). The biological data collected from the small-scale fisheries do not differ from one vessel size category to another but differed from country to country ranging from size data by species to size, sex, maturity and age by species in others. In some instances, some fleets are not sampled at sea for logistical reasons (space for an observer) or because the discard data and mortality is perceived to be insignificant, for example in crustacean pot fisheries. Some fisheries and species are unique to the SSF category so the biological parameters collected may also be unique.

Access to some small-scale fisheries are highly dispersed which makes them costly to sample and their catches might not go through the main sales points or auctions where most of the sampling effort is directed. One respondent made the point that sampling effort was directed to ports

or fleets based on records of activity and landings, which if relying on sales notes data might not be wholly accurate. One respondent made the note that under 15m vessels are not obliged to record their activity which might affect how well those fleets are sampled, and dependent on the numbers of vessels sampled and rules about confidentiality might affect how that data can be used. Another point made was that in the absence of activity and landings data, the collection of auxiliary data with biological data at auctions can help improve on those statistics.

Is there some specific SSF biological data sampling program or is SSF included in a more general/large biological data sampling program?

Of the 15 respondents all said that the sampling of small-scale fisheries are captured in the general programme, 8 said that they fell within specific stratum or directed sampling effort at specific fisheries including self-sampling.

Do the collected biological variables differ with vessel length? -and is this similar in countries?

Figures 5a and 5b below summarise the results of the question identifying where possible any difference in response for onshore and on board sampling. Of the 15 respondents, none identified a difference in the biological data collected, however directed sampling onshore at particular fisheries or excluding some vessels because of vessel size and activity offshore does affect the data collected.

Generally, the variables do not differ, but the species sampled might in some cases especially, if these fisheries are spatially independent of the large-scale fleet and therefore the parameters might also change. One reference was made to the time and place that small-scale landings was available which impacted on the state of the landed individuals and therefore the maturity data that was available. Additionally, if small-scale fisheries are not sampled on-board, then observers cannot obtain data on fractions of the catch that are not landed, such as on incidental by-catches (for example PETS, Protected Endangered and Threatened Species).
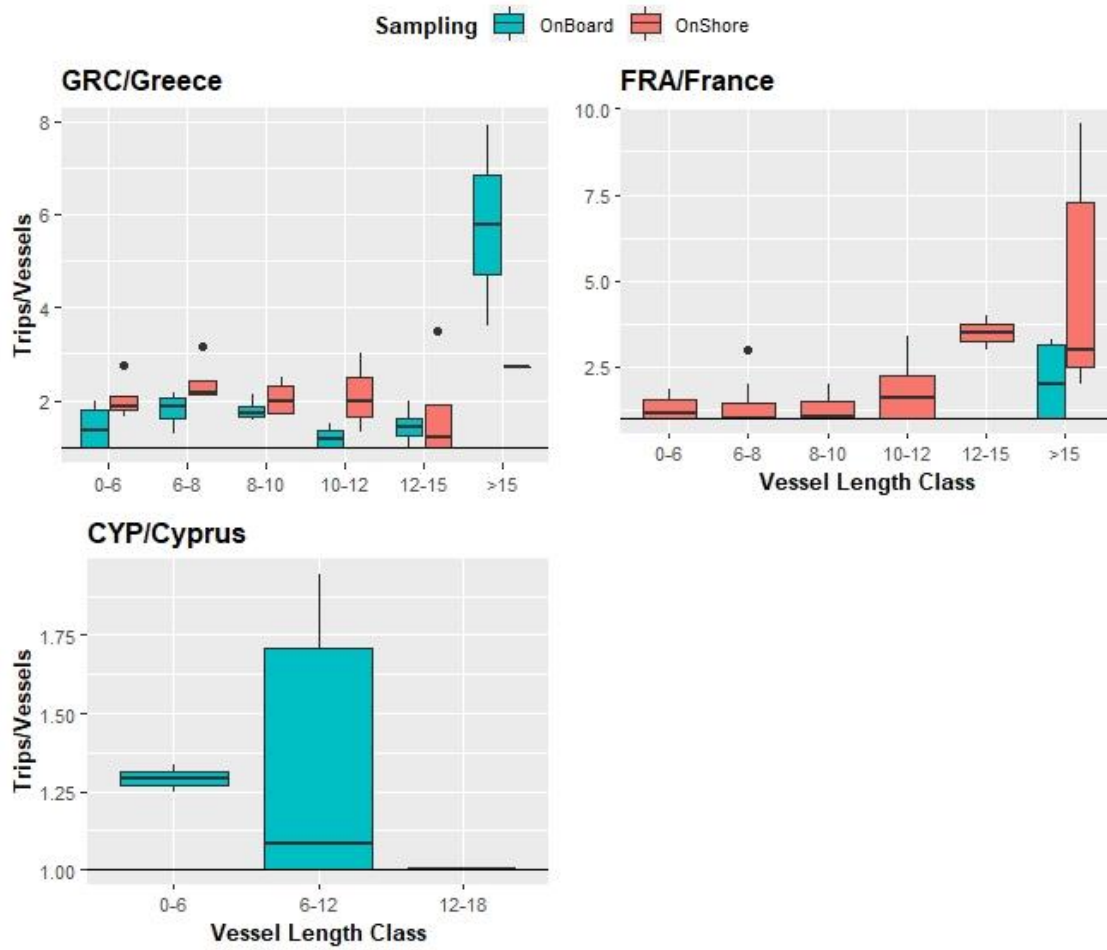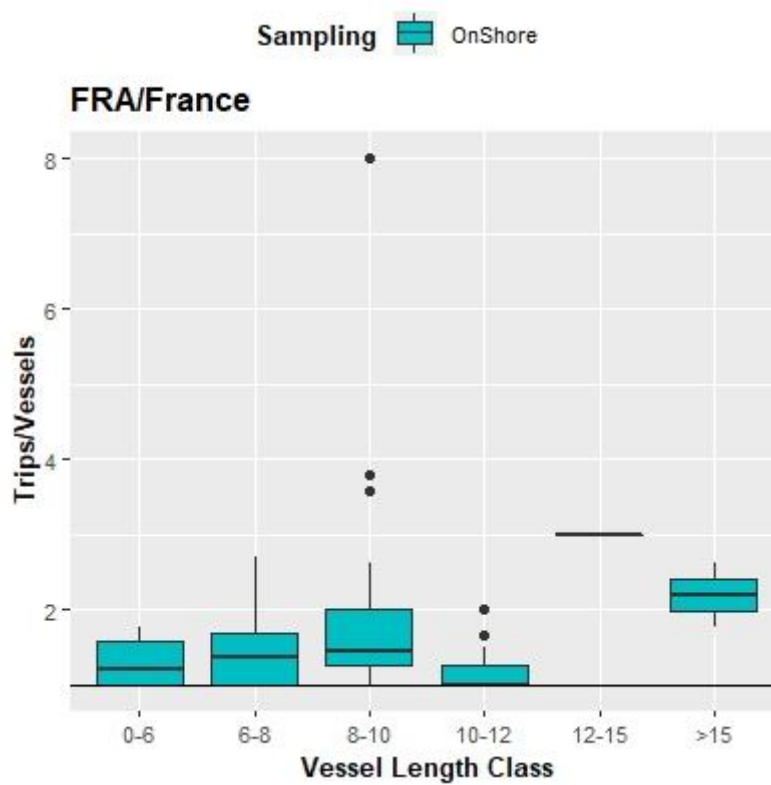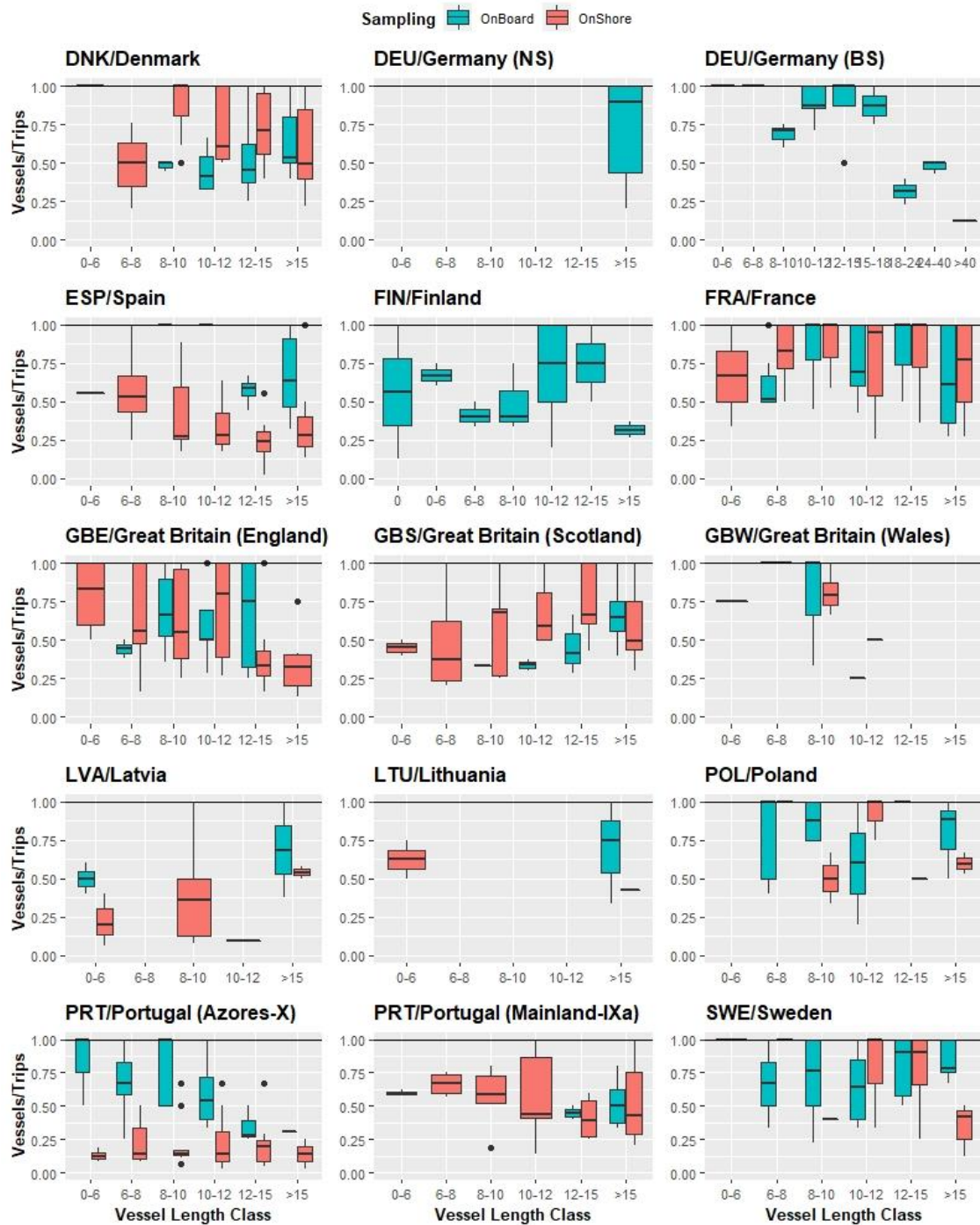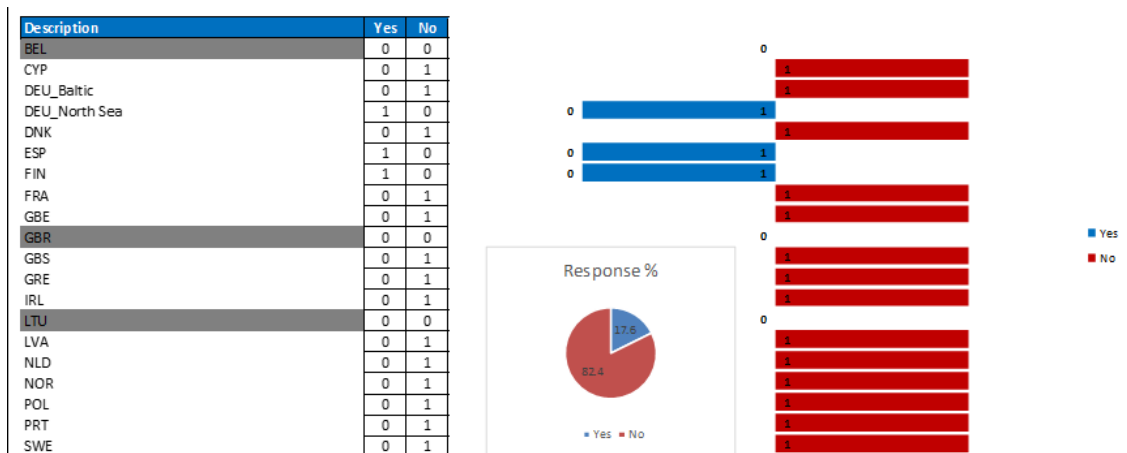

Figure 19a. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Answers to the question: Do the biological variables sampled on-shore differ with vessel length?

Description	Yes	No
BEL		
CYP	No OnBoard	
DEU_Baltic	0	0
DEU_North Sea	0	0
DNK	1	0
ESP	0	0
FIN	No OnBoard	
FRA	0	1
GBE	0	1
GBR		
GBS	0	0
GRE	0	1
IRL	0	1
LTU		
LVA	0	1
NLD	0	0
NOR	0	1
POL	0	1
PRT	0	1
SWE	0	1

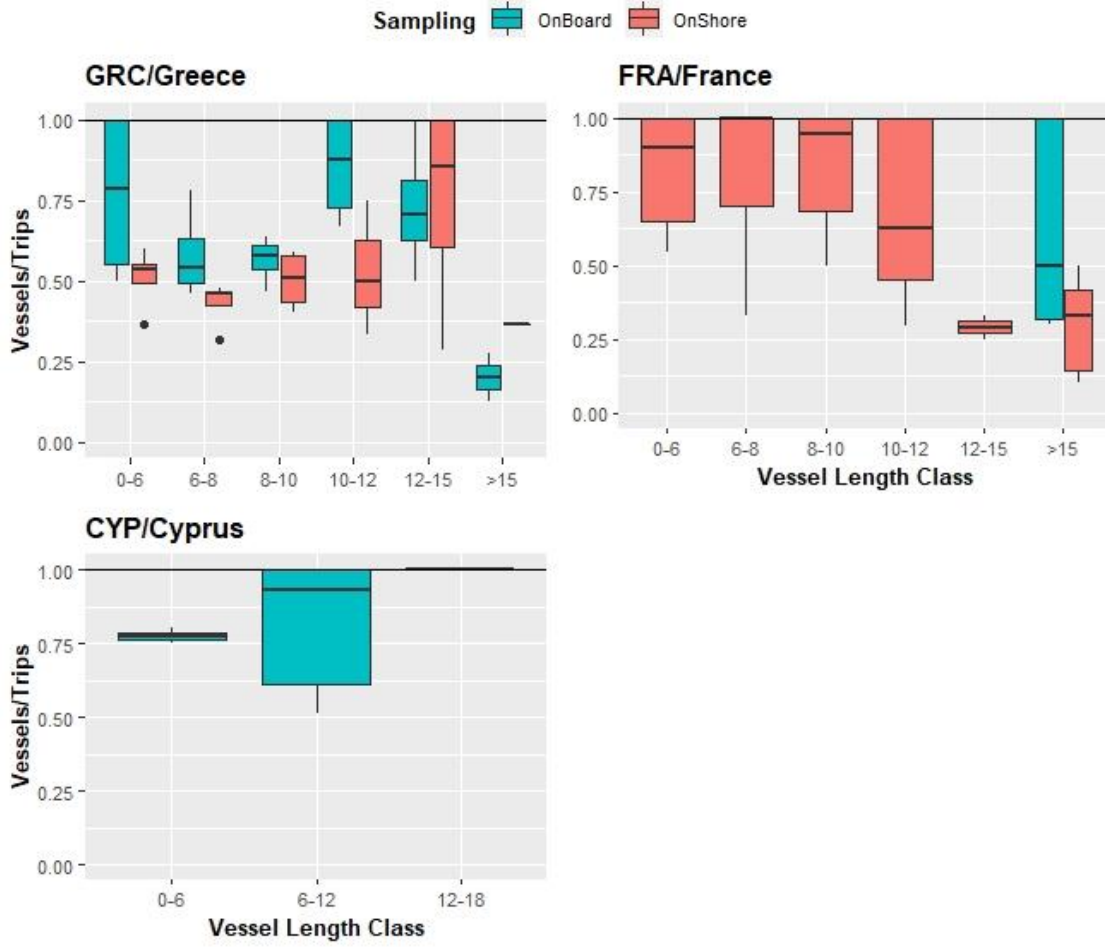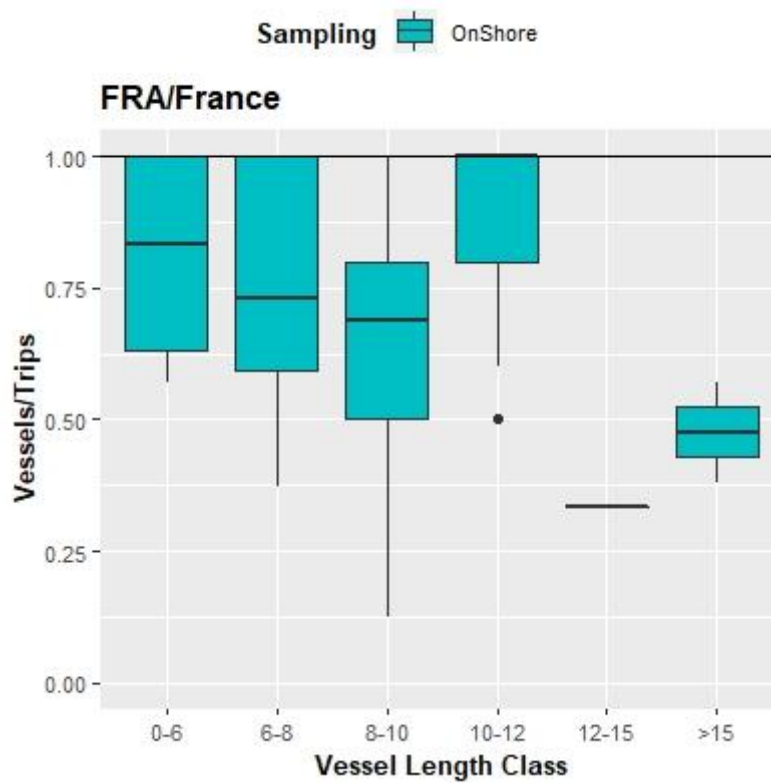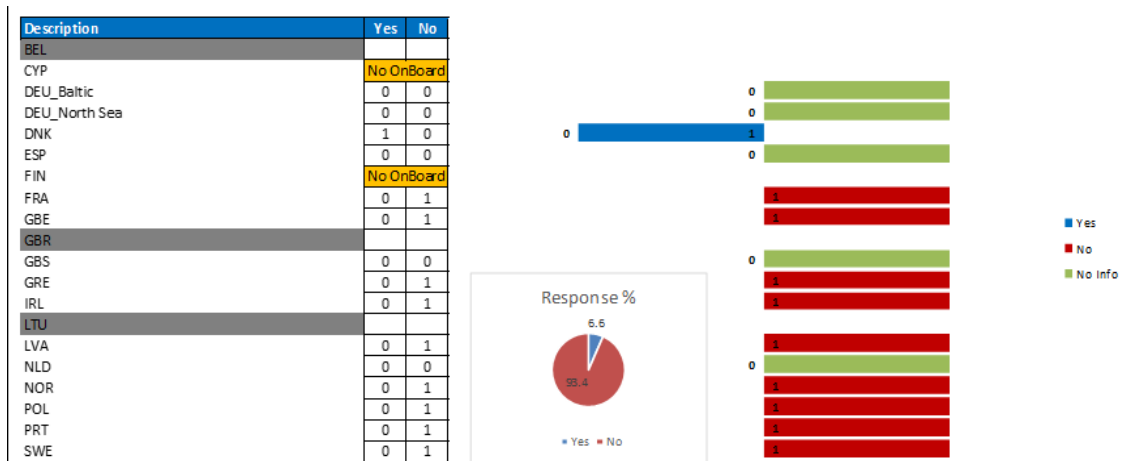**Figure 19b. Results of 2020 questionnaires on biological sampling of small-scale fisheries versus large-scale fisheries: Answers to the question: Do the biological variables sampled on-board differ with vessel length?**

Any relevant question that can be answered based on the qualitative questionnaire?

The submitted qualitative questionnaires were reviewed to see if they might help guide the results of the analysis of the quantitative data, 1 to 4 above. What metiers or gaps are there in the sampling? This requires answers that will help with the interpretation of the results. Some countries identified significant fisheries where observer data is not collected but samples are collected on shore. The allocation of sampling effort to specific strata might have an impact on the sampling to activity ratios being calculated but if the true activity of these fleets is underestimated then the ratios will also be biased. Generally, the responses by countries were not consistent and often too broad to distinguish between responses for on board and on shore sampling for example (see Figure 5b). This point is made in the opening section "B2 Sampling effort of biological data of Small-Scale Fisheries versus Large-Scale Fisheries above" where it was identified that more details by sample source would be needed.

Are there gaps in the metier sampling because of practical reasons or simply due to the sample selection approach? Some small-scale fisheries may not be sampled sufficiently because of the way the sampling effort is allocated, or access to the landings are limited because the vessels market their catch differently from the rest of the fleet. One respondent pointed out that multi-valent trips confuse the number of vessels and activity data in the quantitative tables and how the biological data for a trip might be used. The metier derived by the sampler and allocated to a sample, either by monitoring the event on board or interviewing the skipper, is different to how a metier is derived from the landings data and official catch records. The metiers derived for the same trip by both methods should be the same but could differ. The at sea observer will have finer information available to them than is available to the onshore sampler or required to be reported by the skipper under the control regulation.

2.3 ToR b.3) Peer-review publication on SSF

During its 2020 meeting WGCATCH subgroup on SSF continued to discuss the writing of a scientific paper that details the SSF work carried out by WGCATCH last years. The group discussed during a specific session the first draft available for review in a google document (https://drive.google.com/file/d/1qFLiBuOb0-uK5wmEyhXudMWei3QAr8QM/view?usp=sharing).

The sections/topics considered to be covered are: 1) Small-scale fisheries (SSF) definition; 2) SSF status, situation, characterization and importance; 3) SSF data collection, data gaps, data quality issues *(esp. on fishing activity variables)*; 4) Guidelines for data collection on SSF; and 5) Recommendations/conclusions *(in particular the usefulness of the innovative/electronic reporting systems in monitoring SSF)*. The paper focus on SSF fishing activity variables *(capacity, effort and landings data)* as SSF biological data sampling *(discards, length and age distributions, other biological parameters)* present specific issues which will be addressed by the group in the following years *(see § 2.2)*. The paper covers data from European countries in broad senses *(i.e. including EU and/or ICES European countries also included Norway/UK or Mediterranean countries – Cyprus/Greece)* namely all the countries for which data have been collected from WGCATCH.

The core group identified to finalize the paper has been extended with new participants in the subgroup and target journal "Fish and fisheries" has been confirmed. For each of the sections, a responsible team to prepare the 2nd version of the draft has been constituted also an overall team to harmonize and give coherence to all of the sections of the paper. The graphical outputs have to be renewed on a more recent year. With this aim in mind, an update of SSF data will be asked to the WGCATCH members in the following year *(esp. on fishing effort, weight and value)*. The group agreed to add in all the graphical outputs the 12–15 m vessel length ranges.

Finally, the group agreed on the following work plan to finalize the task:

1. First round of draft comments by the core group completed before the end of the 2020 year
2. Ask WGCATCH members for an update of the data *(esp. on fishing effort and landings/value)* in the beginning of the 2021 year
3. Update graphical outputs for the second draft before march 2021
4. Second draft of the document taking into account first round of comments drafted by the section responsible teams and the overall team before march 2021
5. Second round of comments by the core group completed before the summer 2021 and bibliography updated
6. Finalization and final proofreading of the paper, formalization, first journal submission (autumn 2021).

3 ToR c) Review developments in sampling and estimation of incidental by-catch of Protected, Endangered and Threatened Species (PETS) and including other rare species.

ToR C: Review developments in sampling and estimation of incidental by-catch of Protected, Endangered and Threatened Species (PETS) and other rare species and ensure that database structures support the implementation of the appropriate estimation procedures.

With the monitoring of PETS implemented in the on board sampling schemes of EU Member States under the DCF, the cooperation between WGCATCH with WGBYC has been intensified. The ToR proposed and added at last year's meeting, requires the following deliverables (1) RDBES development to ensure by-catch data is included in the RDBES, (2) review bycatch estimations of PETS and rare species by other expert groups (2020–2021), (3) report on - and support on board sampling practices at national institutes with regard to PETS and (4) report on - and support redesign of national databases with regard to PETS. As (3) and (4) have been extensively addressed during the last years and time during the present meeting was limited, it was decided to focus on the first two deliverables.

Coordination of monitoring of PETS is not restricted to WGBYC and WGCATCH. While the focus of WGBYC before 2017 directed in the first place to cetaceans (mainly steered by EC Resolution 812/2004), the expansion towards other species groups has also led to overlap with other expert groups. In order to streamline the data handling towards Advice on incidental bycatch, ICES has developed a Roadmap, (https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2020/2020/Roadmap_ICES_Bycatch_Advice.pdf) which was presented plenary at the meeting by Henn Ojaveer.

As a follow-up of the workshop on the joint WGBYC/WGCATCH Workshop on sampling of bycatch of PET species (WKPETSAMP) which dealt with the practical on board sampling of protected species, the subgroup drafted a resolution on a joint WGBYC/WGCATCH Workshop on Estimation of Commercial Catches III – Rare events / species.

ICES Roadmap and overlap PETS assessments with other expert groups

The roadmap of ICES bycatch on protected, endangered and threatened species (PETS) sets out ICES overarching advisory goal for the bycatch advice on PETS: to assess the risk of, and the impact of fleet activity on incidental bycatch, and to include these in ICES Fisheries Overviews by 2022. Efficient use of internal resources and effective cooperation between ICES and a wide range of international conservation and management organisations is a primary objective of the roadmap, particularly in terms of sharing data and information and a collaborative approach to bycatch assessments and risk evaluation. The roadmap also gives the list of key expert groups in the process and outlines their main expected roles and tasks. WGCATCH feeds into the internal workflow and system for creating the evidence base for the bycatch advice by developing sampling protocols.

3.1 ICES working groups or workshops assessing bycatch of protected species

The group decided to review the products of ICES working groups dealing with assessment of bycatch of protected species. Since we have protected species in all taxa there are not only marine mammals and bird groups to be reviewed but also groups dealing with fish such as for example eels or shad. However not many working groups other than WGBYC actually have assessed the mortality of protected species due to bycatch. The groups listed below include assessment working groups or others addressing bycatch of protected species.

WGBYC, Working Group on bycatch of protected species

In 2020, ICES WGBYC evaluated bycatch mortality across métiers for the common dolphin (*Delphinus delphis*) in the Celtic Seas, in the Bay of Biscay and the Iberian Coast, and in the western English Channel. In 2019, ICES WGBYC carried out a bycatch risk assessment for harbour porpoise (*Phocoena phocoena*) and grey seal (*Halichoerus grypus*) in the Greater North Sea and the Celtic Seas for 2017. A bycatch risk assessment was carried out for harbour porpoise in the net fisheries in Subarea 7 of the Celtic Sea for the year 2016 reported in the ICES WGBYC report 2018. The same year an assessment of common dolphin bycatch in the net and midwater trawl fisheries in the Celtic Seas and Bay of Biscay was carried out.

Data used for these assessments came from the WGBYC database. The WGBYC database includes mainly data submitted through the DCF monitoring however a few ICES member countries do have dedicated surveys monitoring bycatch in high risk métiers such as gillnets. The observer coverage is relatively poor so sampling is not representative. Monitoring of larger vessels and data collection using fisheries observers (i.e. as part of the DCF) dominate the dataset. Therefore, all the described assessments need to be interpreted with caution. Data collected by dedicated monitoring differ from data collected with fisheries observers for example in terms of the main métiers sampled.

WGMME, Working Group on Marine Mammal Ecology

In terms of bycatch, WGMME mainly reports from scientific studies or stranding reports and do not do any full assessments on ecoregion level. WGMME examines and review information on population sizes, distribution, population/stock structure and management frameworks for marine mammals in the North Atlantic. WGMME also review anthropogenic impacts on marine mammals.

WGHARP, ICES/NAFO/NAMMCO Working Group on Harp and Hooded seals

WGHARP does compile and analyses data regarding harp (*Pagophilus groenlandicus*) and hooded (*Cystophora cristata*) seals that are used for seal stock assessments and to evaluate stock status leading to a forecast of catch options. When available, data on bycatch of harp and hooded seals are incorporated into the estimates of mortality in the assessment models.

JWBIRD, Joint OSPAR/HELCOM/ICES Working Group on Seabirds

JWGBIRD does not gather or provide data on seabird bycatch mortality estimates. However, the group collects background information and input for the revision of the WGBYC data call to

support future extrapolations of seabird bycatch numbers from observed effort to total fishing effort for certain fishing gear. Recent work of JWGBIRD also focused on the development of the OSPAR candidate indicator "Marine bird bycatch" and the HELCOM indicator "Number of drowned mammals and waterbirds in fishing gear", both related to the MSFD criterion (under Com Dec 2017/848) D1C1 bycatch. In the near future, JWGBIRD is planning a pilot assessment of any available bycatch data to test and demonstrate assessment methodologies for the next holistic assessments in the OSPAR and HELCOM regions (respectively, OSPAR QSR2023 and HELCOM HOLAS III). WGEF, Working Group on Elasmobranch Fishes.

When bycatch of a species or stock takes place and is quantified, these catches (in biomass) can be incorporated to the total removals for the stock within the stock assessment. For example, in recent years, an increasing proportion of the total spurdog (*Squalus acanthias*) landings are taken as bycatch in mixed demersal trawl fisheries. In case of post-release of bycatches, post-release survival is mostly unquantified.

WGEEL, Joint EIFAAC/ICES/GFCM Working Group on Eels

Bycatch is not included in the [European eel (*Anguilla anguilla*) assessment](). Only anecdotal data from Norway are available; [The Fisheries Overviews of the Norwegian Sea Ecoregion]() report that around 80 000 eels are caught as bycatch in the coastal trap fisheries for wrasse (Labridae), but the majority of these are released unharmed. The WGEEL does not have such data for other fisheries, but recognizes it would be valuable to confirm what exists and to collate it.

WKLS, Workshop on Lampreys and Shads

The workshop carried out in 2014 reported number of specimens of lampreys and shads (Alosa spp.) bycaught (1995–2013) based on WGBYC data. However, no assessment of bycatch population mortalities (minimum-maximum) was carried out.

WKCOFIBYC, Workshop on Fish of Conservation and Bycatch Relevance

The main task for the workshop was to compile a list of fish species (including non-commercial and commercial) of conservation concern (threatened, sensitive, or already listed in legislation) that should be included in future assessments by ICES, and compile the assessment units for these species. A list was also compiled of fish species of relevance for ICES bycatch advice and assessment units for these species.

3.2 Comparison fishing effort WGBYC and RDB datasets

ICES WGBYC has historically used fishing effort data provided through MS Council Regulation 812/2004 annual reports for contextualising reported bycatch rates and to form the basis of bycatch risk assessments. In 2017 WGBYC were informed that Regulation 812/2004 would be repealed so the WG began considering alternative data sources. Some initial basic comparisons of Days at Sea (the effort metric generally used by WGBYC) records from different effort datasets (WGBYC, Logbooks, RDB, VMS) were carried out in 2018 (WGBYC, 2018) and then for only the WGBYC and RDB datasets in 2019 (WGBYC, 2019). As expected, these comparisons indicated that fishing effort data contained in the WGBYC database and RDB were the most complete, because the logbook and VMS data only contain data for some vessel sizes, but there were some quite large discrepancies between the two datasets.

In 2020, a further comparison was made using 2017 and 2018 effort data from the WGBYC and RDB databases for three broad metiers (nets, midwater trawls and bottom trawls) to try and understand any possible biases in reported effort levels. As with previous comparisons several discrepancies were found. In general, there was more variability in each dataset between countries but less variability between years of submission for each country indicating that discrepancies may be country specific. An example plot for over 10m bottom trawls is shown in Figure 20. Several other plots for different gear/vessel size combinations are in Annex 9.
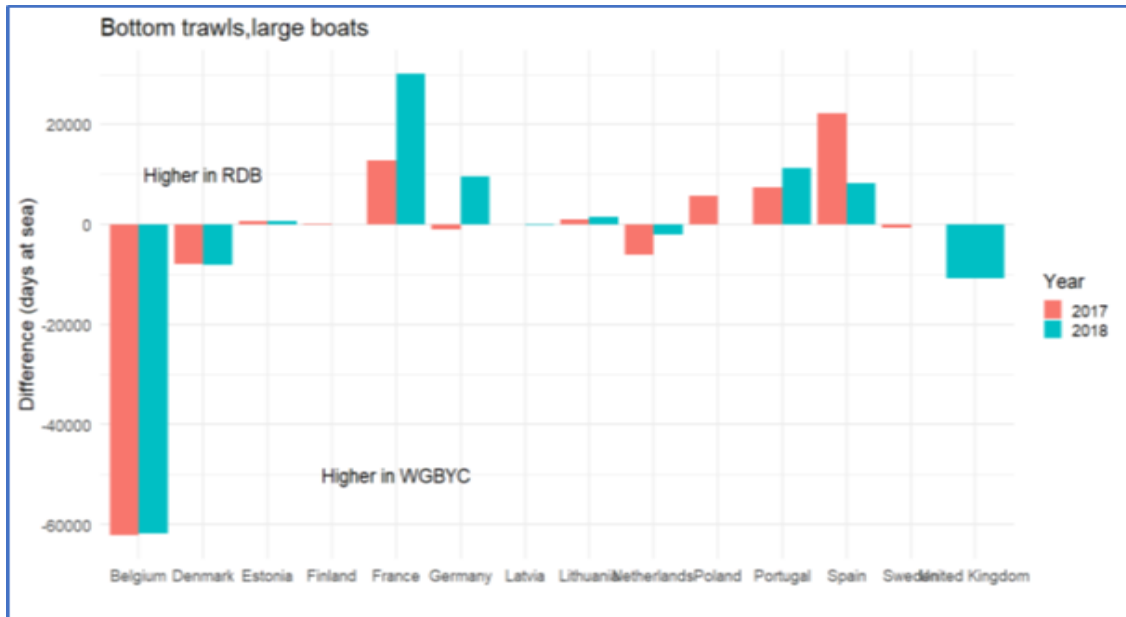
Figure 20: A plot showing discrepancies in over 10 m bottom trawl fishing effort contained in the WGBYC and RDB.

Not all of the observed differences across the range of gears and vessel sizes considered in the analysis could be explained at the WGBYC 2020 meeting and after discussions within the group it was agreed that a short questionnaire should be developed and circulated prior to the 2020 WGCATCH meeting which is attended by many of the national data submitters, and so could provide important insights into why these sometimes significant discrepancies in reported fishing effort exist between the WGBYC and RDB databases.

A questionnaire was prepared intersessionally by a subgroup within WGBYC and was sent to all WGCATCH members about 3 weeks before their meeting in November 2020. 14 countries completed the questionnaire. The questionnaire contained ten questions (see Annex 9 for the full questionnaire and a summary of responses) related to five broad topics and here we provide an aggregated summary of the responses within in each category:

1. **Data sources (Q1,2).**

This section asked about the fishing effort data sources used in the RDB and WGBYC data submissions, and about the differences in the data sources used for the small scale and large scale fleets within each data call.

Most countries indicated that the data sources were the same for both data calls, this was either specifically mentioned or was evident from the response. A few countries reported differences in the data sources between the two data submissions but the reasons for the differences were not specified. One Mediterranean country that responded does not submit to the RDB but does to the WGBYC database.

But most countries replied that the data sources used for small and large-scale fleets differed, notably with logbooks not being available for the same scale fleet, leading to the need for using alternative data sources.

See Annex 9 for the full compiled responses to questions 1,2.

2. Effort metric and vessel size classes considered (Q3,4).

This section asked about the vessel size classes and effort metrics used to populate the data submissions in the RDB and WGBYC data calls.

Most countries submit effort data in Days at Sea (DaS), as well as other effort metrics, for all vessel size ranges to the RDB and WGBYC databases. However, there are some exceptions:

- some countries do not report effort data for certain gear types (e.g. bivalve dredge),
- some countries have only recently (since 2019) started submitting small vessel effort to the RDB,
- some countries have only routinely submitted large vessel effort to WGBYC,
- some countries also submit data for non-ICES regions to WGBYC but not to RDB.

3. Methods used for calculating effort (Q5,6,7,8).

This section asked about the methods used for the calculation of fishing effort for the RDB and WGBYC data calls.

Most countries indicated that they use the same metier classifications for both data calls but there were some exceptions:

- One country highlighted minor discrepancies can result from data upload checks,
- One country indicated that the metier assignment for the RDB is based on the gear recorded in logbooks but that for the WGBYC submission the classification is based on a combination of the reported gear and catch composition,
- One country explained that differences could occur because in the WGBYC submission metiers are allocated by haul first and corrected to trip level whereas in the RDB submission metiers are assigned by trip directly.

Similarly, when asked about the methodology for calculating effort most countries indicated that the same procedure is used for both data calls, typically where DaS is calculated from the logbook departure and arrival dates/times or from sales notes where one entry represents one DaS. There were some exceptions:

- One country indicated that fishing time is provided in hours and transformed to DaS so may lead to differences because of the specifications of each data call,
- One country indicated that for WGBYC DaS are provided but for the RDB the DaS records more accurately reflect Days Fished,
- Conversely another country indicated that they submit DaS to the RDB and Days Fished to WGBYC (note: this has been highlighted to WGBYC who will clarify the field definition in future data calls.

In relation to calculating effort for different fleet vessel size segments (under and over 10m) some countries indicated that the methodologies are the same but others indicated that there are differences in estimation approach with logbooks used for larger vessels and a combination of monthly journals, sales notes and landing declarations used for smaller vessels. It was not clear if the same or different approaches are used for each of the data calls.

4. **Possible explanations for the observed discrepancies (Q9).**

This section asked for information about the main reasons why there may be differences between the effort data estimation submitted to each database. A wide variety of explanations were provided and are listed here:

- Different variables requested/mandatory within each data call,
- Some under 10 m effort has no metier assignment so those data are not submitted,
- Error in the submission script,
- Rounding effects,
- Different metier assignments
- Differences in DaS calculation methodology between data submissions,
- Differences between logbook records and VMS ping assignments,
- Lack of harmonisation between different institutions working on the same data calls,
- Different fisheries included in each data call,
- Timing of data processing for each data call may not incorporate data corrections,
- Unclear definition of DaS in the WGBYC data call,
- Misinterpretation of the different data calls specifications.

5. **Suggested solutions and further actions (Q10).**

This section asked respondents to provide suggestions for solutions and further actions to improve consistency between the data submissions. Several countries responded with a variety of suggestions as listed below:

- Only request effort data once,
- Improved clarification on effort and DaS definitions,
- Use the RDBES when it is fully operational,
- Use a different effort parameter (i.e. not DaS),
- The same metric should be used for fleet effort and sampling effort,
- Improved communication and collaboration between institutes responsible for data estimations and submissions,
- Standardise / harmonise both datasets,
- Clarification on geographical areas of interest,
- Add new types of survey to RDB.

Conclusions:

Given the wide variety of responses returned through the questionnaire it is clear there is no single reason that explains the observed discrepancies in fishing effort data submitted through the RDB and WGBYC data calls. Various issues related to: the different timing of the data calls, communication between different institutions involved in national submissions, different approaches to metier labelling, simple errors in data extractions, descriptions of and methods used for calculating DaS, and non-standardisation of data requirements between the data calls were all highlighted as reasons why differences in submitted effort levels might exist between the data calls.

Some of the highlighted issues have already been resolved, e.g. error in scripts and the ambiguous description of "Days at Sea" provided in the WGBYC data call guidance notes. Other sources of discrepancy highlighted by this exercise remain but have now been identified, and if these are considered significant, they can be addressed. This should help improve the overall quality and consistency of fishing effort data across countries.

The upcoming transition from the RDB to the RDBES will help in this regard as some data fields such as DaS will be mandatory in the RDBES (but are not in the RDB). Other parallel work is also ongoing to ensure that observations of protected species bycatch can be held within the RDBES and because of these developments when it is fully operational WGBYC will likely use the RDBES as the main data source of fishing effort and sampling data for bycatch assessments.

Fishing effort data are regularly used by numerous ICES working groups, including WGBYC, and are one of the fundamental components in the production of bycatch mortality estimates and risk assessments, and along with bycatch rates estimated from sampling programmes and abundance estimates help to improve our understanding of the impacts of fishing activity on many non-commercial and protected species populations and in the development of bycatch management measures. To ensure that any measures introduced on the basis of such mortality assessments are appropriate (i.e. effective and proportionate) it is important to improve data quality across all the main data elements used in bycatch assessments.

3.3   Workshop on Estimation of Commercial Catches III – Rare events / species (WKRARE)

Estimating the impact of commercial fisheries on PETS is dependent on multiple sources of data. WGBYC and WGCATCH have provided best practice guidelines and recommendations on how to improve the data collected from existing commercial catch sampling schemes. At present there is a need to identify standards and criteria on, not just the way the data is collected, but the process of analyzing and deriving estimates to help improve on the confidence in any estimates made, particularly when dealing with data from sampling strategies not specifically designed for estimating by-catch.

3.4   Inventory of sampling programmes conducted to collect PETS bycatch data

WKPETSAMP (ICES 2018) compiled an inventory of the various sampling programmes that provide information on incidental bycatch at the national level. These programmes include regular Data Collection Framework (DCF) at-sea sampling programmes as well as other national monitoring programmes and directed studies that focus on protected species bycatch.

The inventory provides an opportunity to get an overview of all programmes and studies collecting information on protected species bycatch. The existence of such an overview provides end users of the data, such as ICES WGBYC, the potential to assess what data should be available and to identify gaps to help further improve data collection efforts. It may also be useful to and inform expectations on where, for example, bycatch rates can be appropriately generated. This is of increasing importance as more focus is put on quantifying bycatches in fisheries in connection with sustainability accreditation schemes but also because of the broadening scope of the Common Fisheries Policy (Council Regulation 1380/2013) within EU as it moves towards the proper implementation of the Ecosystem Approach.

However, it is important that the inventory is managed and kept up to date in order to maximise its utility. **WKPETSAMP thereby recommended that WGBYC get the responsibility to gather and maintain an inventory of various sampling programmes providing data on protected species bycatch conducted by ICES countries.** This includes regular DCF at sea programmes, other national sea sampling programmes (including dedicated bycatch monitoring programmes) and directed studies that target protected species bycatch.

WGCACTH and WGBYC agreed that WGBYC will be the responsible to maintain this inventory updated. This inventory will be accessible at an ICES specific github (**https://github.com/ices-eg/wg_WGBYC**) and both WG members will have access to it. In addition, WGCACTH will co-operate reviewing this inventory at annual bases and include any new programmes that WGCATCH members are aware.

4 ToR d) Review and collaborate with WGRDBESGOV on design-based sampling and estimation

Overview of the on-going development work with the RDBES and review of intersessional work on selections methods

The three estimations workshops will support the development of design-based estimation within the RDBES.

4.1 Presentations

Henrik Kjems-Nielsen gave an overview of recent RDBES development made by the ICES Secretariat and the RDBES Core Group.

4.2 Selection methods

WKRDB-POP, 2019, recommends that WGCATCH "Evaluate the code list for the "selection method" design variables in the RDBES data model and provide guidance on how to decide when each value should be used. This will be particularly useful to help national institutes decide whether their practical sampling techniques should be considered as, for example, simple random selection or expert judgement"

Based on the above recommendation an intersessional group was formed with people from WKRDD-POP and WGCATCH. The group meet several times in 2020 with the aim of securing similar interpretation of none-probabilistic methods and support the different methods used across the community. One of the overall design goals of the RDDES is to secure that the need for external documentation is minimized, therefore the group discussed the aim of the selection methods – is the aim to guide the estimation without the need for external documentation? - Or is the aim to describe the actual selection procedure? In a perfect world both aims would be supported. In reality some of the none-probabilistic methods e.g. judgemental sampling will require so many different codes to describe the specifics relevant for different end-user, that the group decided that the main focus should be on the description of the selection procedure, but also convey some relevant information for analysis e.g. for judgemental sampling the message is "Sampling institutions should be consulted ahead of estimation for evaluating fitness for purpose". The aims were achieved by creating new codes for none-probabilistic selection methods and descriptions thereof.

The updated codes and descriptions was thoroughly reviewed during the WGCATCH 2020, both in subgroups and plenary, and the feedback was used by the intersessional to further refine the codes and descriptions thereof.

The updated codes and descriptions has been implemented in the RDBES and can be found in an annex in the documentation of the RDBES data model[13]. Further, the codes for selection

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[13] https://github.com/ices-tools-dev/RDBES/blob/master/Documents/RDBES%20Documentation%20of%20the%20Data%20Model.docx

methods have been adopted in the templates for the EU Work Plan for data collection in the fisheries and aquaculture sectors.

At the time of WGCATCH 2020 WGRFS had an intersessional group looking into new emerging methods for sampling. It was suggested that WGCATCH could join forces with WGRFS in respect to none-probabilistic selection methods, since it seems that these often will be an inevitable part of future data collection. The idea would be to look at how the quality can be judged e.g. methods for evaluating the quality of groups of selections methods, which is especially relevant to convenience and judgement sampling.

5   ToR e) Collaborate in the advisory process, liaising with assessment groups and benchmarks on commercial catch issues

Benchmark process, recommendation regarding data calls and describing the estimation

5.1   Benchmark process

In 2019 WGCATCH recommended to PGDATA and ACOM that the current benchmark process for data compilation of commercial catch data are reviewed and updated with contribution from WGCATCH. Further, one of WGCATCH new ToR is 'Collaborate in the advisory process, liaising with assessment groups and benchmarks on commercial catch issues' (ToR e)). Before the 2020 meeting the WGCATCH chairs had a meeting with the chairs of the Benchmark Oversight Group (BOG) to discuss the potential role of WGCATCH in the benchmark process, see meeting notes in Annex 6.

The suggestions from the BOG meeting was discussed at the WGCATCH 2020 meeting and the conclusion was that WGCATCH would like to play an active role in the development of a checklist for the benchmark data evaluation workshops (DEWK's) in respect to topics relevant for commercial catches e.g. LPUE / CPUE. The discussion of WGCATCH's role in the benchmark spawned a discussion on how the group could play a role in raising the quality of data asked for in benchmark data calls, see next paragraph.

5.2   ICES data calls

WGCATCH 2020 Recommendation to ACOM on data calls including commercial catches

Include ICES Data Centre as receiver

(The recommendation has also been communicated through WKNSEA 2021)

There is a clear framework of set dates and formats for the annual provision of ICES advice. This allows both the secretariat and stock assessment and advice WGs to plan their work and provide timely advice. WGCATCH recommends:

That ICES include data calls into this framework, to allow data providers, and related ICES WGs, to plan their work and to ensure the best quality and quantity of data are provided. Specifically:

- A standard format and checklist for data calls is developed to ensure all information required by the data provided is included in a clear and standard structure.
- Stock assessment data calls should request only an update of the previous year's data and the deadlines for these data calls should be extended to 2 months.
- The deadlines for all data calls requiring time series of data or new data, for example benchmark data calls, should be extended to 4 months. The extent of the time series requested should be clearly specified.

- For time series of data or new data requests, a preparatory data call should be released, before the data call is prepared, requesting information on sample sizes and years available.
- WGCATCH representatives are involved in preparation of the data calls in the same way as the stock assessors and stock co-ordinators.
- A standard timeline of dates is introduced for benchmark data calls as outlined in the table below.

Timeline for a benchmark in year y **Additional or changed timelines are included in bold.**

Date	Action
Spring y-2	WGs discuss benchmark stocks at their annual meetings
November y-2	WGs provide list of desired stocks for benchmarks for year y
March y-1	ACOM approves list of stocks with justification
Spring y-1	**Secretariat, stock assessors, WGCATCH formulate data calls**
May y-1	**Benchmark data calls released with 4 month-deadlines**
Summer y-1	**WKbenchmarkname-DP online *described below**
Late Oct y-1	Data call deadlines
Nov y-1	Data compilation WKs
Feb y	Benchmark WKs

WKbenchmarkname-DP (Data Preparation)

A series of 3 short (2–3 hour) online meetings of WGCATCH members and data providers to discuss the data call, issues lists, availability and quality of data, and feasibility of providing the data. The meeting would be chaired by members of WGCATCH and report to WGCATCH and WKbenchmarkname-DC. The stock assessors for each stock in the data call would be invited to present the issues list at the first meeting. Data availability would be discussed at the second meeting. Lack of data and concerns or quality issues would be discussed and summarised in the third meeting. The WK would report to WGCATCH and WKbenchmarkname-DC (Data Compilation) and WKbenchmark.

Rationale

WGCATCH acknowledges and very much appreciates the progress ICES has made in standardising the format and timelines of the Fisheries Advice data call. However, this has not yet fed through to the process for other data calls, and WGCATCH believes these processes could be formalised further, as is the case for the stock assessment and advice process.

In particular the short deadlines (1 month) allowed for the provision of long time series of data, or of new data, does not leave sufficient time for appropriate quality control, leading either to incorrect, or incomplete data being provided. If data providers have planned leave during this month, there is the possibility that key data may not be provided.

In autumn 2020, data providers have been issued with 4 major data calls, with deadlines within 2 calendar months, listed below. Some of these data calls, and/or the quantity of data being requested, have come as an unexpected surprise to the data providers. Although each deadline has allowed one month, the overlap of the data calls means that in practice, the data providers in institutes have as little as two weeks to prepare the data calls. The deadlines of these data calls also conflict with key meetings in the ICES calendar for data providers, or other planned work within the institute, and a choice has to be made within institutes as to which commitments to

fulfil. Any combination of these issues has a substantial negative effect on the workload of data providers, which is not sustainable longer term.

A standardised timetable of when to expect large data calls, increased involvement of data providers in the development of data calls, and in coordinating the delivery of data, and longer timelines with which to prepare and fully quality control historical or new data will solve these issues. In addition, a more coordinated approach to data calls within the context of other ICES requirements (meetings, other data calls, other work planned) is required. Examples of issues with recent data calls are listed below.

Benchmark and other additional data calls in autumn 2020

- RDBES, issued 27/5/2020, deadline 30/09/2020. Data requested: Data for 2019 for around 8–10 stocks. Format: the new RDBES format – requiring substantial recoding, but with a realistic deadline allowing time for this.
- WGScallop, issues 12/08/20, deadline 18/09/2020. Standard 1 month-deadline. Data requested: Registered landed weights and effort. Format: non-standard format, requiring recoding, not submitted to InterCatch. Data call for 10 years of data but with standard 1 month-deadline
- WKNSEA, issued 25/09/20, deadline 24/10/20, updated to 06/11/20. "As far back as possible". Sole, cod, DGS. Sole standard format submitted to InterCatch. Cod, new areas, submitted to intercatch, DGS not submitted to intercatch, different format, requiring recoding but not clearly specified.
- WKWEST, issued 20/10/20, deadline 19/11/20. A list of stocks under WGHANSA, WGWIDE, WGCSE and WGBIE. Some of the reported data types should be submitted to InterCatch, other to data.call@ices.dk without a clear format. For most of the stocks, data are requested "As far back as possible". Mixing of metiers and InterCatch fleets.

Issues in Recent Data calls

- Data requested without species list (WGBYC 2019).
- Data requested with indeterminate time span (WKNSEA 2021, WKWEST 2021)
- Data requested with no set format (WKWEST 2021, WKNSEA 2021 (recreational))
- Data requested with non-standard format (WGEF 2018, WKNSEA 2021, WKWEST 2021).
- Data requested at non-standard, too high resolution (WKWEST 2021).
- Deadline updated due to unrealistic deadlines and issues with the data call (WKNSEA 2021).
- Vast quantities of data requested without a clear plan as to what will be done (WKNSEA 2021).

Standard data call template

ICES already has a template for data call, but the group is experiencing that more and more of the benchmark data calls are difficult to overview and sometimes unclear, see points above. Therefore, the group decided to draft a template as an input to the development of more structured data calls that gives a better overview of what is asked.

It was decided to do the work intersessionally with the following draft ToR's

a) Review data call from the last year

b) Draft standard data call – ICES has a template for Data calls

5.3 Liaise with assessment working groups

Communication of sampling design and estimation to end-users

During the last couple of years WGCATCH has put a lot of work into the development of excel templates for description of sampling design and estimation. The aim was to have very detailed templates that could be summarized for end-users. Populated templates was used to give an overview of present discard estimation in the 2019 report. In parallel PGDATA, and later WGQUALITY, have develop a Commercial Catch Sampling Summary template, which gives an overview of sampling design and estimation procedures. So there has been a lot of development in respect to standardized ways of communicating sampling designs and estimation procedures to end-users, but all of the templates needs to be tested to see how well these convey structured and relevant information, especially for end-users working with multi-national time series.

Triggered by a recommendation from WGNSSK 'Report on any issues in catch data, e.g. overview and changes in ALK filling methodology for catch data. Quick presentation to WG to open up channels of communication' it was decided to continue the work. The discussion at the meeting was focused on the pro and cons with written vs. tabulated documentation and how overviews can be extracted from detailed tabulated overviews.

It was decided to continue the work intersessional with the following draft ToR's

a) What is important to communicate
b) How to communicate (templates, documents with text | algorithms)
c) Populate with (at least) information relating to sol.27.7d and cod.27.47d20
d) Present at WGNSSK and summarise feedback
e) Feedback to WGCATCH

6   ToR f) Collaborate with other groups

Presentation from other relevant ICES groups in plenary

David Currie gave an overview of work achieved in **PGDATA** (ICES Planning Group on Data Needs for Assessment and Advice) and the transition to **WGQUALITY** (ICES Working Group on the Governance of Quality Management of Data and Advice), Steven Mackinson presented the work intended at **WKDSG** (ICES Workshop on Standards and Guidelines for fisheries dependent data), Brett Alger presented the outcome of **WGTIFD** 2020 (Working Group on Technology Integration for Fishery-Dependent Data), Jens Rasmussen presented the new **ICES - Data Science and Technology Steering Group**, where WGCATCH belongs, and Henn Ojaveer presented **ICES Roadmap for bycatch advice on protected, endangered and threatened species.**

All presentations can be found at the WGCATCH share point.

Many of the presentations resulted in lively discussions afterwards. One of the more concrete suggestions was to develop, together with WGTIFD and WGRFS, an inventory of new technologies and novel approaches used in data collection.

Annex 1:   List of participants

Name	Institute	Country (of institute)	Email
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More or less random pictures of WGCATCH 2020 participants
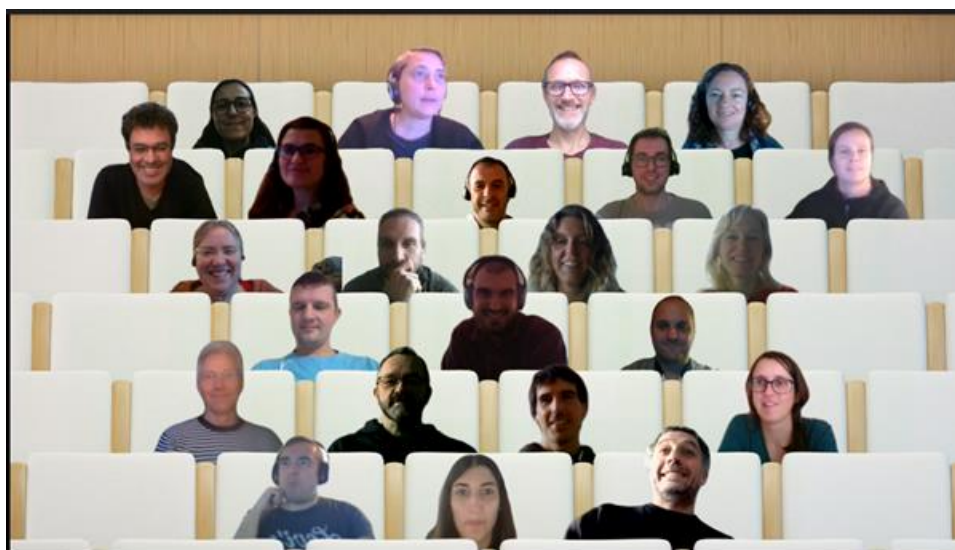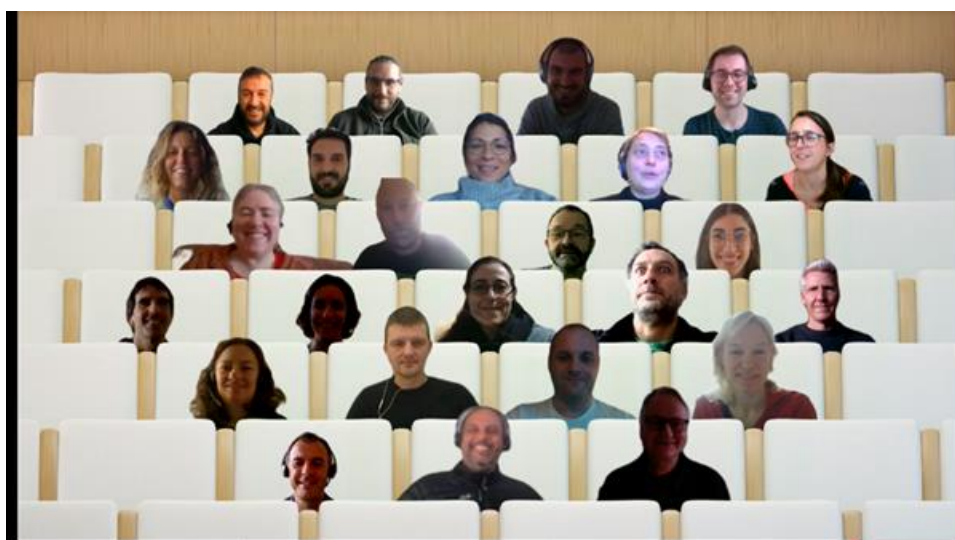
Annex 2:   Resolutions

A **Working Group on Commercial Catches (WGCATCH)**, chaired by Kirsten Birch Håkansson (Denmark), and Estanis Mugerza (Spain) will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2020	09-13 November	Online meeting	Interim report by 15 January to EOSG	Estanis Mugerza (Spain) is new co-chair for 2020-2022; Kirsten Birch Håkansson (Denmark) ends 3-yr term as chair; new co-chair will be appointed
Year 2021	08-12 November	San Sebastian (Spain)	Interim report by 15 January to DSTSG	Estanis Mugerza (Spain) and Liz Clarke (Scotland)
Year 2022	To be determined	To be determined	Final report by 31 January to DSTSG	Liz Clarke (Scotland) Estanis Mugerza (Spain) ends 3-yr term as co-chair; new co-chair will be appointed

ToR descriptors[1]

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN TOPICS ADDRESSED	DURATION	EXPECTED DELIVERABLES
a	Review and update guidelines and best-practices for implementation of statistically sound catch sampling and estimation thereof.	Many ICES member states are moving towards more probabilistic catch sampling designs. For consistent data use in time series it is necessary to document these changes and to update guidelines and procedures, particularly in regard to practical sampling issues that make a strict probabilistic approach unfeasible as demonstrated by case studies. The update will revise the survey designs classes for catch-sampling programs (WKPICS) in the light of the RDBES and couple it with basic design-based estimation.	3.1, 3.2, 3.3, 3.5, 3.6	3 years	Based on real case studies produce a Cooperative Research Report (CRR) with updated guidelines for on-shore and off-shore sampling of commercial catches (2022). Develop 3 workshops on estimation Ratio estimators, WKRATIO (2021) Post-stratification, WKPOST (2021) Estimation of rare species or events, WKRARE (2022) Based on WKRATIO produce a Cooperative Research Report (CRR) with best practice guidelines for

		With ICES moving to a transparent framework for estimating catch parameters, and thereby putting more focus on estimation, good guidelines are needed to support this transition.

There is also an increasing need to design commercial sampling programmes in multi-purpose context, to answer the multiple end-users needs. WGCATCH will continue to propose and endorse WK with the aim of a future optimization at national/stock/regional levels. WKRARE will be planned together with WGBYC.

There are increasing examples of the use of other data sources (e.g. grading machines, EM technology) that could be used in estimation. Therefore, there is need to develop guidelines on how QA data and how to combine different data sources. This needs to be developed in cooperation with WGTIFD | | | choosing and using ration estimators (2022) |
| b | Review developments in sampling and estimation practices of catch, effort, length and age distributions and other biological parameters of small scale fisheries | WGCATCH continues to review developments for collection of transversal variables (landings, discards and PETS by species, fishing effort) and biological data, length and age distributions, other biological parameters) in small-scale fisheries (SSF) to ensure that the collection of fishing data from SSF across ICES member countries are sufficient, harmonised and comparable and to improve their effectiveness. | 3.1, 3.2, 3.3, 3.5, 3.6 | 3 years | Update and refine risk assessment for transversal data quality methodology developed in 2018/2019 (comparison with Large Scale Fleets and scientific estimates) – 2020

Document sampling effort of biological data on SSF – 2020

Develop guidelines for SSF biological data sampling. 2021-2022

Peer-review publication on SSF- 2020

Continue to develop best practices guidelines on |

		During its term the WG will focus mainly on five? aspects: 1) evaluate the implementation of guidelines for transversal variables and continue the development of quality indicators and quality checking methodologies ; 2) document sampling effort and develop guidelines for biological data (length and age distribution, other biological parameters) sampling on SSF; 3) knowledge-sharing on how to improve data collection for SSF (e.g. add a social dimension to understand how to improve data collection, assess the usefulness of sampling approaches, use of new technologies), 4) analysis of the catch fraction of the SSF to evaluate the impact in the populations of different target species and 5) continue to work on the proper integration of SSF data with their specificities into the RDBES database			sampling and census data for SSF transversal variables-and evaluate its implementation 2020-2022
c	Review developments in sampling and estimation of incidental by-catch of Protected, Endangered and Threatened Species (PETS) and other rare species and ensure that database structures support the implementation of the appropriate estimation procedures. .	The sampling and estimation of incidental catches of PETS and other rare species in commercial fisheries has been a long-term ICES concern. WGBYC and WGCATCH are two ICES EGs involved in data compilation and estimation of such rare events and impacts and have been collaborating closely to ensure that by-catch is properly sampled and estimated in national sampling programmes. To improve collaboration between the two groups, WGBYC members participated in the last	3.1, 3.2, 3.3, 3.5, 3.6	3 years	Continue to support RDBES development to ensure by-catch data is included in the RDBES (2020-2022). Annual reporting. Review bycatch estimations of PETS and rare species by other expert groups (2020-2021). Annual reporting. Report on - and support on board sampling practices at national institutes with regard to PETS (2020-2022). Annual reporting. Report on - and support redesign of national databases with regard to PETS

		WGCATCH meeting to reviewed best practices for sampling protocols for incidental by-catches. The roadmap for ICES by-catch advice describes the science needs, and a path for ICES to strengthen its advice on incidental by-catch. WGCATCH has an important role in the roadmap by developing sampling protocols for estimating PET bycatch risk and by improving data availability and quality (e.g. through monitoring).

Further work still to be developed particularly in relation to estimation procedures for rare species and ensure the incidental by-catches are included in the RDBES. | | | (2020-2022). Annual reporting. |
| d | Review and collaborate with SCRDB on design-based sampling and estimation. | The RDBES is the practical tool for ICES to ensure the quality and transparency of commercial catch data. WGCATCH has always supported the development of the RDB and now the RDBES. Its knowledge and expertise on the underlying sampling designs are critical to the appropriate use and implementation of the estimation procedures required by the ICES advisory process. The ICES Data Centre and SC-RDB have requested 'WGCATCH to continue advising RDBES development and ensuring the development encompasses statistically sound sampling schemes and proper methods of estimation'. | 3.2, 3.3, 3.6 | Routine ToR | Address specific recommendations from the SCRDB and RDBES associated working groups |

| e | Collaborate in the advisory process, liaising with assessment groups and benchmarks on commercial catch issues | Commercial catch data is a major input to ICES stock assessments. The accuracy of commercial catch data is highly dependent on the quantity and quality of the sampling and estimation carried by at national level and stock coordination level. WGCATCH is the ICES EG that deals with sampling design, estimation and quality of commercial catch data that is provided to the assessment process by the national authorities. It is a key-player in informing on the quality of the time series used and suggesting improvements to sampling and estimation methods. Over 2020-22, WGCATCH will work with the ACOM legacy groups and Fisheries Resources Steering Group (FRSG) to have a more active participation in the assessment and benchmark processes. | 3.1, 3.2 | Routine ToR | Address specific recommendations from assessment expert groups in relation to commercial catch data to be used/revised in future benchmarks

Actively seek involvement in a review and updated of the current benchmark process for data compilation of commercial catch data, so these take resent WGCATCH findings into account |
| f | Collaborate with other ICES groups dealing with other aspects of catch data (e.g., WGBIOP, WGRFS, PGDATA, WGTIFD, and WGBYC), RCGs (LM) and commercial catch focused external projects. | WGCATCH links with ACOM, SCICOM, EOSG, EGs under EOSG (e.g., PGDATA, WGBIOP, WGRFS) and the ICES secretariat to inform on guidelines on quality and quantity of catch data. WGCATCH further links and obtains information from research projects that address sampling and estimation of commercial catches | 3.1, 3.2 | Routine ToR | |

Annex 3:   Agenda

Time	Monday		Tuesday		Wenedsday		Thursday			Friday
09:00-10:00										
10:00-10:30	WK ToR's & recommendations, agree agenda, practicalities & round the table		WKDSG - presentation (Steven Mackinson)		ICES - Data Science and Technology Steering Group - presentation (Jens Rasmussen)		Roadmap for ICES bycatch advice - presentation (Henn Ojaveer)			Present results from ToR a), b), c) & d) and agree plans for intersessional work
10:30-11:00			ToR a.2)	ToR b)	ToR a.1)	ToR b)	ToR a.1)	ToR b)	ToR c)	
11:00-11:30	Present ToR d) - Introduce selection methods									
11:30-12:00	RDBES - presentation (Henrik Kjems-Nielsen)									
12:00-13:00	Break		Break		Break		Break			Break
13:00-13:30	ToR a) Intro	ToR b)	ToR a.2)	ToR b)	ToR d) - Selection methods		WKRARE ToR's			Discuss and agree WK resolutions, work plan for WGCATCH 2021, new co-chair, dates & hopefully venue for 2019
13:30-14:00							ToR a.3) & ToR a.4) - WKPOST, WKRATIO & WKBIOPTIM	ToR b)	ToR c)	
14:00-14:30										
14:30-15:00										
15:00-15:30										
15:30-16:00	WGQUALITY - presentation (David Currie)		WGTIFD - presentation (Brett Alger)							
16:00-17:00					ToR social)					
	Home work - work on your own									
	Common plenary									

Annex 4: Work plan

Year 1	ToR a)

- Intersessional identify relevant topics | contents for commercial sampling guidelines and come up with a framework for having ready-available and updated guidelines. Liaise with PGDATA, RDBES core group and ICES data centre in the process and take the work done by former WK's into account
- Identify practical issues with sampling of commercial catches, focusing on sampling of unsorted catches (sampling of e.g. small pelagic, fish for reduction, fish pumped into factories and processors), start solving the issues and develop tools for identification of issues. Start to develop the guidelines based on these issues, solutions and tools.
- Agree on ToRs for the post stratification WK in 2021 (WKPOST).
- Review the R-packages developed for optimization of length and age data (in separate WK: WKBIOPTIM4) and discuss results at the meeting.

ToR b)

- Intersessional produce and complete the templates to document sampling effort of biological data on SSF. Extend the 2018 questionnaire to the large-scale fisheries (LSF) and refine the risk assessment for transversal data quality methodology developed in 2018/2019, by including LSF in the risk assessment map and compare SSF and LSF status. Assess the differences between scientific estimate and control data.
- Document sampling effort of biological data on SSF
- Continue to develop best practices guidelines on sampling and census data for SSF for transversal variables and evaluate its implementation
- Following development of RDBES database and making recommendation for the proper integration of SSF data and their specificities into
- Peer review publication on SSF
- Annual chapter in report detailing work progress, next work-plan and deliverables

ToR c)

- Continue to support RDBES developments
- Report and support on board sampling practices at national institutes, including re-design of national databases
- Initiate review of by-catch estimations of PETS/rare species by other expert groups

ToR d)

- Intersessional liaise with PGDATA and ACOM to start the process of giving WGCATCH (as a proxy for commercial catches) a more active role in the assessment and benchmark processes.

ToR e)

- This ToR will be dealt with on a yearly basis by WGCATCH.

ToR f)

- This ToR will be dealt with on a yearly basis by WGCATCH.

Year 2	ToR a)

- Continue updating and developing the guidelines for commercial sampling.

- Identify issues with sampling designs, focusing on sampling of sorted landings on-shore (sampling of e.g. fish for human consumption sold at auctions and other landing sites), start solving issues and develop tools for identifying issues. Start to update and develop guidelines based on the issues, solutions and tools.
- Intersessional identify relevant topics | contents for guidelines on estimation of catch parameters and come up with a framework for having ready-available and updated guidelines. Liaise with the RDBES core group take the work done by former WK's into account, including WGCATCH's estimation WK's in 2021 and former RDBES WK's
- Review outcomes of WKRATIO and WKPOST. Start producing best practices for estimation

ToR b)

- Develop guidelines for SSF biological sampling
- Continue to develop best practices guidelines on sampling and census data for SSF transversal variables-and evaluate its implementation
- Following development of RDBES database and making recommendation for the proper integration of SSF data and their specificities into
- Evaluate the use of geospatial data (e.g. GPS, AIS) to improve effort estimates and produce guidelines
- Annual chapter in report detailing work progress, next work-plan and deliverables
- Identify stocks for case-studies to analyse the length frequency between SSF and LSF

ToR c)

- Continue to support RDBES
- Report on - and support on board sampling practices at national institutes, including re-design of national databases
- Continue review of by-catch estimations of PETS species by other expert groups
- Intersessional liaison with WGBYC and draft ToRs for a WK that addresses estimation of rare things (e.g. species, events) (WKRARE, 2022) in the following year. Taking the review of present methods into account. Approve proposed ToR's at the meeting

ToR d)

- Intersessional liaise with PGDATA and ACOM to start a process of giving WGCATCH (as a proxy for commercial catches) a more active role in the assessment and benchmark processes

ToR e)

- This ToR will be dealt with on a yearly basis by WGCATCH.

ToR f)

- This ToR will be dealt with on a yearly basis by WGCATCH.

Year 3   ToR a)

- Continue updating and developing the guidelines for commercial sampling.
- Identify issues with sampling designs, focusing on sampling of sorted landings at-sea (e.g. observer programs at-sea targeting fish for human consumption), start solving issues and develop tools for identifying issues. Update and develop guidelines based on the issues, solutions and tools.
- Continue updating and developing the guidelines for estimation, taking the work from WKRARE (2022) into account.

ToR b)

- Intersessional produce and issue an informal data call for provision of length frequency data, from the stocks identified in previous meetings
- Analysis on length frequency data from SSF and LSF and evaluate the relevance and impact of SSF data for the stock assessment
- Develop guidelines for SSF biological sampling
- Evaluate the use of geospatial data (e.g. GPS, AIS) to improve effort estimates and produce guidelines
- Continue to develop best practices guidelines on sampling and census data for SSF transversal variables-and evaluate its implementation
- Following development of RDBES database and making recommendation for the proper integration of SSF data and their specificities into
- Annual chapter in report detailing work progress, next work-plan and deliverables

ToR c)

- Continue to support RDBES
- Report on - and support on board sampling practices at national institutes, including re-design of national databases
- Review outcomes of WKRARE and update guidelines | best practice (from ToR a) in accordance

ToR d)

Intersessional liase with PGDATA and ACOM to start the process of giving WGCATCH (as a proxy for commercial catches) a more active role in the assessment and benchmark processes.

ToR e)

- This ToR will be dealt with on a yearly basis by WGCATCH.

ToR f)

- This ToR will be dealt with on a yearly basis by WGCATCH.

Annex 5:   Workshops proposed

WKRATIO

The resolution has been approved[14]

WKRARE – notes from WGCATCH 2020 plenary

20XX/2/EOSGXX The **Workshop on Estimation of Commercial Catches III – Rare events / species (WKRARE)** chaired by XXX (XXX) and XXX (XXX), will meet in XXX, XX-XX XXX 2022 to:

Note from WGCATCH 2020:

Other relevant groups: WKSHARK

Lead the development of the WK resolution: co-chair of WGCATCH & WGBYC intersessional. Ready for WGCATCH 2021

How to analyse data on by-catch species and how to interpret the data collected from improved sampling strategies.

Topics / Methods: zero inflated approaches – a lot of data and modeling. Post-processing of already collected data or developing methods for sampling. The latter is still in the mist.

Estimating the impact of commercial fisheries on PETS is dependent on multiple sources of data. WGBYC and WGCATCH have provided best practice guidelines and recommendations on how to improve the data collected from existing commercial catch sampling schemes. There is a need to identify standards and criteria on, not just the way the data is collected, but the process of analyzing and deriving estimates to help improve on the confidence in any estimates made, particularly when dealing with data from sampling strategies not specifically designed for estimating by-catch.

1. *Identify criteria and best practices for designing a multipurpose programme for sampling and estimating by-catch of rare events.*
2. *Using case studies covering different sampling strategies (Denmark REM, Iceland Cod, UK SMRU observer, Dutch Freezer Trawler observer (, French stranding data) - for example) test these standards and criteria.*
3. *Derive recommendations for existing and non-dedicated programmes which might include the monitoring of PETS… and guidance on how data on rare occurrences may be used and estimates may be derived and can be used.*
4. *Screening of data before. Distinguish between true zero's | not – sampled consistent throughout the time series (on-going in WGBYC)*
   a. *Understand sampling designs – identify programs suitable for estimating (on-going in WGBYC)*
   b. *Understand protocols – relevant for identifying TRUE zeroes*
5. *Auxiliary information to understand what's going on –*
   a. *(fishery independent surveys (mimicking commercial fisheries) | fishery dependent (studies around e.g. EM, study of specific species) to confirm where/why by-catch)*
   b. *Xxx*

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[14] https://www.ices.dk/about-ICES/Documents/Resolutions/2020%20Resolutions/DSTSG%20EGs%20Resolutions%202020.pdf

6. *How can current designs be adjusted, so overall sampling effort also covers fisheries relevant for estimating by-catch PETS. Methods for implement required designs into current designs e.g. a lot of DCF species target fisheries not relevant for by-catch of PETS*

Explore methods for dealing with zero inflated data – relevant estimating for of 'mainstream' commercial fish

    a. *Explore present methods (on-going in WGBYC)*
    b. *…..*

7. *(What products are expect – that would be nice to know)*

    a. *……….*
    b. *Present outcomes at the next WGCATCH & WGBYC meeting*

Annex 6:   Ref from meeting with BOG

Online meeting, WGCATCH-BOG interaction, 29th October 2020

Participants:

Kirsten Birch Håkansson; Estanis Mugerza; Ghislain Chouinard; Anne Cooper; Ruth Fernandez

Background:

In 2019 WGCATCH recommended to PGDATA and ACOM that the current benchmark process for data compilation of commercial catch data are reviewed and updated with contribution from WGCATCH. Further, one of WGCATCH new ToR is 'Collaborate in the advisory process, liaising with assessment groups and benchmarks on commercial catch issues' (ToR e)). This meeting aimed at discussing the potential role of WGCATCH within the Benchmark Oversight Group (BOG) before the WG meets on 9-13 November 2020.

Points of discussion:

Input from WGCATCH will be more useful at the preparatory stage of benchmarks (i.e. before the DEWK). Can WGCATCH input be taken at the Assessment Expert groups when stocks are being proposed for future benchmarks? For example, the consideration by expert groups of the guidelines produced by PGDATA in 2015 and/or others produced by WGCATCH could be mentioned in the ToRs for Assessment working groups or Benchmark workshops. The guidelines would need to be reviewed by ACOM first.

Communication to be improved. Outcomes from WGCATCH and recommendations regarding methodology to collect and analyze commercial data should be better communicated to assessment expert groups. It was suggested that a short presentation on WGCATCH could be included in the next WGCHAIRS meeting. At the same time the communication from ICES Secretariat to WGCATCH (and probably also to other "data WGs") should improve. It was agreed that WGCATCH will be informed of the upcoming benchmarks once they are approved by ACOM (usually they are approved in March of the year previous to the actual benchmark). Communication will improve once the benchmarks' "issue lists" are online and are publicly available (work in progress by the ICES Secretariat). One way for WGCATCH to "reach out" more once new guidelines/protocols are proposed is to add a recommendation to BOG suggesting to adopt and apply such guidelines.

It was also briefly mentioned that benchmarks are open workshops and WGCATCH members are very welcome to attend and contribute to those.

It was discussed whether a "check list" for the reviewers of benchmark processes could be developed by WGCATCH.

WGCATCH is considering producing an ICES Cooperative Research Report (CRR) on best practices regarding sampling and analysis of commercial fisheries data. Related to this, it was discussed whether the main points of the various guidelines produced by WGCATCH could be compiled in structured/standalone documents that are easier to circulate and to be applied.

Action Points:

1.   ACOM to consider if previous guidelines regarding best practices on DEWK should be adopted and referred to within the benchmark general ToRs.

2. WGCATCH to have a short presentation at WGCHAIRS promoting their work and how WGCATCH contributes to the stock assessment/benchmark process.

3. ICES Secretariat to inform WGCATCH about the stocks to be benchmarked once approved by ACOM.

4. WGCATCH to recommend BOG to adopt new guidelines once these are developed.

5. WGCATCH to develop a "check list" for benchmarks (TBD, future ToR of WGCATCH or satellite workshop)

Annex 7:   WGCATCH responses to recommendations made by other EGs

From WGNSSK 2020

Recommendation 48

Report on any issues in catch data, e.g. overview and changes in ALK filling methodology for catch data. Quick presentation to WG to open up channels of communication.

(this recommendation was not considered a true recommendation by ICES, but answered anyway)

Answer to 48

WGCATCH has been in direct contact with the WGNSSK chairs and will present a summary of methods used nationally for commercial catch estimates of cod.27.47d20 at the next WGNSSK meeting, spring 2021

From WKBIOPTIM 2019

Recommendation 192

Feedback on the usefulness and potential improvements of the tools.

Answer to 192

An overview of tools developed at WKBIOPTIM was given at WGCATCH 2020 and afterwards discussed in the TOR a) subgroup, more than half of the group have never used the tools, but around half of these are using optimization tools developed at their own institute and / or in other projects e.g., fishPi2, the rest use some of the tools developed.

In conclusion WGCATCH encourage everyone to test the tools and provide input to WKBIOPTIM. Further, WGCATCH encourage members developing their own tools to participate in WKBIOPTIM, so ideas can be discussed and potentially included in the common tools. WGCATCH encourage WKBIOPTIM to attract survey people and to adopt the tools to the RDBES format.

From WGBYC 2020

Recommendation 118

WGCATCH and WGSFD should work with WGBYC to deliver estimates of fishing effort (including small-scale fisheries) for 2018 and 2019 prior to WGBYC 2021 meeting.

Answer to 118

WGCACTH chairs will contact WGSFD and WGBYC chairs to discuss how to address this issue during 2021 and if it feasible to do it before 2021WGBYC meeting among the three working groups.

Recommendation 119

WGBYC recommends to RDBES, WGCATCH and the RCGs that the WGs involvement in the development of the RDBES should continue, to ensure data needs are fully met when the RDBES becomes operational.

Answer to 119

WGCATCH will follow involved in the development of the RDBES to ensure WGBYC data needs. In addition, WGCATCH will maintain the collaboration and coordination with the RCGs on this issue too.

From WKRDB-POP 2019

Recommendation 35

Evaluate the code list for the "selection method" design variables in the RDBES data model and provide guidance on how to decide when each value should be used. This will be particularly useful to help national institutes decide whether their practical sampling techniques should be considered as, for example, simple random selection or expert judgement

Answer to 35

DONE - During 2020, WGCATCH has been working intersessional with WKRDB-POP on a suggestion. The suggestion was reviewed at the WGCCATH meeting 2020 and the plan is to have a final suggestion ready mid-spring 2021. The suggestion will be sent directly to the Henrik Kjems-Nielsen in the ICES data centre and the RDBES core group

From WKRDB-EST 2019

Recommendation 12

Consider a series of workshops and training courses dedicated to model-assisted and model-based estimation (see more details in section 5.1)

Answer to 12

DONE - WGCATCH is planning three estimation workshops during 2020-2023. See WGCATCH resolution.

Annex 8: Recommendation from WGCATCH 2020

To be copied to ICES recommendation database
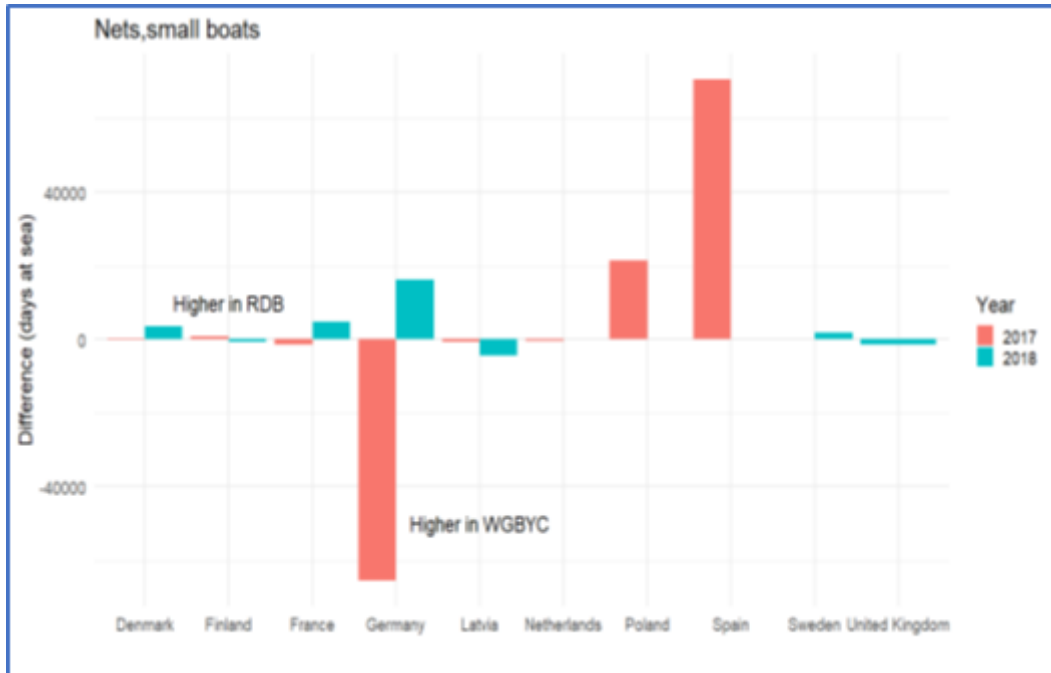
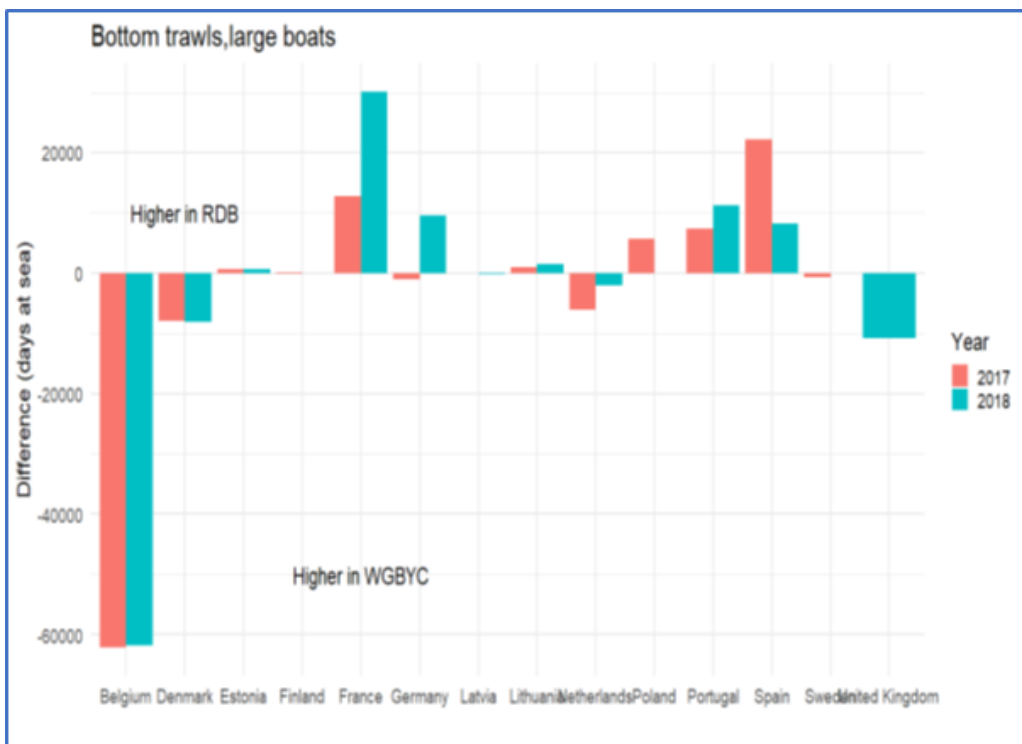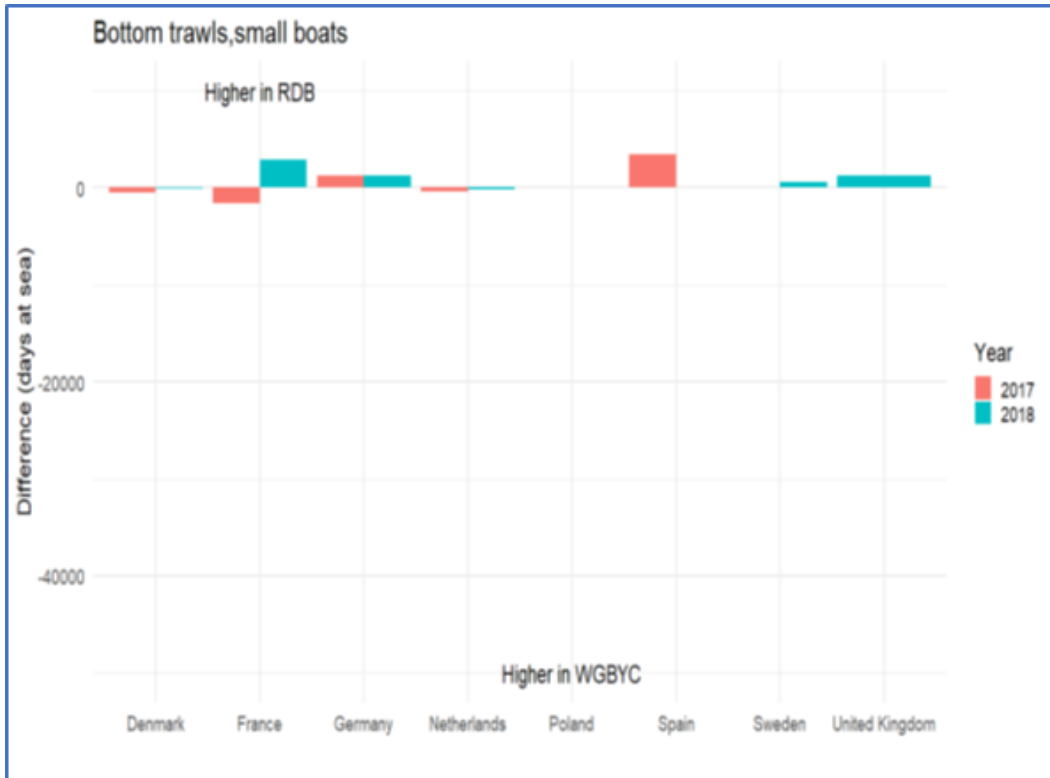| Recommendation	To
WGCATCH 2020 Recommendation on data calls including commercial catches, see section 5.2 in the WGACTCH 2020 report	ACOM, ICES Data Centre

Annex 9: Discrepancies plots in effort data and questionnaires and summary responses regarding comparison fishing effort between the WGBYC and RDB data bases

Discrepancies plots in effort

Questionnaires and summary of the responses

Questions 1, 2 - About <u>data sources</u> used for effort in the two data calls (RDB and WGBYC):

"1.	What sources of data are used to answer the data call to the RDB? (official transversal data, sampling-based data). Define what sources of data are used to estimate the under 10m fleet and the over 10m fleet effort."

2.	What sources of data are used to answer the data call to the ICES WGBYC? (official transversal data, sampling-based data). Define what sources of data are used to estimate the under 10m fleet and the over 10m fleet effort.

<u>Summary of answers from countries:</u>

		RDB							sampling
		official transversal data							
		sales notes	landings	vms	fleet register	logbook	licenses	other	
FRA (27)	ssf (<10)	yes			yes			monthly declarative forms; annual fishing activity survey	
	lsf (>10)	yes		yes (>12)	yes	yes		annual fishing activity survey	
PRT	ssf (<12)	yes			yes				
	lsf (>12)	yes			yes	yes			
SWE	ssf (<10)							yes (mandatory fishing journals)	
	lsf (>10)					yes			
BEL	ssf (<10)	no fleet							
	lsf (>10)	yes				yes			yes
CYP	ssf	not applicable							
	lsf								
DEU - Baltic	ssf (<8)	yes	yes		yes			monthly trip summary sheets	yes
	lsf (>8)	yes	yes		yes	yes			yes
DEU - North Sea	ssf (<10)	yes	yes		yes			monthly catch reports	yes
	lsf (>10)	yes	yes		yes	yes			yes
DNK	ssf (<8 Baltic, <10 North Sea)	yes							
	ssf (>8 Baltic, >10 North Sea)	(yes but not used for effort)				yes			
FIN	ssf (<10)							yes (coastal fishing journal)	
	ssf 10-12							yes (coastal fishing journal)	
	lsf (>10)					yes			
	lsf (10-12)					yes			
ESP	ssf (<10)	yes							
	lsf (>10)	yes				yes			
IRL	ssf (<10)	yes	yes						
	lsf (>10)					yes			
LVA	ssf				yes			yes (coastal logbooks)	
	lsf				yes	yes			
POL	<10							yes (monthly catch reports)	
	10-12					yes			
	>12					yes			
EST	ssf (<10)				yes			yes (coastal logbooks)	
	lsf (>10)				yes	yes			

		Does WGBYC use same data sources as RDB?	WGBYC							sampling
			official transversal data							
			sales notes	landings	vms	fleet register	logbook	licenses	other	
FRA (27)	ssf (<10)	yes	yes			yes			monthly declarative forms; annual fishing activity survey	
	lsf (>10)		yes		yes (>12)	yes	yes		annual fishing activity survey	
PRT	ssf (<12)		yes			yes		yes		
	lsf (>12)		yes			yes	yes	yes		
SWE	ssf (<10)	yes							yes (mandatory fishing journals)	
	lsf (>10)						yes			
BEL	ssf (<10)	yes	no fleet							
	lsf (>10)		yes				yes			yes
CYP	ssf		yes							
	lsf						yes			
DEU - Baltic	ssf (<8)		yes	yes		yes			monthly trip summary sheets	yes
	lsf (>8)		yes	yes		yes	yes			yes
DEU - North Sea	ssf (<10)		yes	yes		yes			monthly catch reports	yes
	lsf (>10)		yes	yes		yes	yes			yes
DNK	ssf (<8 Baltic, <10 North Sea)	yes	yes							
	ssf (>8 Baltic, >10 North Sea)		(yes but not used for effort)				yes			
FIN	ssf (<10)								yes (coastal fishing journal)	
	ssf 10-12	yes							yes (coastal fishing journal)	
	lsf (>10)						yes			
	lsf (10-12)						yes			
ESP	ssf (<10)	yes	yes							
	lsf (>10)		yes				yes			
IRL	ssf (<10)	IRL	yes	yes						
	lsf (>10)						yes			
LVA	ssf					yes			yes (coastal logbooks)	yes
	lsf					yes	yes			yes
POL	<10	yes							yes (monthly catch reports)	
	10-12						yes			
	>12						yes			
EST	ssf (<10)	ssf(<15) not submitted to wgbyc	-	-	-	-	-	-	-	-
	lsf (>10)	yes				yes	yes			

It should be noted that the questionnaire made the distinction between ssf and lsf, and set the limit between the two at 10 m; however, some countries replied with a different limit (especially at 8 m in the Baltic referred by Denmark and Germany; and 12 m in some countries).

Regarding the data sources used for the two data calls, several countries replied that the data sources were the same; this was either specifically referred to by the countries or evident from the countries' responses. In contrast, a few countries reported differences in data sources between the two data calls, though reasons are not presented (nor were they asked for in the questionnaire). These differences are highlighted in the table in red.

As for the data sources of the small scale and large-scale fleet, several countries replied that these differed, notably with logbooks not being available for the same scale fleet, leading to the need for using alternative data sources.

Additionally:

-Some countries had unclear responses that could not be clarified and included here in the summary.

-CYP replied not applicable, since it is not included in the RDB data call.

Questions 3, 4 - About <u>vessel size classes</u> covered in the two data calls (RDB and WGBYC):

"3.   Are DaS data submitted routinely to the RDB for all or only some fleet segments? If only some segments why not the others?

Most countries replied that they submit to RDB the variable Days at Sea for all fleet segments (FRA, PRT, SWE, BEL, DEU-Baltic and DEU-North Sea, DNK, ESP, FIN, LVA, POL, EST). However:

-BEL had "no under 10 m fleet active";

-ESP and DNK do not report bivalve dredge activity to the RDB, since it is not considered under the scope of the fisheries assessment and management developed in ICES;

-EST reports all vessel size classes to RDB since 2019, but before that the availability of effort data for coastal fisheries (under 12 m) was dependent on the type of fishing gear;

-CYP replied not applicable, since it is not included in the RDB data call.

4.   Are all fleet segments covered (including the under 10m fleet) in both data calls? If not, describe the segments not covered and main reasons for that."

Most countries submit data for all vessel sizes to both data calls (FRA, PRT, SWE, BEL, CYP, DEU-Baltic and DEU-North Sea, DNK, FIN, LVA, POL).

However:

-BEL had "no under 10m fleet active".

-ESP and DNK add that they submit the bivalve dredge activity to WGBYC but not RDB (as explained in question 3).

-ESP adds that RDB and WGBYC both include ICES area (North Atlantic), but WGBYC additionally includes NAFO and GSAs areas.

-EST reports all vessel size classes to RDB since 2019, but before that the availability of effort data for coastal fisheries (under 12m) was dependent on the type of fishing gear; and moreover, only reports vessels >15 to WGBY.

Questions 5,6,7,8 - About <u>methods</u> used for determination of effort in the two data calls (RDB and WGBYC):

5. Are the métiers descriptions codified using the same methodology for both data calls?

The majority of the countries (10) replied that they use the same métier codifications for both data calls, but France mentioned that there can be some minor corrections due to upload checks.

Portugal described that the métier for the RDB based is on gear in logbooks, others have no métier assigned. For WGBYC the métier is based on reported gear and catch composition. For vessels without logbooks the métier is based on the license and catch compositions

Germany (Baltic) described that differences can occur because the WGBYC métiers are calculated by haul and then corrected into trips, while the RDB métier is assigned by trip directly.

6. If all fleet segments are covered, what methodology is used to estimate the effort for both data calls? Define the effort units used and explain what methodology is used to quantify effort, for example directly recorded or estimated from other directly recorded metrics (e.g. conversion from days/hrs fished to days at sea etc).

The majority of the countries (6) it is the same for both data calls. For trips with logbooks days at sea is calculated from departure date/time and arrival date/time and a day at sea is defined as a started 24-hour period. For trips without logbooks the effort estimates are based on monthly journals/sales notes/landing declarations. One sales note represents one day at sea.

France report that fishing time is provided in hours, and then differences caused by the specifications of the two data calls.

Belgium describes that for WGBYC days at sea is used, while for RDB the days at sea represent fishing days rather than days at sea.

Spain responds that says at sea is used for RDB, for WGYBC Call (Days at sea = Total number of days at sea corresponding to fishing time" (page 13, WGBYC Data Call 2018). This can explain differences in the Spanish data.

7. If all fleet segments are covered, are there differences in methodology estimating the effort for small vessels (<10 meter) compared to large vessels (>10 meter).

6 countries replied yes. Large vessels effort estimates are based on logbooks, for small vessels effort estimates are based on monthly journals, sales notes or landing declarations

5 countries replied No, and two NA.

8. If there are differences in methodology between large and small vessels, please describe the methodology for each fleet segment, including the effort unit used.

Four countries replied that for large vessels logbook data are used, for small vessels sales notes, monthly journals or landing declarations are used to estimate effort. One sale note is counted as one fishing day.

Two countries replied no differences and 4 NA.

Question 9 relating to <u>main reasons</u> for differences in effort estimation between the two data calls (RDB & WGBYC):

- Different variables requested (France/Latvia)
- RDB data for fleet under 10m without métier assignment (Portugal)
- Mistake in the script (Belgium)
- Rounding effects (Germany-Baltic)
- Differences in métier assignment (Germany-Baltic)
- Different DaS methodology (Germany-Baltic)
- Differences in logbook and VMS ping assignment in LSF (Germany-Baltic)
- Lack of harmonization between different institutions working on same data/data calls (Germany-North Sea)

- Different fisheries included (Denmark)
- Timing of data processing may (or not) include data corrections (Finland)
- Definition of Days at Sea (Spain)
- Misinterpretation of data calls specifications (Poland)

Only 2 countries replied NA (Sweden/Cyprus)

Question 10 relating to <u>solutions and further actions</u> to avoid differences:

- Request of effort data once in time (France)
- Clarification on effort and DaS definition and truncation of DaS (France/Finland)
- Use of RDBES (Portugal)
- The use of a different effort parameter (Belgium)
- Effort parameter should be the same for fleet and sampling (Belgium)
- Improve communication and collaboration between responsible institutes/persons (Germany-Baltic & North Sea)
- Standardize the two data sets (Denmark)
- Clarification on geographical areas used (Spain - RDB does not include Mediterranean fleets)
- Add new types of survey to RDB (Latvia)
- Data harmonization (Estonia)

Only 2 countries replied NA (Sweden/Cyprus)