ISSG Métier and transversal variable issues

Background

The group has been ongoing since 2018, starting with a workshop discussing the methods used to assign métier codes to transversal data, issues and best practices, and the following years as an RCG ISSG, reports can be found here. Achievements from the ISSG over the years have been:

- Suggestion on new standardized and harmonized list of métier codes, which was approved by RCG's in 2020 and in the September 2020 Liaison meeting, it was agreed by the NCs that the new codes for métiers and reference lists can be used and implemented by the MS. Work has been done to include relevant selective devices in the codes. A table links between new and old codes (in cases that a mesh size range has been split up, a choice has been taken to link to one of them).
- Reference lists:
    - Reference species list on how to group species
    - Reference area list
    - Reference gear list
- Script that can assign métier codes using a specified data input format. It also has functionalities 1) to propose an estimate of métiers where all needed information is not available and 2) to refine the "rare" métiers firstly assigned by the general algorithm focusing on the year*vessel main métiers, in order to limit the multiplication of métiers calculated.
- Manual explaining the background, script, input format and reference lists
- GitHub repository (RCGs/Metiers at master · ices-eg/RCGs (github.com)) where all the material is available (reports, métier list, reference lists, script, manual)

In 2021, the group changed name to 'ISSG on Métier and transversal variable issues', also including a task to look at effort calculations for the small-scale fisheries. The new métier codes were requested for the 2021 and 2022 RDBES data calls.

The ISSG is chaired by Sébastien Demaneche, Ifremer, France and Josefine Egekvist, DTU Aqua, Denmark.

Work-plan

ToRs and work plan (specific tasks) for 2022/2023.

1. Continue following and evaluating the implementation of the métier codes and maintaining métier reference lists and script.

2. Advice on standardization and harmonization of métier coding on a pan-regional level (RCG NANSEA and Baltic, RCG Med&BS, RCG LDF, RCG LP).

3. Make métier descriptions from the 2022 RDBES data call (which is not a test data call for the CE and CL data).

4. Review the fecR package (calculating fishing effort) in relation to the RDBES data format.
    a. This should include a review of scenarios where no logbook data are available.
    b. Possible collaboration with ISSG SSF and RCG MED&BS on this.
    c. Possible questionnaire on fecR package (are MS using it for RDBES data preparation).

5. Link with the alternative fleet segmentation suggested by RCG Econ to enhance the link between the two approaches. Analysis of the variation in métiers within the fleet segmentation.

6. Evaluate the use of cross-validation methods in MS to combine data coming from different declarative sources. The first step could be to collect information from all countries on data availability and methods.

7. Harmonization of variables submission for AER and FDI data calls (landings, effort). In collaboration with JRC and RCG Econ participants:
    a. Follow up on issues raised in STECF EWG-21-12 regarding the inconsistencies between AER and FDI data.
    b. Discuss methodologies and make an inventory of methods used by MS to define the common variables used in the AER and FDI data calls.
    c. Discuss the definitions, clustering procedures and allocation of vessels to the fleet segment for FDI and Economic data calls.
    d. Check and compare the codes and content in the data call templates for both data calls, in case of deviations make a suggestion for changes and unification in data calls structure. Any suggestions for changes to data calls should be communicated to JRC and STECF EWG-FDI & EWG-AER.

Progress during 2022/2023

The ISSG had the following online meetings during the last year:

09-09-2022	Discussion on métier codes, based on a request from ICES secretariat in relation to old codes in the system that didn't have a corresponding new code.
07-10-2022	Discussion on métier codes, which had been requested by Spain under RCG LP, RCG Med&BS and RCG LDF, with participants invited to represent CECAF and RCG Med&BS.
26-10-2022	Discussion on roles of RCGs, ISSG and end-users, Principles for defining métier codes, and discussion on métier codes, which had been requested by Spain under RCG LP, RCG Med&BS and RCG LDF
09-12-2022	Meeting to plan ISSG tasks for the 2022/2023 term.
26-01-2023	Meeting to follow up on ISSG tasks
31-01-2023	Meeting between ISSG and RCG Econ chairs to coordinate the work on FDI-AER harmonization between the ISSG, RCG Econ and JRC/STECF EWGs.
22-02-2023	Subgroup meeting with the co-chairs of the alternative fleet segmentations workshops set up by RCG-Econ to get an update on what they are working forwards and what could be the input of the ISSG to this process.
01-03-2023	Meeting to follow up on ISSG tasks
27-03-2023	Meeting to follow up on ISSG tasks
24-04-2023	Meeting to finalize ISSG tasks and report

Roadmap/follow-up

Main outcomes and communication between the ISSG and other groups

- Evaluated requests for new métier codes in RCG Med&BS, RCG LP & RCG LDF

- Reached agreement to introduce a métier level 7 for RCG LP in STECF FDI data call
- Analysed the extent of MIS_MIS métiers uploaded to the RDBES 2022 data call for 2021 data
- Suggested pan-regional procedures for managing the list of métier codes with responsibilities of RCGs, ISSG and end-users
- Suggested to RCGs agreed principles in order to assign new métier codes if needed
- Produced métier descriptions as html documents based on RDBES 2021 data issued from 2022 data call
- Discussed issues and maintenance relating to the fecR package for calculating fishing effort. The package is now again made available in a public GitLab repository by JRC. The work on updating the package will continue at STECF FDI methodology meeting in 2023.
- Analysed the variety/variability – homogeneity/heterogeneity of métiers/gears available in the current DCF/EU-MAP fleet segmentation in the RDBES 2021 data issued from 2022 data call as preparation of the 3rd RCG-Econ workshop on an alternative fleet segmentation
- Issued a questionnaire on data cross validation methods and use of the fecR package within MS, which was sent out to NCs by RCG secretariat
- Compiled the questionnaire information received about cross-validation and combination methods on-going in MS
- Continued discussion on harmonization of variables submission for AER and FDI data calls *(landings, effort)* in collaboration with JRC
- Did a suggestion on fishing activity variables agreed procedures and methodologies for the regional work plans (ISSG RWP)

Suggestions for the next step in intersessional work (future tasks)

1. Continue following and evaluating the implementation of the métier codes on a pan-regional level and maintaining métier codes and other reference lists and script.
2. Update métier descriptions from the 2023 RDBES data call *(tables CE & CL)*
3. Based on information received from the questionnaires sent out in spring 2023, evaluate the use of cross-validation methods in MS to combine data coming from different declarative sources, the on-going common practices and develop, on this basis, best practices guidelines, with a focus on the RDBES CE and CL tables.
4. Work on a template to document CE and CL data uploaded to RDBES[1]
5. Continue following up on the development of the fecR package and its efforts to calculate fishing effort metrics that are harmonized/homogenized between MS (note: depends on the outcome of upcoming FDI meetings)

[1] The ISSG considers important that good and comprehensive documentation on exists on the transversal variables uploaded to the RDBES. Such documentation is a necessary first step in the move towards the development of best practice guidelines that ultimately take into account the large diversity of data sources and methodologies being used (e.g., with regard to SSF).

6. Continue following the development under RCG-Econ of an alternative fleet segmentation and advice on it in order to enhance and keep the link between the two approaches[2] (depending on the RCG-Econ work on this especially the feedbacks of the 3rd workshop scheduled in May 2023)

Task 1: Continue following and evaluating the implementation of the métier codes and maintaining métier reference list and script.

Within this task, requests for new métier codes are evaluated, approved and implemented. The 2023 FDI data call request the new métier codes for DCF level6 reference list for 2013-2022 data and was issued by JRC the February 22nd opening at the same time the data validation tool with the annexes and the validation tool updated consequently. The 2023 ICES VMS data call also requests the new métier codes DCF level6 reference list for the time series 2009-2022 with a deadline set on the April 14th. Consequently, it was a high priority of the ISSG to review requests for new métier codes and to update the reference list when necessary. The updated métier codes reference list by RCG was agreed in ISSG.

Simultaneously, emails were sent to RCG Med&BS and LP chairs; before the launch of the two data calls; to temporarily approve the updated métier codes reference list *(formal validation will be discussed in next RCGs meetings as it has been done for RCG NANSEA in 2022)*:

- RCG Med&BS chairs have temporarily approved the suggested codes from the ISSG and replied with preliminary comments to the recommendation. The métier list will be discussed again in the next RCG Med&BS meeting.
- RCG LP outgoing chair temporarily accepted the suggested codes from the ISSG. The ISSG is still waiting for a reply from the new chairs also for an approval of the new codifications proposed during ISSG meeting for métier DCF Level7 (i.e., using '_' instead of '()' to specify the target species). The métier list will be discussed also in the next RCG LP meeting.

Furthermore, the ICES secretariat found old codes in their system which did not have a corresponding new code. In some cases, they could be recoded to new codes, in other cases, métiers codes had to be added to the reference list. A column with the date of the addition of a métier has been added to the métier codes reference list to better follow these adjustments.

Finally, under task 2, procedures and roles between the ISSG, RCGs and end-users have been discussed, and a setup was proposed. It is suggested that new métier codes for DCF level6 reference list will be sent to RCG chairs for temporarily approval, and then they can be discussed during RCG year's meetings. When a new métier code has to be added to the métier codes reference list, both JRC and ICES should be informed, and an issue should be created on the ICES code management GitHub.

The updated métier codes reference list (at DCF level 6 and level 7) is available under the ISSG GitHub and is included in the FDI data call annexes recently issued. The list has also been sent to ICES data center and the métier DCF level 6 vocabulary //vocab.ices.dk/?ref=1647, i.e., CodeType=Metier6_FishingActivity has been

[2] ISSG still considers that a new fleet segmentation should reflect the exploitation strategy of the vessels and that this new segmentation should be linked to the métiers *(a vessel could practice several métiers during the year but belong to only one Fleet segment for the year considered which should represent its exploitation strategy)*.

updated as well as the métier DCF level 7/National fishing activity vocabulary //vocab.ices.dk/?ref=1614, i.e. CodeType=NationalFishingActivity for tuna fisheries.

1. Review of new métier codes asked for RCG LDF from Spain

Spain sent a list of métier codes to add for RCG LDF (Long Distance Fisheries). This issue was discussed among the ISSG and representatives from RCG LDF and CECAF.

It was agreed that following métiers must be added to the DCF level 6 métier codes reference list for RCG LDF:

Metier_level6	Description
OTB_MDD_>0_0_0	Bottom otter trawl, Mixed deep-water species and demersal species, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
OTB_MDD_70-119_0_0	Bottom otter trawl, Mixed deep-water species and demersal species, mesh size between 70 and 119
OTB_MDD_>120_0_0	Bottom otter trawl, Mixed deep-water species and demersal species, mesh size larger than 120
OTM_DEF_>0_0_0	Midwater otter trawl, Demersal species, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
OTM_DEF_70-119_0_0	Midwater otter trawl, Demersal species, mesh size between 70 and 119
OTM_DEF_>=120_0_0	Midwater otter trawl, Demersal species, mesh size larger than 120

For the other asked métier codes, it was agreed that they can be recoded into métier codes present in the reference list *(should then be validated by the RCG LDF in their next meeting)*.

List of long-distance métier codes asked for CECAF areas which could be recoded into code present in the reference list:

Métier code discussed	Agreement
LLS_DEF_6_0_0	Accept to be changed into the following métier code "LLS_DEF_0_0_0" depending on the general acceptance from RCG LDF in their next meeting
MIS_DES_0_0_0	Accept to be changed into the following métier code "MIS_MIS_0_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_CRU>=40_0_0	Accept to be changed into the following mesh size range "OTB_CRU_32-69_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_DEF_>=70_0_0	Accept to be changed into the following mesh size range "OTB_DEF_70-119_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_DEF_>=80_0_0	Accept to be changed into the following mesh size range "OTB_DEF_70-119_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_MCF_>=70_0_0	Accept to be changed into the following mesh size range "OTB_MCF_70-119_0_0" depending on the general acceptance from RCG LDF in their next meeting
PS_SPF_0_0_0	Accept to be changed into the following métier code "PS_SPF_>0_0_0" depending on the general acceptance from RCG LDF in their next meeting
PS_SPF_10_0_0	Accept to be changed into the following mesh size range "PS_SPF_10-31_0_0" depending on the general acceptance from RCG LDF in their next meeting

List of long-distance métier codes asked for FAO area 27 which could be recoded into métier codes present in the reference list:

Métier code discussed	Agreement
OTM_DEF_100-129_0_0	Accept to be changed into the following mesh size range "OTM_DEF_100-119_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_DWS_100-129_0_0	Accept to be changed into the following mesh size range "OTB_DWS_100-119_0_0" depending on the general acceptance from RCG LDF in their next meeting

2. *Review of new métier codes asked by RCG Med&BS*

RCG Med&BS sent a list of métier codes to be added to the reference list. This issue was discussed between the ISSG and representatives from RCG Med&BS.

It was agreed that following métiers must be added to the DCF level 6 métier codes reference list for RCG Med&BS:

Métier	Description
GNC_DEF_<16_0_0	Encircling gillnets, Demersal species, mesh size less than 16 mm
GNC_DEF_>=16_0_0	Encircling gillnets, Demersal species, mesh size larger than or equal 16 mm
GNC_DEF_>0_0_0	Encircling gillnets, Demersal species, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
GTN_DEF_<16_0_0	Combined gillnets-trammel nets, Demersal species, mesh size less than 16 mm
GTN_DEF_>=16_0_0	Combined gillnets-trammel nets, Demersal species, mesh size larger than or equal 16 mm
GTN_DEF_>0_0_0	Combined gillnets-trammel nets, Demersal species, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
LA_LPF_>0_0_0	Lampara *(surrounding nets without purse lines)*, Large pelagic fish, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
LA_LPF_<14_0_0_0	Lampara *(surrounding nets without purse lines)*, Large pelagic fish, mesh size less than 14 mm
LA_LPF_>=14_0_0	Lampara *(surrounding nets without purse lines)*, Large pelagic fish, mesh size larger than or equal 14 mm
LA_SLP_>0_0_0	Lampara *(surrounding nets without purse lines)*, Small and large pelagic species, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
LA_SLP_<14_0_0_0	Lampara *(surrounding nets without purse lines)*, Small and large pelagic species, mesh size less than 14 mm
LA_SLP_>=14_0_0	Lampara *(surrounding nets without purse lines)*, Small and large pelagic species, mesh size larger than or equal 14 mm
LA_SPF_>0_0_0	Lampara *(surrounding nets without purse lines)*, Small pelagic fish, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
LA_SPF_<14_0_0_0	Lampara *(surrounding nets without purse lines)*, Small pelagic fish, mesh size less than 14 mm
LA_SPF_>=14_0_0	Lampara *(surrounding nets without purse lines)*, Small pelagic fish, mesh size larger than or equal 14 mm
LH_SPF_0_0_0	Hand and pole lines (not specified), Small pelagic fish, no mesh size specified
LHM_SPF_0_0_0	Hand and pole lines (mechanized), Small pelagic fish, no mesh size specified
LHP_SPF_0_0_0	Hand and pole lines (hand-operated), Small pelagic fish, no mesh size specified
LLD_DEF_0_0_0	Drifting long lines, Demersal fish, no mesh size specified
LTL_DEF_0_0_0	Trolling lines, Demersal fish, no mesh size specified
LTL_FIF_0_0_0	Trolling lines, Finfish, no mesh size specified

SX_DEF_0_0_0	Beach and boat seines, Demersal species, no mesh size specified

For the other asked métier codes, it was agreed that they can be recoded into métier codes present in the reference list *(should be then validated by the RCG Med&BS in their next meeting)*.

List of other discussed métier codes asked by RCG Med&BS which could be recoded in another métier code from the reference list:

Métier code discussed	**Agreement**
DRB_MOL_0_0_0	Accept to be changed into the following métier code "DRB_MOL_>0_0_0" depending on the general acceptance from RCG Med&BS in their next meeting.
FPO_DEF_0_0_0	Accept to be changed into the following métier code "FPO_DEF_>0_0_0" depending on the general acceptance from RCG Med&BS in their next meeting.

A new list of métier codes to add to the reference list was sent from the RCG Med&BS after their September meeting. They were reviewed and discussed by the ISSG, which gave feedback with the recommendations below. The chairs of RCG Med&BS gave provisional acceptance for the below proposal added métier codes or recodification. This will be discussed at the next RCG Med&BS meeting.

Métier	**Request origin**	**Recommendations during ISSG meeting 26/1-2023**
FPO_CRU_0_0_0	List from RCG Med&BS after September meeting	Recommend using the métier code "FPO_CRU_>0_0_0"
GNC_FIF_0_0_0	List from RCG Med&BS after September meeting	The following métier codes can be added (see above) to the reference list. It is proposed to use species group DEF instead of the FIF (species group DEF preferred than FIF). Also, it is proposed to follow the mesh size ranges agreed for MBS list and passive gears (nets). GNC_DEF_<16_0_0, GNC_DEF_>=16_0_0, GNC_DEF_>0_0_0
GTN_DEF_0_0_0	List from RCG Med&BS after September meeting	The following métier codes can be added (see above) to the reference list with the mesh size ranges agreed for MBS list and passive gears (nets): GTN_DEF_<16_0_0, GTN_DEF_>=16_0_0, GTN_DEF_>0_0_0
GTR_MIS_>0_0_0	List from RCG Med&BS after September meeting	Is the target species assemblage unknown? Can one of the codes from EU-MAP be used: ANA: Anadromous CAT: Catadromous CEP: Cephalopods CRU: Crustaceans DEF: Demersal fish DES: Demersal species DWS: Deep-water species FIF: Finfish (try to avoid) FWS: Freshwater species

		GLE: Glass eel LPF: Large pelagic fish MCD: Mixed crustaceans and demersal fish MCF: Mixed cephalopods and demersal fish MDD: Mixed demersal and deep-water species MOL: Molluscs MPD: Mixed pelagic and demersal fish SLP Small and large pelagic fish SPF: Small pelagic fish For GTR, the following codes are already integrated in MBS reference list: CEP, CRU, DEF & MOL. ISSG considers that using unspecified group of species (=MIS) in the métier reference list should be avoid.
HAR_DEF_0_0_0	List from RCG Med&BS after September meeting	HAR is not listed as gear in EU-MAP table 5 (reference list used by ISSG for gear). Can one of the following métiers be used instead: DIV_DEF_0_0_0 (Diving) FOO_DEF_0_0_0 (Fishing on foot) If yes, they should be added.
LA_SLP_>=14_0_0	Request from Spain	The following métier codes can be added (see above) to the reference list: LA_SLP_>0_0_0 LA_SLP_<14_0_0 LA_SLP_>=14_0_0 LA_SPF_>0_0_0 LA_SPF_<14_0_0 LA_SPF_>=14_0_0 LA_LPF_>0_0_0 LA_LPF_<14_0_0 LA_LPF_>=14_0_0 Following mesh size ranges agreed for MBS list and purse seines gears. Including also SPF and LPF group of species if they could be assessed, it is better than SLP, mixed group of species, which at least could not be calculated from the R-script.
LH_MIS_0_0_0	List from RCG Med&BS after September meeting	Is the target species assemblage unknown? Can one of the codes from EU-MAP be used: ANA: Anadromous CAT: Catadromous CEP: Cephalopods CRU: Crustaceans DEF: Demersal fish DES: Demersal species DWS: Deep-water species FIF: Finfish (try to avoid) FWS: Freshwater species GLE: Glass eel LPF: Large pelagic fish MCD: Mixed crustaceans and demersal fish MCF: Mixed cephalopods and demersal fish MDD: Mixed demersal and deep-water species MOL: Molluscs MPD: Mixed pelagic and demersal fish

		SLP Small and large pelagic fish SPF: Small pelagic fish For LH, the following codes are already integrated in MBS reference list: CEP, DEF, FIF & LPF (+ SPF which will be added). ISSG considers that using unspecified group of species (=MIS) in the métier reference list should be avoid.
LHP-LHM_CEP_0_0_0	Request from Spain	Recommend using the métier code "LH_CEP_0_0_0" (already in the reference list)
LHP-LHM_FIF_0_0_0	Request from Spain	Recommend using the métier codes "LH_FIF_0_0_0" or "LH_DEF_0_0_0" which are already in the reference list.
LHM_DWS_0_0_0	List from RCG Med&BS after September meeting	Listed in the métier list but marked as 'to be included at regional level' as 'No'? should we include this new group of species (DWS – Deep-water species) in MBS list for LH gears? If yes the following métier codes can be added to the list: LHP_DWS_0_0_0 LH_DWS_0_0_0 LHM_DWS_0_0_0
LHM_LPF_0_0_0 & LHP_LPF_0_0_0	List from RCG Med&BS after September meeting	Already in the MBS métier codes reference list
LHP_FIF_0_0_0	List from RCG Med&BS after September meeting	Already in the MBS métier codes reference list
LHP_SPF_0_0_0	List from RCG Med&BS after September meeting	The following métier codes can be added (see above) to the reference list: LHP_SPF_0_0_0 LH_SPF_0_0_0 LHM_SPF_0_0_0
LLD_DEF_0_0_0	List from RCG Med&BS after September meeting	The following métier code can be added (see above) to the reference list: LLD_DEF_0_0_0
LLS_DEF_0_0_0	List from RCG Med&BS after September meeting	Already in the MBS métier codes reference list
LLS_MIS_0_0_0	List from RCG Med&BS after September meeting	Is the target species assemblage unknown? Can one of the codes from EU-MAP be used: ANA: Anadromous CAT: Catadromous CEP: Cephalopods CRU: Crustaceans DEF: Demersal fish DES: Demersal species DWS: Deep-water species FIF: Finfish (try to avoid) FWS: Freshwater species GLE: Glass eel LPF: Large pelagic fish MCD: Mixed crustaceans and demersal fish MCF: Mixed cephalopods and demersal fish MDD: Mixed demersal and deep-water species MOL: Molluscs MPD: Mixed pelagic and demersal fish SLP Small and large pelagic fish

		SPF: Small pelagic fish For LLS, the following codes are already integrated in MBS reference list: CAT, DEF & FIF. ISSG considers that using unspecified group of species (=MIS) in the métier reference list should be avoid.
LTL_FIF_0_0_0	List from RCG Med&BS after September meeting	The following métier codes can be added (see above) to the reference list: LTL_FIF_0_0_0 LTL_DEF_0_0_0 ISSG considers avoiding using FIF, preferred DEF which could be also calculated from the R-script.
MIS_MIS	List from RCG Med&BS after September meeting	Recommend using the métier code "MIS_MIS_0_0_0" (already in the reference list)
Misc	List from RCG Med&BS after September meeting	Recommend using the métier code "MIS_MIS_0_0_0" (already in the reference list)
SB-SV_DEF_0_0_0	Request from Spain	The following métier code can be added (see above) to the reference list: "SX_DEF_>0_0_0" ISSG considers that SX as a "mixed" gear is a codification more in line with the codifications agreed for the other gear codes.
SB_SPF_0_0_0	List from RCG Med&BS after September meeting	Recommend using the métier code "SB_SPF_>0_0_0" (already in the reference list)

3. *Métier codes in relation to movement of NAFO areas from RCG NANSEA to RCG LDF*

It has been decided to move NAFO areas from being under RCG NANSEA to be under RCG LDF. First, the ISSG updated the reference table "AreaRegionLookup.csv" available under the ISSG GitHub to consider the modification. This movement has consequences for the métiers that are allowed in the NAFO areas, as the métier codes reference lists are dependent on the RCG regions.

The ISSG checked if the métiers codes listed under the RCG LDF include all the métier codes that have already been declared in the NAFO areas in data submitted for the FDI data call and the RDBES 2022 data call. From the check in the RDBES data, all NAFO areas' métiers uploaded are listed in the RCG LDF métiers codes reference list, with the unique exception of 'OTM_DEF_100-119_0_0' which could be recoded to 'OTM_DEF_70-119_0_0' instead.

Figure 1 resumes the check done from the FDI data. Green indicates that the métier is already in the LDF métier code reference list, yellow means that the métier can be recoded into a métier code available in the reference list and red means that the métier code is not in the LDF métier code reference list. Most of the métier codes colored with red have very few fishing days (<10 fishing days in lot of the cases) and it is some years ago since they have been used. For the two métiers with more than 10 fishing days : 1) the métier code "OTB_MOL_60-89_0_0" has been used recently, but is now replaced by a new accepted métier code used by Spain *("OTB_CEP_>0_0_0")* and it could be recoded in it and 2) the métier code "OTB_MCD_0_0_0" has been used only in 2014, 2016 and 2017 by Portugal, and the code is not in use anymore. Therefore, no changes are needed on the LDF métier list in the NAFO area.

Data submitted for FDI 2014-2020 (from public effort table)

Sub-region	(Multiple Items)							Already in metier list
								Can be recoded
Sum of Total Fishing Day Colu								Discuss if the metiers need to be added
Row Labels	2014	2015	2016	2017	2018	2019	2020	Comment
GNS_DEF_80-99_0_0			1					1 fishing day in 2016. Currently no gillnet meters in LDF
HMD_MOL_0_0_0	1							1 fishing day in 2014. Currently no gillnet HMD in LDF
LHM_SPF_0_0_0		1						Is in LDF metier list
LLD_LPF_0_0_0	15	13	4	44	113	175	227	Is in LDF metier list
LLD_LPF_0_0_0 (SWO)	7994	234		9065	2436	1679	1050	Level 6 is in LDF metier list, LLD_LPF_0_0_0_SWO is in level 7 list
LLS_DEF_0_0_0	8	11	1	2				Is in LDF metier list
NK	1014	8962	7996	150	5	134	80	MIS_MIS_0_0_0 and other MIS metiers
OTB_CRU_32-69_2_22	7							7 fishing days in 2014. OTB_CRU_32-69_0_0 exists. Add wit selection panel?
OTB_CRU_40-59_0_0	210	76	153	103	115	143	159	Use OTB_CRU_32-69_0_0?
OTB_DEF_>=120_0_0			28	29				Is in LDF metier list
OTB_DEF_>=130_0_0	2051	1816	1896	1838	1650	2053	1689	Use OTB_DEF_>=120_0_0?
OTB_DEF_>=55_0_0			1					1 fishing day in 2016. Add metiers OTB_DEF_55-64_0_0 and OTB_DEF_65-69_0_0?
OTB_DEF_130-219_0_0	129	86	98	94	90	75	93	Use OTB_DEF_>=120_0_0?
OTB_MCD_0_0_0	48		2	29				Add OTB_MCD_>0_0_0?
OTB_MDD_>=220_0_0	1637	2122	1704	1897	845	266	288	Use OTB_MDD_>=120_0_0?
OTB_MDD_130-219_0_0	4470	4985	4023	4319	262	893	851	Use OTB_MDD_>=120_0_0?
OTB_MOL_60-89_0_0						10	13	Add OTB_MOL metiers?
OTM_DEF_130-219_0_0	5		29	21				Use OTM_DEF_>=120_0_0?
OTT_DEF_130-219_0_0			3			19	3	Use OTT_DEF_>=120_0_0?
PS_SPF_0_0_0			1					Use PS_SPF_>0_0_0

Figure 1: Métier codes submitted for NAFO areas for the FDI data call 2014-2020 (from public effort table)

Finally, following these two checks on RDBES and FDI data, the ISSG agreed not to add any new métier code to the métier codes reference list for RCG LDF.

4. Métier codes for RCG Large Pelagics - Introducing métier on DCF level 7 in the FDI data call

For the large pelagic fisheries, métier codes on level 7 (including target species) were agreed by the RCM Med&BS and LPF in 2014. Spain has uploaded métier codes on this level for the FDI data call and found it important to continue reporting the tuna fisheries on this level. This was discussed, and the ISSG didn't find it appropriate to include métiers DCF level 7 in the métier DCF level 6 reference list. Therefore, it was finally agreed among the ISSG chairs, DG MARE, JRC and Spain to add an optional métier level 7 code in the FDI data call, and that the codes on this level can be reported in the 'National fishing activity' field in the RDBES data call. The text below describes the background and agreements and was sent to the RCG LPF chairs for preliminary approval. It should be discussed at their next RCG meeting.

Background

The métier codes reference list has been updated to be standardized and harmonized on DCF level6 by the *RCG ISSG on Métier and transversal variables*, following EU-MAP table 5 specifications. The goal was to define an operational métier reference list on DCF level6 with harmonized/standardized codes on a regional level and across data calls/regions/countries. The DCF level6 codes are used for harmonization/standardization, and the purposes of data calls when possibility is given nationally/regionally to keep more precise métier at a national/regional level *(i.e., DCF level7)*. This updated DCF level6 métier codes reference list will be requested in the FDI data call 2023 for the time series 2013-2022. The métier on DCF level 6 combines information on gear code, target species assemblage, mesh size range and selection devices.

For tuna fisheries *(carried out by Large Pelagic Fisheries and monitored by tuna fisheries RFMOs (ICCAT, IATTC, IOTC, WCPFC & CCSBT))*, Spain has uploaded the métiers on a DCF level7 in the METIER field for the FDI data call. The métier on DCF level7 are more precise than the ones on DCF level6 and could include for example the specific principal target species in addition to the target species assemblage. The métier codes provided by Spain in the FDI data call were those agreed by RCM Med&BS and LPF in 2014. Spain highlighted that for tuna

fisheries' monitoring and evaluation, as agreed by Tuna fisheries RFMOs and RCG LPF, it is necessary to consider this level as target species assemblage remain insufficient overlapping different species composition and fisheries which should be considered separately. Otherwise, the quality of the data would be compromised. Since the codes on this level don't fit with the level 6 structure, and to keep harmonization and standardization between regions, fisheries and countries, it has been suggested to introduce an optional métier field for DCF level7 in the FDI data call to solve the issue.

It is considered also that, in the future, this field column may be used to introduce métier on DCF level7 *(at national/regional level)* to monitor specific fisheries when needed. At this stage, it was proposed to standardize the FDI data call codes on DCF level7 only for tuna fisheries *(see hereafter FDI data call specifications drawn by ISSG)* for other fisheries the field should be completed with "NA" *(not applicable)*.

FDI data call specifications

The METIER_LEVEL_7 field *(métier on DCF level7)* should be added following the METIER field as optional with the possibility to enter 'NA' *(not applicable)* for non-tuna fisheries or 'NK' *(not known)* for tuna fisheries where the métier is not known on DCF level7 in the tables A, G, H and I.

METIER_LEVEL_7: Precise métier code on DCF level7. Optional to be completed, at this stage, only for tuna fisheries under tuna fisheries RFMOs' monitoring. According to the code list provided in Appendix X; 'NK' if not known *(for tuna fisheries)* or 'NA' if not applicable *(for all other fisheries than tuna fisheries)* should be used.

The codes for the tuna fisheries *(carried out by Large Pelagic Fisheries and monitored by Tuna fisheries RFMOs)* to be used to complete the "METIER_LEVEL_7" field *(métier on DCF level7)* should conform with the code list agreed by RCM Med&BS and LP in 2014, but have in some cases been updated to follow the new DCF level6 métier codes reference list developed by ISSG:

Métier on DCF level 7	Description of target species that are added to the métier on DCF level 6	ISSG suggestion for métier codes in meeting 26/1-2023
FPN_LPF_>0_0_0 (BFT)	Bluefin tuna (Thunnus thynnus)	FPN_LPF_>0_0_0_BFT
FPN_LPF_>0_0_0 (SMT)	Small tuna (Auxis rochei, Sarda sarda and Euthynnus alletteratus)	FPN_LPF_>0_0_0_SMT
LHM_LPF_0_0_0 (BFT)	Bluefin tuna (Thunnus thynnus)	LHM_LPF_0_0_0_BFT
LHP_LPF_0_0_0 (ALB)	Albacore tuna (Thunnus alalunga)	LHP_LPF_0_0_0_ALB
LHP_LPF_0_0_0 (BFT)	Bluefin tuna (Thunnus thynnus)	LHP_LPF_0_0_0_BFT
LHP_LPF_0_0_0 (MSP)	Combination of the following tuna species: Skipjack tuna (Katsuwonus pelamis) Bigeye tuna (Thunnus obesus) Yellowfin tuna (Thunnus albacares) Albacore tuna (Thunnus alalunga) Bluefin tuna (Thunnus thynnus)	LHP_LPF_0_0_0_MSP
LHP_LPF_0_0_0 (TROP)	Combination of the following tuna species: Skipjack tuna (Katsuwonus pelamis) Yellowfin tuna (Thunnus albacares) Bigeye tuna (Thunnus obesus)	LHP_LPF_0_0_0_TRO
LLD_LPF_0_0_0 (ALB)	Albacore tuna (Thunnus alalunga)	LLD_LPF_0_0_0_ALB
LLD_LPF_0_0_0 (BFT)	Bluefin tuna (Thunnus thynnus)	LLD_LPF_0_0_0_BFT
LLD_LPF_0_0_0 (SWO)	Swordfish (Xiphias gladius)	LLD_LPF_0_0_0_SWO
LTL_LPF_0_0_0 (ALB)	Albacore tuna (Thunnus alalunga)	LTL_LPF_0_0_0_ALB

PS_LPF_>0_0_0 (TROP) PS_LPF_10-31_0_0 (TROP) PS_LPF_32-69_0_0 (TROP) PS_LPF_70-119_0_0 (TROP) PS_LPF_>=120_0_0 (TROP)	Combinaton of the following tuna species: Yellowfin tuna (Thunnus albacares) Skipjack tuna (Katsuwonus pelamis) Bigeye tuna (Thunnus obesus)	PS_LPF_>0_0_0_TRO PS_LPF_10-31_0_0_TRO PS_LPF_32-69_0_0_TRO PS_LPF_70-119_0_0_TRO PS_LPF_>=120_0_0_TRO
PS_LPF_>0_0_0 (BFT) PS_LPF_<14_0_0 (BFT) PS_LPF_>=14_0_0 (BFT)	Only for MED&BS area Bluefin tuna (Thunnus thynnus)	PS_LPF_>0_0_0_BFT PS_LPF_<14_0_0_BFT PS_LPF_>=14_0_0_BFT

The ISSG evaluated the asked métier codes proposed and suggested that 1) they are recoded with an underscore, avoiding the space and brackets in the code, and 2) a 3-letter code is used preferentially for the precision about the species or group of species targeted (i.e., TRO instead of TROP).

The ISSG stored the DCF level7 métier codes in the Github at the same place as the DCF level6 métier codes, with a code and a description field.

An additional request from Croatia was discussed by the ISSG. It was to add the DCF level 7 métier code "LHP_LPF_0_0_0_SWO" (Swordfish (*Xiphias gladius*)). The métier level 6 exists with the code LHP_LPF_0_0_0 and following level 7 codes already exist: "LHP_LPF_0_0_0_ALB", "LHP_LPF_0_0_0_BFT", "LHP_LPF_0_0_0_MSP" & "LHP_LPF_0_0_0_TRO". No one of these have Swordfish as target species. The group concluded that this code can be added to the métier DCF level7 reference list.

5. *Update and maintenance of the script to assign métiers to transversal data*

There was an issue raised that some métiers could be allocated from the script to RCGs where they are not allowed. The issue was in the steps where the missing métiers are estimated so that it only looks for métiers within the same RCG region. This has been corrected, and now the script will not assign métiers outside the relevant RCG region during this step. After running the corrected script, the resulting métiers were checked with both FDI and RDBES validations.

Another issue was raised for trips with no landings which are assigned with the dominant métier from the same vessel, but which could have declared another gear. This can be adjusted by modifying the steps, to include only those considering the declared gear when estimating the missing métier *(in these cases the métiers could not be calculated in the first steps because there is no possibility to calculate target species or group of species with zero landings*).

An additional issue was found related to the numeric fields weight and value of landings and format associated. If the numbers are thousand-separated by a space, the script would convert the value provided to NA without warning, and métiers could be incorrectly assigned. The script has been changed so that an error will be raised if the conversion of KG and EUR to numeric types fails.

6. *Update on analysis of missing métiers based on RDBES 2022 data call for Northeast Atlantic*

A/ General overview

Data were provided for one year: **2021**.

14 countries supplied data: Spain, France, Denmark, Finland, Netherlands, Estonia, Sweden, Poland, Ireland, Germany, Belgium, Latvia, Lithuania and Portugal. All the countries provided same information as "Official" or "Scientific" therefore only "Scientific" information will be presented.

Table 1 : Fishing days and landings by country provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage from the country in relation to the total effort/landings.

Year	Country	FishingDays	Landings (tons)	% FishingDays	% Landings
2021	SPAIN	390 318	245 871	**32**	**10**
2021	FRANCE	327 277	366 869	**27**	**15**
2021	DENMARK	91 004	462 666	8	**19**
2021	FINLAND	74 147	97 582	6	4
2021	NETHERLANDS	59 530	270 643	5	**11**
2021	ESTONIA	55 812	64 555	5	3
2021	SWEDEN	53 313	152 115	4	6
2021	POLAND	44 956	158 069	4	6
2021	IRELAND	43 431	205 423	4	8
2021	GERMANY	41 015	144 115	3	6
2021	BELGIUM	11 959	17 342	1	1
2021	LATVIA	11 171	61 362	1	3
2021	LITHUANIA	8 377	50 347	1	2
2021	PORTUGAL	NA	149 477	NA	6
		1 212 311	**2 446 437**		

Table 1 show that a total of more than **1 200 thousand fishing days** have been provided for almost **2,5 million tons**. **Portugal** did **not** provide any **fishing effort data** *(table CE)*, only landings data have been provided *(table CL)*. Almost 60% of the total fishing days provided were performed by Spain and France. Spain, France, Denmark and Netherlands contribute each to more than 10% of the total landings provided.

Table 2 show the same information by vessel length groups. All the 14 countries provided data for less than 10 meters *(VL0010)*, 10-12 meters *(VL1012)* and more than 12 meters *(VL12XX)* length vessels. Ireland provided only landings data for less than 10 meters (no fishing effort data). Belgium do not have any vessels less than 10 meters length and provided only ~100 fishing days for 10-12 meters length vessels. Finally, Germany provided few landings data (20 tons) with vessel length information not informed *("NK")*.

Table 2: Fishing days and landings by country and vessel length group provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage from the country in relation to the total effort/landings. In addition, the column KG/Fishing Days show the landing per fishing day.

Year	Country	VesselLength	FishingDays	Landings (tons)	% FishingDays	% Landings	KG/FishingDays
2021	SPAIN	VL0010	200 030	6 510	51	3	33
2021	SPAIN	VL1012	34 282	5 912	9	2	172
2021	SPAIN	VL12XX	156 007	233 449	40	95	1 496
2021	FRANCE	VL0010	114 184	31 373	35	9	275
2021	FRANCE	VL1012	89 890	91 099	27	25	1 013
2021	FRANCE	VL12XX	123 203	244 397	38	67	1 984
2021	DENMARK	VL0010	25 597	3 551	28	1	139
2021	DENMARK	VL1012	7 431	3 580	8	1	482
2021	DENMARK	VL12XX	57 976	455 534	64	98	7 857
2021	FINLAND	VL0010	70 919	5 600	96	6	79
2021	FINLAND	VL1012	698	4 148	1	4	5 943
2021	FINLAND	VL12XX	2 530	87 834	3	90	34 717
2021	NETHERLANDS	VL0010	2 192	1 114	4	0	508
2021	NETHERLANDS	VL1012	457	162	1	0	354
2021	NETHERLANDS	VL12XX	56 881	269 367	96	100	4 736
2021	ESTONIA	VL0010	50 043	2 993	90	5	60
2021	ESTONIA	VL1012	2 246	6 106	4	9	2 719
2021	ESTONIA	VL12XX	3 523	55 456	6	86	15 742
2021	SWEDEN	VL0010	31 712	1 396	59	1	44
2021	SWEDEN	VL1012	9 434	3 692	18	2	391
2021	SWEDEN	VL12XX	12 167	147 027	23	97	12 084
2021	POLAND	VL0010	29 083	4 262	65	3	147
2021	POLAND	VL1012	5 835	2 604	13	2	446
2021	POLAND	VL12XX	10 038	151 203	22	96	15 063
2021	IRELAND	VL0010	NA	8 936	NA	4	
2021	IRELAND	VL1012	12 769	8 575	29	4	672
2021	IRELAND	VL12XX	30 662	187 912	71	91	6 128
2021	GERMANY	NK	NA	20	NA	0	
2021	GERMANY	VL0010	12 285	1 955	30	1	159
2021	GERMANY	VL1012	4 962	879	12	1	177
2021	GERMANY	VL12XX	23 768	141 262	58	98	5 943
2021	BELGIUM	VL1012	103	159	1	1	1 542
2021	BELGIUM	VL12XX	11 856	17 183	99	99	1 449
2021	LATVIA	VL0010	6 502	3 114	58	5	479
2021	LATVIA	VL12XX	4 669	58 248	42	95	12 476
2021	LITHUANIA	VL0010	6 627	363	79	1	55
2021	LITHUANIA	VL1012	340	10	4	0	28
2021	LITHUANIA	VL12XX	1 410	49 974	17	99	35 443
2021	PORTUGAL	VL0010	NA	31 060	NA	21	
2021	PORTUGAL	VL1012	NA	27 733	NA	19	
2021	PORTUGAL	VL12XX	NA	90 684	NA	61	
			1 212 311	**2 446 437**			

B/ MIS métiers submission

A total of 31 different gear codes have been provided. The main gears provided are nets *(gillnets – GNS or trammel nets – GTR)*, trawls *(bottom trawls – OTB, midwater trawls – OTM or beam trawls - TBB)*, pots and traps *(FPO)*, dredges *(DRB)*, longlines *(set longlines – LLS)*, fyke nets *(FYK)* and purse seines *(PS)*.

Table 3: Number of countries providing data by gear code for the RBDES 2022 data call for 2021 data. In addition, fishing days, landings by gear and % FishingDays and % Landings from the gear in relation to the total effort/landings.

Year	Gear	Nb country (CE)	Nb country (CL)	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	MIS	5	6	4 367	76 611	0.4	3.1
2021	GNS	12	13	221 410	57 454	18	2
2021	OTB	12	13	188 489	368 986	16	15
2021	FPO	11	12	147 977	38 498	12	2
2021	DRB	6	7	123 641	91 950	10	4
2021	GTR	6	7	92 802	19 357	8	1
2021	TBB	8	9	78 151	78 023	6	3
2021	LLS	10	12	68 445	36 469	6	1
2021	FYK	9	10	64 632	11 600	5	0
2021	PS	4	5	36 663	198 407	3	8
2021	OTM	12	12	32 261	1 089 659	3	45
2021	OTHER	NA	NA	153 474	379 422	13	16
		13	**14**	**1 212 311**	**2 446 437**		

Table 3 show that **only 6 countries** provided **at least one** row with a "MIS métier": Denmark, France, Ireland, Netherlands, Sweden and Portugal. Other countries do not provide any "**MIS métier**". It represents a total of **around 4,4 thousand Fishing Days** for **around 77 thousand tons** i.e. **less than 0.5% of the total fishing days** and **~3% of the total landings** provided.

Table 4: Number of countries reporting MIS gear code and the métier DCF level 5 code. In addition, fishing days, landings by métier level 5 code and %Fishing Days and %Landings from the level 5 group in relation to the total MIS effort/landings.

Year	Gear	Metier DCF level5	Nb country (CE)	Nb country (CL)	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	MIS	MIS_SWD	1	1	2 067	56 882	47	74
2021	MIS	MIS_MIS	5	6	1 609	19 383	37	25
2021	MIS	MIS_MOL	1	1	269	19	6	0
2021	MIS	MIS_DES	1	1	235	52	5	0
2021	MIS	MIS_DEF	1	1	119	45	3	0
2021	MIS	MIS_CRU	1	1	43	1	1	0
2021	MIS	MIS_CAT	1	1	16	1	0	0
2021	MIS	MIS_SPF	1	1	10	229	0	0
			5	**6**	**4 367**	**76 611**		

The possibility given to countries to provide the targeted group of species with a "MIS fishing gear" has been used by few countries according to table 4, except France which provided data for its seaweeds' fishery with the code **"MIS_SWD".** This métier code could be **converted** into the **"HMS_SWD"** métier code i.e. **"Harvesting gear Seaweeds"**. It represents ~50% of the total Fishing Days provided with a "MIS fishing gear" and ~75% of the total landings *(more than 50 thousand tons)*. Therefore, the following continued analysis focused on the "MIS_MIS" métier submission in RDBES by country.

C/ MIS_MIS métier submission

The same **6 countries** provided at least one row with **"MIS_MIS" métier**. According to table 5 it represents a total of **around 1.6 thousand Fishing Days** for **around 19.4 thousand tons** i.e. **less than 0.2% of the total fishing days** and **1% of the total landings** provided.

Table 5: Number of countries reporting MIS_MIS DCF level 5 in RDBES CE and CL data. In addition, fishing days, landings by métier level 5 code and %Fishing Days and %Landings from the level 5 group in relation to the total effort/landings.

Year	Métier DCF Level5	Nb country (CE)	Nb country (CL)	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	MIS_MIS	5	6	1 609	19 383	0.1	0.8

Table 6 indicates that the "MIS_MIS" métier is provided for all the vessel length ranges. The 6 countries provided "MIS_MIS" métier for vessels less than 10 meters length for landings but only 4 for fishing effort as Portugal and Ireland do not provide any fishing effort data for vessels less than 10 meters length. In terms of fishing effort "MIS_MIS" métier represents a very small proportion. That is not the case in terms of landings especially for **vessels 10-12 meters length** (**~3% of the total landings provided**) and even more for **vessels less than 10 meters length** (**~13% of the total landings provided**). For **vessels more than 12 meters length**, fishing effort and landings provided with a **"MIS_MIS" métier** represent **less than 0.1%** of total fishing effort and landings provided.

Table 6: DCF level 5 MIS_MIS métiers by vessel length group. Total fishing days, total landings, number of countries reporting the MIS_MIS code in RDBES CE and CL, Fishing days and landings with the MIS_MIS code, and the percent fishing days and percent landings within the vessel length group.

Year	Métier DCF Level5	Vessel length	Total Fishing Days	Total Landings (tons)	Nb country (CE)	Nb country (CL)	Fishing Days	Landings (tons)	% Fishing days	% Landings
2021	MIS_MIS	VL0010	549 174	102 228	4	6	1 250	12 954	0.23	12.67
2021	MIS_MIS	VL1012	168 447	154 657	2	3	164	4 397	0.10	2.84
2021	MIS_MIS	VL12XX	494 689	2 189 531	5	4	194	2 031	0.04	0.09
			1 212 311	2 446 417						

Finally, **smaller vesssels** *(less than 10 meters length' vessels especially)* are **more affected** by the provision of **"MIS_MIS" métier than larger vessels** especially for landings data**.**

Table 7:DCF level 5 MIS_MIS métiers by country. Total fishing days, total landings, fishing days and landings reported with the MIS_MIS code in RDBES CE and CL and percent fishing days and percent landings within the country.

Year	Métier DCF Level5	Country	Total Fishing Days	Total Landings (tons)	Fishing Days	Landings (Tons)	% Fishing Days	% Landings
2021	MIS_MIS	DENMARK	91 004	462 666	1 141	298	1.25	0.06
2021	MIS_MIS	FRANCE	327 277	366 869	125	42	0.04	0.01
2021	MIS_MIS	IRELAND	43 431	205 423	242	8 997	0.56	4.38
2021	MIS_MIS	NETHERLANDS	59 530	270 643	71	335	0.12	0.12
2021	MIS_MIS	PORTUGAL	NA	149 477	NA	9 709	NA	6.50
2021	MIS_MIS	SWEDEN	53 313	152 115	29	1	0.05	0.00

Denmark concentrates more than 90% of the total Fishing Days provided with "MIS_MIS" métier, nevertheless they represent only 1% of the total Fishing Days of Denmark fleets and less than 0.1% of the total landings, see table 7. France, Netherlands and Sweden also provided few data with "MIS_MIS" but it remains insignificant considering the total Fishing Days and Landings they have provided *(around 0.1% or less)*. The issue is different for Ireland and Portugal for which respectively more than 4% and 6% of the total landings they have provided has been supplied with the "MIS_MIS" métier. These two countries constitute more than 95% of the total Landings provided with "MIS_MIS" métier. This should be put into perspective with the fact that Portugal do not provide any fishing effort data and Ireland do not provide fishing effort for the vessels less than 10 meters length.

Table 8: DCF level 5 MIS_MIS métiers by country and vessel length group. Fishing days and landings reported with the MIS_MIS code in RDBES CE and CL and percent fishing days and percent landings.

Year	Country	Vessel length	Métier DCF Level5	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	DENMARK	VL0010	MIS_MIS	1 141	298	4.5	8.4
2021	DENMARK	VL12XX	MIS_MIS	0	NA	0.0	NA
2021	FRANCE	VL0010	MIS_MIS	95	10	0.1	0.0
2021	FRANCE	VL1012	MIS_MIS	10	5	0.0	0.0
2021	FRANCE	VL12XX	MIS_MIS	20	27	0.0	0.0
2021	IRELAND	VL0010	MIS_MIS	NA	8 936	NA	100.0
2021	IRELAND	VL1012	MIS_MIS	154	35	1.2	0.4
2021	IRELAND	VL12XX	MIS_MIS	88	27	0.3	0.0
2021	NETHERLANDS	VL0010	MIS_MIS	7	-	0.3	-
2021	NETHERLANDS	VL12XX	MIS_MIS	64	335	0.1	0.1
2021	PORTUGAL	VL0010	MIS_MIS	NA	3 709	NA	11.9
2021	PORTUGAL	VL1012	MIS_MIS	NA	4 358	NA	15.7
2021	PORTUGAL	VL12XX	MIS_MIS	NA	1 642	NA	1.8
2021	SWEDEN	VL0010	MIS_MIS	7	1	0.0	0.1
2021	SWEDEN	VL12XX	MIS_MIS	22	NA	0.2	NA

Finally, table 8 shows that the biggest issue concerns the **vessels less than 10 meters** length in **Ireland** for which no fishing effort data has been provided and all landings data have been provided with the "MIS_MIS" métier. The vessels less than 12 meters length in Portugal for which no fishing effort has been provided, present a total of more than 10% of the total landings provided with "MIS_MIS" métier associated which could be also an issue. Finally, Denmark presents 4.5% of their total fishing effort for vessels less than 10 meters length with "MIS_MIS" métier for around 8% of their total landings; it remains relatively minor considering the fishing activity data of their total fleet.

In all, it seems that MIS_MIS métiers do not represent a big issue regarding the available RDBES 2021 data provided in answer to the 2022 data call.

Task 2: Advice on standardization and harmonization of métier coding on a pan-regional level *(RCG NANSEA and Baltic, RCG Med&BS, RCG LDF, RCG LP)*

As the métier codes listed by RCG in the métier codes reference lists are being requested in data calls, there is a need to agree on and establish procedures for working pan-regionally, and agree on the roles between RCGs, the ISSG and end-users. The text below was sent as an email to RCG chairs with the suggestion of the responsibilities of the RCGs and the ISSG to maintain and update the DCF métier codes reference lists in a standardized way, and to agree on the principles retained for the definition of the DCF métier codes; following the principles agreed on in the ISSG. No email replies have been received yet, but it is something that should be discussed further in RCG meetings and could also be discussed at the Liaison meeting in September 2023.

"RCG ISSG on métier and transversal variables issues" suggestion on procedures for managing métier codes pan-regionally

The ISSG has in 2022/2023 received a task to advice on standardization and harmonization of métier coding on a pan-regional level *(RCG NANSEA and Baltic, RCG Med&BS, RCG LDF, RCG LP)*.

Background

The "RCG ISSG on métier and transversal variables issues" has been working since 2018 on a revision of the reference list of métier codes at DCF level5 & 6, starting from the RCGs NANSEA & Baltic, where the new

codes have been approved. Métier codes from other RCGs (Med&BS, LDF, LP) have also been included in the reference list, and now that the codes are being implemented in data calls, there is a need for agreeing on a procedure for working pan-regionally.

The RCG Med&BS have revised codes in 2022 and have on their recommendations to revise again in 2023. The RCG Large Pelagic agreed on métier codes for tuna métiers in 2014 corresponding to a DCF level 7 as they include target species (more precise than group of target species). Métier codes have also been agreed by RCG Long Distance Fisheries, but the movement of the NAFO areas from RCG NANSEA to RCG LDF needs to be considered.

The STECF FDI will request the full time series 2013-2022 in the 2023 data call with the new list of métier codes considering the reference framework managed by the RCG ISSG on métier and transversal variables issues, and therefore it is important that the RCGs agree on the reference list and procedures before the FDI data call is issued, with enough time to redo historical time series. The métier codes are also requested for the ICES RDBES, ICES WGBYC and ICES VMS/Logbook data calls. It is aimed that similar reference list of métier codes will be considered also for these data calls *(this is already the case in the last two years for ICES RDBES data call and it has been also implemented in ICES VMS/Logbooks 2023 data call)*. For tuna métiers, level 6 is not detailed enough, so alternatives are being considered to maintain these fisheries on a level 7.

Therefore, the ISSG has drafted this suggestion for procedures to 1. manage the reference list of métier codes and 2. agree on the principles for the structure of the métier codes.

Suggestion for procedure for managing the reference list of métier codes

1. The ISSG on métier and transversal variables issues manages the reference list of métier codes, coordinates and advice regarding the new métier codes requested to ensure that it follows agreed principles.
2. The agreed reference list of métier codes is used as input for ICES and STECF FDI data calls.
3. The RCGs have the final responsibility of the reference list of métier codes for their region.
4. Requests for new métier codes should be sent to the ISSG, who will be in contact with relevant RCG chairs before final approval.

Agreed principles for harmonized and standardized métier codes on DCF level6

The ISSG has since 2018 worked on updating the reference list of métier codes on DCF level6 with the aim of making the harmonized and standardized reference list operational. The codes are now being implemented in data calls in ICES and the STECF FDI data call. A goal is to have DCF level6 métier codes harmonized and standardized on a regional level and across data calls, regions and countries.

Métier codes uploaded to the ICES RDB were used as a starting point and analyzed for harmonization and standardization (esp. for the mesh size ranges). Previous lists of métiers used in ICES and STECF were also considered as well as end-user needs.

Then the reference list of métier codes has been updated if requested, following the agreed principles, but being practical and pragmatic regarding specific cases *(e.g., adding mixed target species assemblage groups MCD, MPD)* or métiers observed in national fishing data. At the same time too many specificities/special cases were avoided.

Therefore, it is agreed that the DCF level 6 métier codes are used for harmonization, and the purposes of the data calls *(ICES RDBES, STECF FDI, ICES WGBYC, ICES VMS/Logbook)* when possibility is given nationally/regionally to keep more precise métier at a national/regional level (i.e., DCF level7). For example, in

the ICES RDBES the possibility is given to upload a métier at a national/regional level (i.e., DCF level7) if needed in the "nationalFishingActivity" field.

Principles used for defining métier codes:

- Gear-target species assemblage combinations *(métier level 5)* follow table 5 from EU-MAP commission delegated decision (EU 2021/1167[3]).
- Métier level 5 codes are defined/identified by RCG region.
- Mesh size ranges are suggested by RCG region ensuring[4]:
    - No overlapping mesh size ranges.
    - Standardized mesh size ranges for active and passive gears by RCG region.
    - All significant mesh size "limits" regarding regulations or fishing practices are considered *(splitting up into smaller mesh size ranges)*.
- "_0_0_0" for gears with no mesh size *(e.g., longlines, hand lines, trolling lines)*, "_>0_0_0" for unknown mesh size also for the following gears: traps, pots, beach seines and dredges *(gears with mesh size but for which no mesh size ranges have been defined)*.
- Possibility of including relevant selection devices.
- Unknown gear/métier will be coded as "MIS_MIS_0_0_0", also allowed following codes e.g., "MIS_DEF_0_0_0", "MIS_CRU_0_0_0" etc. in case the catch composition is known from e.g., sales notes, but the gear is unknown.
- Avoid using FIF *(Finfish group) (not calculated from the R-script developed by the ISSG[5])* but métiers codes have been made available with FIF for hooks and longlines, pots and beach seine fisheries for national needs.

Task 3: Make métier descriptions from the 2022 RDBES data call

The ISSG received data from the RDBES data call 2022 *(which is not this year a test data call for the CE and CL data i.e., for fishing effort and landings)*, where 2021 data are available to make the métier descriptions based on 'Commercial Landings' (CL) and 'Commercial Effort' (CE) tables. The description of the metiers includes information on official landings (weight and value) and official effort (number of fishing days and number of trips), by country, metier and vessel size range. The CL information presented in the report refers only to the catch category for the landings ('Lan'), ignoring the other possible options (e.g. 'BMS' and 'RegDis'). The information is displayed in a hierarchical mode, from the lowest (level 4) to the highest (level 6) metier. The top 10 metiers at level 4 are selected according to the official effort in number of fishing days. The metiers at levels 5 and 6 presented in this report are the ones that have more than 5% of the total fishing days within the previous metier level. It is important to note that if official landing weight was considered for selecting the main metiers (instead of the effort), probably other important metiers might also be included in these descriptions. In 2019 an R markdown script was developed to make a métier description by RCG region and métier code, and based on this, the code has been updated to fit the RDBES format and changed to output a

[3] http://data.europa.eu/eli/dec_del/2021/1167/oj
[4] The new métier codes don't necessarily follow the technical regulations, so there might be métier codes where the fishery is not legal.
[5] Discussion raised in the ISSG group between using FIF or DEF. For the normalized R-script using DEF was agreed as FIF does not aggregate much more fishes than DEF for these gears. FIF is used for national purposes when the normalized R-script could not be used.

html report structured in the hierarchical way to create overviews by RCG regions Baltic, North Sea and Eastern Arctic and North Atlantic and then by:

1. All métier level 4
    a. Landed weight by country and métier level 4
    b. Landed value by country and métier level 4
    c. Effort (fishing days) by country and métier level 4
    d. Number of trips by country and métier level 4
    e. Landed weight by vessel length category and métier level 4
    f. Landed value by vessel length category and métier level 4
    g. Effort (fishing days) by vessel length category and métier level 4
    h. Number of trips by vessel length category and métier level 4
2. For each of the top 10 métier level 4
    a. Landed weight by country and métier level 5
    b. Landed value by country and métier level 5
    c. Effort (fishing days) by country and métier level 5
    d. Number of trips by country and métier level 5
    e. Landed weight by vessel length category and métier level 5
    f. Landed value by vessel length category and métier level 5
    g. Effort (fishing days) by vessel length category and métier level 5
    h. Number of trips by vessel length category and métier level 5
3. For each of the level 5 métiers that have more than 5% of the total fishing days within the level 4
    a. Table with total values by country and métier level 5: Official weight, Value, Official fishing days, Number of trips
    b. Landed weight by country and métier level 6
    c. Landed value by country and métier level 6
    d. Effort (fishing days) by country and métier level 6
    e. Number of trips by country and métier level 6
    f. Landed weight by vessel length category and métier level 6
    g. Landed value by vessel length category and métier level 6
    h. Effort (fishing days) by vessel length category and métier level 6
    i. Number of trips by vessel length category and métier level 6
    j. Landed weight for top 10 species
    k. Landed value for top 10 species
4. For each of the level 6 métiers that have more than 5% of the total fishing days within the level 5
    a. Landed weight of top 15 species
    b. Landed value of top 15 species
    c. Fishing days by country
    d. Number of trips by country
    e. Fishing days by vessel length group
    f. Number of trips by vessel length group
    g. Fishing days by quarter
    h. Number of trips by quarter
    i. Map showing fishing days by ICES rectangle

As the content of the métier report show more than what is allowed according to the current RDBES data license (which will be reviewed), it can't be made public currently and remain only available internally for the RCG work.

It can be further developed to show yearly variation, when a time series of data are available in the RDBES.

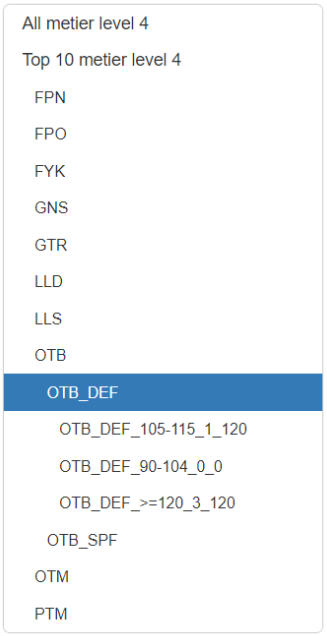


Figure 2: Example of the métier report html navigation pane, where it is possible to see the overview on the different levels.

Task 4: Review the fecR package *(calculating fishing effort)* in relation to the RDBES data format

The task is described as:

Review the fecR package *(calculating fishing effort)* in relation to the RDBES data format.

a. This should include a review of scenarios where no logbook data are available.
b. Possible collaboration with ISSG SSF and RCG MED&BS on this.
c. Possible questionnaire on fecR package *(are MS using it for RDBES data preparation)*.

fecR package

The fecR package provides a set of functions that implement the so called "Nicosia principles for fishing effort calculation" that aim to standardize the calculation of fishing days and days at sea of across MS during e.g., FDI uploads. The development of fecR started during the 2nd Workshop on Transversal Variables (22-26 February 2016) and a first version was put online in a public repository (CRAN) in early November 2016. The use of the package for MS effort calculations was then promoted in the 2017 and 2018 FDI data calls but in December 2018 the package was put offline and archived by CRAN after its code failed to pass a few internal checks to CRAN and CRAN registered difficulties in contacting the maintainer of the package. From that moment to present, the package remained offline with only archived versions being available to MS a situation that complicated its usage in the answering of effort data calls. Such situation was largely motivated by difficulties from JRC side to find the resources needed to retake the regular updates required for the package to be put back up on CRAN. The original code, as of the last update made, remained in a private JRC GitLab, available

only to a couple of developers external to JRC that, however, lacked the GitLab permissions required to put the package back online. The issue was taken up by the ISSG for its work 2022/2023.

The ISSG considers it important that the fecR package is put available online to the MS so that its code can be scrutinized and used by the MS in answering effort data calls. Issues related to the Nicosia principles for fishing effort calculation were discussed in the ISSG. The ISSG supports the present implementation with regards to vessels carrying logbooks but notes that the Nicosia principles were developed with the minimum data requirements of logbook data available at that time in mind. Nowadays countries input data is increasingly available by fishing operation, on a haul/set by haul/set basis (namely via e-logbooks) and not just on a per-day temporal resolution initially prescribed in fecR. In parallel, new requirements now exist whereby the Nicosia principles (and therefore also the fecR package) may need review and update, e.g., the new RDBES metiers and increasing needs to report effort from small-scale fisheries.

The ISSG analysed these new needs and possibilities and concluded that the package should be updated and checked with regards to its capabilities to handle data more disaggregated data (namely by fishing operation). Furthermore, both the package methodology and its examples need to be updated to the effort required for the RDBES CE format, which is more detailed (e.g., including métiers instead of gears) than originally agreed at the Nicosia meeting. The latter could be done either by considering a new métier as a new gear, meaning that the effort could be higher *(doubled in case of passive gears if there is two (or more) métiers calculated for the same fishing sequence/fishing gear),* or to split the effort between métiers. The ISSG agreed to the second option, i.e. to split the fishing effort metrics calculated at the gear level *(gear DCF level4 & mesh size)* by metier so that the original sums remain unchanged. In summary, in case where more precise data are available than the one available in all countries and/or in all the time series, the ISSG **recommends as a best practice guidelines**:

- Fishing effort should be calculated following the Nicosia principles and time*gear*area resolution and only after that should the fishing days and days at sea be split up/divided into the more precise information available.

- Examples from the Nicosia report should be expanded and updated with examples where the target assemblage (i.e., the métier) is available or where "haul by haul" information is available.

The ambition of this ISSG has been to look at examples and agree on solutions rather than having the script updated to solve everything. How to handle the small-scale fisheries could also be discussed but the methodologies, data formats and data storage involved in monitoring SSF are so widely diverse across countries that it creates lot of challenges to adapt fecR at all these possibilities.

Finally, with regards to the maintenance and further development of the package the ISSG initiated efforts next to JRC in order ensure the package was again made available in a public repository. JRC corresponded with an internal evaluation of what would be needed to attain that end. A decision was taken not to pursue availability on CRAN given its high maintenance requirements and instead to invest in a public repository. It was considered beneficial that the repository would remain owned by JRC with maintenance rights being enlarged from one person to a small group of people to create redundancy in the maintenance, updates and development. After some initial technical difficulties were experienced, JRC moved the fecR package from its original private repository in GitLab to a public one and, as of mid-April 2023, the package can now be downloaded and tested again by users using the code below. Further development of the package is scheduled over the next few weeks with further progress being attained during the STECF EWG 23-05: FDI methodology:

```
library(remotes)
mremotes::install_gitlab("r-packages/fecr", host="https://dcallnet.jrc.ec.europa.eu/gitlab")
```

Questionnaire

The actual use of the fecR package to calculate fishing effort to answer data calls was included in the questionnaire sent out by the ISSG. The questionnaire included questions regarding the fecR package: How far it is used by MS and the different scenarios not considered currently, but which could be included in the FecR package in order to improve its use to calculate standardized/harmonized fishing effort metrics. The questionnaire in Annex 3 was sent out and answers received are found in Annex 4, with the replies both compiled by question and the questionnaire received by Member State.

Based on the questionnaire replies on the use of the fecR package, 5 MS report that they are using the fecR package, 3 are using it partly and 4 MS are not using the package. All MS that are not using the package have developed similar procedures in other software to estimate effort in line with the Nicosia principles.

This summary/synthesis of the information collected through these questionnaires will be also useful for the STECF FDI methodological workshop. Work will be done on the fecR code in the FDI methodological workshop 30 May to 2 June 2023 where specific TORs have been added regarding update and maintenance of the fecR package and RDBES/FDI métier splittings.

1.5. *Discuss if FecR package produced at the 2nd Workshop on Transversal Variables held in Nicosia, Cyprus on 22-26 February 2016 (Castro Ribeiro et al., 2016) is used for data preparation and how it could be maintained.*

4. Discuss ICES RDBS development progress and its alignment to FDI data call.

Task 5: Link with the alternative fleet segmentation suggested by RCG Econ to enhance the link between the two approaches

The ISSG has in 2022/2023 received a task to establish a "Link with the alternative fleet segmentation suggested by RCG Econ to enhance the link between the two approaches including analysis of the variation in métiers within the fleet segmentation."

A meeting was set up with Jörg Berkenhagen and Erik Sulanke (co-chairs of the fleet segmentation workshops) to get an update on what they are working towards and how to proceed, also to understand their goals, needs and possible collaboration. Indeed, ISSG considers that a new fleet segmentation should reflect the exploitation strategy of the vessels and that this new segmentation should be linked to the métiers *(a vessel could practice several métiers during the year but belong to only one Fleet segmentation for the year considered which should represent its exploitation strategy)*.

A third workshop on alternative fleet segmentation is scheduled on 3rd and 4th May 2023 as afternoon sessions, and preparation work includes work on pre-segmentation of the data. The ISSG worked in advance of the 3rd workshop assessing the variability/variety – homogeneity/heterogeneity of métiers/gears available by current DCF fleet segmentation on the basis of the RDBES 2021 data issued from the 2022 data call. This analysis is available in Annex 2 and constitute the input of the ISSG to the 3rd workshop.

This analysis highlights among others: 1) that a significant part of the real polyvalence of the fleets is hidden by the DCF current fleet segmentation, 2) furthermore current DCF fleet segmentation does not allow to distinguish exclusive vs non-exclusive vessels and 3) finally the analysis by country suggests some differences in algorithm used by MS to allocate vessels in fleet segments. Harmonization, homogenization, and standardization seems necessary especially for passive gears and vessels <12 meters length.

Task 6: Evaluate the use of cross-validation methods in MS to combine data coming from different declarative sources

The aim of this task is to start the work to get an overview on how combination and cross-validation of different data types (coming from different declarative sources) are used by different MS. As an example, it could be to link logbooks and sales note data to evaluate the value of the landings.

In order to assess the methodologies applied by MS for working with transversal data, a questionnaire was drafted by the ISSG and was sent out to NCs by RCG secretariat on 2nd February 2023 and to the ISSG members to speed up the process (see Annex 3). Questionnaires have been received from the following countries: *Denmark, Estonia, Finland, France, Germany, Ireland, Latvia, Lithuania, Netherlands, Poland, Spain and Sweden*. The questionnaire replies are available in Annex 4 both compiled by question and as they were received, by Member State. This will constitute the material for 2023-2024 ISSG work on this issue to evaluate the use of these methodologies by the MS, detail the on-going common practices and develop, on this basis, best practices guidelines to enhance standardization, homogenization and harmonization between MS in order to calculate fishing activity estimates.

The questionnaires received contain a lot of information. It was decided to combine the replies to the questions in the format received (see annex 4) and compiled in an excel spreadsheet.

Due to the workload of this ISSG in 2022/2023, it was decided to draw some general observations/conclusions from the questionnaires in this report, and then to analyze the replies in detail and discuss best practices in the 2022/2023 term of the ISSG.

Question 1 on data types available to assess fishing activity data

All MS reported the use of the logbooks for vessels over 10 m for effort data. For effort calculation for vessels below 10 m monthly declarative form is used by 3 countries, sales notes are used by 2 countries, logbooks/monthly journals are used by 6 countries and 1 country has not specified the sources. However, in some cases sources are available for part of the fleet. Additional resources are: self-sampling program, observers at sea program and port sampling program which have been used by one MS. One MS raised the issue to report and calculate the fishing from ice. Questionnaire for sales data is used by one country, other obtained data from sales notes. When MS provides information on the geo location data, they reported the VMS data use as required in the Control Regulation. AIS data is collected only by one country. In general, data of the vessel position by SSF is missing.

Question 2 on combination/cross-validation of data

4 MS of 12 do not have cross-check/validation systems in place. The most extended cross-checks are between logbooks and VMS data and/or sales notes. Also, MS focused on data quality checks. The data quality checks are implemented by comparison of registered coordinates with VMS data and logbooks information and difference in caught/landed amount by species in logbooks and sales notes. To get the precise weight/catches combination and value on trip level, the logbooks and landing declarations or the logbook and sales notes data/ transfer information are combined by trip number/logbook number/combination of vessel-id and landing date. To combine the data R scripts are often used. In one case the coastal journals information is combined with logbooks data by merging the trip identifiers supplied by the data provider. The monthly days-at-sea are considered equivalent to the number of fishing trips.

Question 2a on assessing value of landings, especially when landings are not sold at auctions

The sources of the value of landings are typically sales notes register or landings declarations. For some countries the sales notes cover the full fleet, for others, when part of the landings is not reported through sales notes, estimates based on e.g., average prices are made. Some MS are estimating the value of landings based on averages.

Question 2b on consolidation of species composition

Species composition can be based on sales notes, logbooks, landing declarations or a combination of these data sources.

Question 2c on assessing vessel fishing effort, and use of geo-localization data

The calculation of fishing effort is generally based on logbook data for vessels larger than 10 m. For the SSF, the effort calculation can be based on monthly catch reports, declarative forms and sales notes.

In some cases, VMS data are used for calculating vessel fishing effort when available.

Question 2d on assessing gear information and effort soaking time

Gear information from logbooks. Gear dimension and soaking time are not mandatory according to the control regulation, and therefore not always available. Some countries are working on the development of methods to estimate the gear dimensions and soaking time from high-resolution geospatial data.

Question 2e on spatial information

In general, the spatial information reported in logbooks are used. For SSF coastal logbooks, and in some cases sales notes or the landing port can be used. VMS can be used as additional information.

Question 2f on métier allocation

Some countries are using the script developed by the ISSG, others have developed similar methods within their own software systems.

Question 2g on data completeness

Some countries consider their data complete, while others are aware of missing data.

Question 4 on fecR and effort calculation

Most part of the countries are in line with Nicosia principles (2016) for calculating the effort. There are 6 countries using the fecR package, but some of these countries are restricting its use for answering to specific datacalls (e.g., FDI, ICES, Economic DCs) or for specific vessel length segments (e.g., >10 m). There is also one country that uses a function adapted from the fecR package and another that is starting to test it to answer RDBES DC. The remaining countries, although following the Nicosia principles (2016), have their own procedures developed in other software (e.g., SAS). In general, for the SSF, when no effort data sources are available, most countries consider that 1 sale = 1 trip = 1 day at sea = 1 fishing day. However, there are some countries that can obtain effort from monthly reports or other similar data sources. The main reasons for SSF not using the fecR are related to the absence of information at trip/haul level in the data sources available and even if information exists, and also if there is the need to combine/process data from different sources to report SSF data, there is the risk of duplicate and/or loose some crucial information that is needed in the fecR.

During the next term, the replies to each question can be discussed in the ISSG, to give advice on how to improve the data, with a special focus on the population of the RDBES effort and landings tables.

Task 7: Harmonization of variables submission for AER and FDI data calls (landings, effort)

Work on harmonization of variables submission to AER and FDI data calls (landings, effort) is needed to be able to link data from the two data calls. Based on a request from RCG Econ chairs at the Liaison meeting 2022, a suggestion for tasks for the ISSG and the FDI were drafted. A meeting was arranged with RCG Econ chairs to coordinate the work in January 2023, and to avoid duplication of work, and the ambition of the work within the ISSG was modified. The work done within the ISSG can be followed up in the 2023 FDI meetings and the RCG Econ workshop on raising transversal variables suggested for the autumn.

The long-term goal is for MS to submit the fishing activity data only in the FDI data call, where in the AER data call only socioeconomic data will be submitted. For the FDI data to be used for the AER needs, there must be a match between the datasets and analysis have shown that for some fleet segments they currently don't match.

Below are listed the subtasks, and the ambition level achieved by the ISSG 2022-2023

a. Follow up on issues raised in STECF EWG-21-12 regarding the inconsistencies between AER and FDI data.

An overview has been made of issues raised in the FDI 2021 report

b. Discuss methodologies and make an inventory of methods used by MS to define the common variables used in the AER and FDI data calls.

A questionnaire has been drafted but, considering the workload of the ISSG this year, it was decided that the draft questionnaire would not be sent out by the ISSG, but can be used as input for the FDI methodological meeting in May-June 2023 to consider it using. The draft questionnaire is found in Annex 1.

c. Discuss the definitions, clustering procedures and allocation of vessels to the fleet segment for FDI and Economic data calls.

The procedures used by MS for fleet segmentation and clustering have been included as a question in the draft questionnaire available in Annex 1.

d. Check and compare the codes and content in the data call templates for both data calls, in case of deviations make a suggestion for changes and unification in data calls structure. Any suggestions for changes to data calls should be communicated to JRC and STECF EWG-FDI.

The list of asked fishing activity variables and the reference framework list of codes of the two data calls have been compared and inconsistencies between their annexes have been highlighted.

a. Follow up on issues raised in STECF EWG-21-12 regarding the inconsistencies between AER and FDI data

In FDI methodological meeting 2021 (STECF EWG 21-12) an analysis was made to test the comparability between the data collected in the FDI database and data provided for the fleet socio-economic data call. The comparison was made on data submitted for the years 2017 and 2018.

Issues relates to:

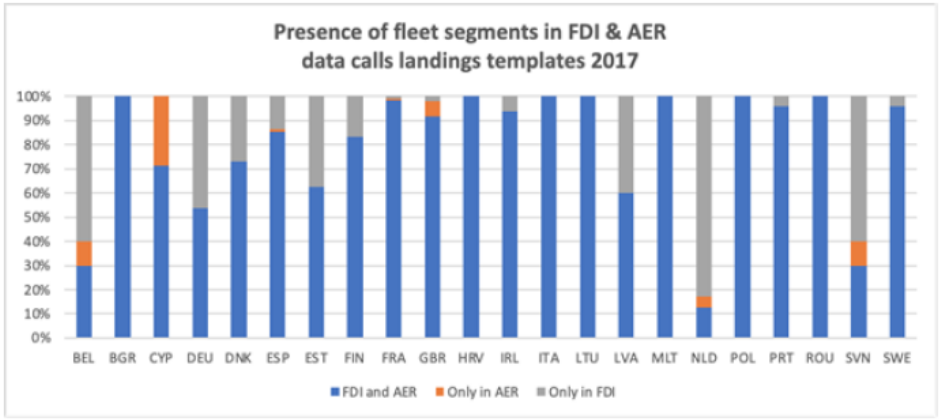
- **Timing in data exports to answer the data call**: AER data legal deadline is 30 March 2023 and some data submitted are provisional. FDI data call legal deadline is 30 June 2023.

- In the FDI it is possible to report **confidential data** and mark it as confidential which is not possible in AER
- **Clustering of fleet segments used in AER data set**: sensitive economic data are reported by clustered fleet segments only.
- **Inactive vessels** reported to AER and not to FDI. It has now been specified in the FDI data call to include inactive vessels in table J.
- **Counting number of vessels**:
    - **Inactive vessels** reported to AER and not to FDI. It has now been specified in the FDI data call to include inactive vessels in table J.
    - **Differences in counting vessels** *(is it a snapshot of from a single date (e.g., 31/12) or all vessels active during the year?).*
- It was proposed to make sure that definitions and guidance are consistent between the two data calls.
- It was highlighted that MS should put effort in improving national coordination when preparing the AER and FDI data calls, especially for:
    - Defining fleet segment clustering procedures. There are fleet segments that are not matched between the data calls (Figure 3.3.1.3. in STECF-2021-12). This can be due to clustering in one data call and not in the other, or different FISHING_TECH definitions across countries. The GEO_INDICATOR field should be used as part of the fleet segment check.
    - Allocation of vessels to fleet segments.
    - Landing and effort data. Some differences in total effort by country in the two data calls.

A fleet segment is defined as: FISHING_TECH+VESSEL_LENGTH_CATEGORY+GEO_INDICATOR

STECF recommendation: dedicated workshop called by RCGs in coordination with JRC, and in line with the work carried out in ISSG on Métier Issues to explore how MS allocate vessels, landing and effort to fleet segments and métiers for the FDI and AER data calls, and to harmonize different approaches, in accordance with DCF definitions on variables and data call specifications.

Below figure 3 from the FDI EWG 21-12 report shows fleet segments classified as available in both data calls, only available in AER and only available in FDI. It is clear that some fleet segments are only available in one data call, which may be related to clustering procedures.



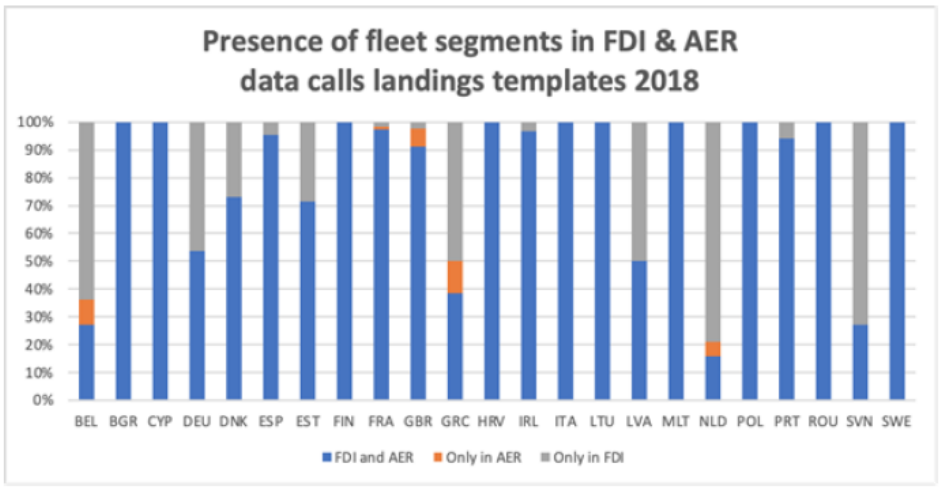


Figure 3: (figure 3.3.1.3 from STECF WEG 21-12 report). Fleet segments in FDI and AER landings tables for 2017 and 2018 data, classified as fleet segment available in both data calls (blue), only available in AER (orange) and only available in FDI (grey).

b. *Discuss methodologies and make an inventory of methods used by MS to define the common variables used in the AER and FDI data calls*

The draft questionnaire available in Annex 1 was developed to make an inventory of the methods used by MS to define common variables used in the AER and FDI data calls and discuss the methodologies used in MS. As a questionnaire had already been sent out by the group, and considering the workload of the ISSG, it was decided that the questionnaire would not be sent out by the ISSG but can be used as input for 2023 FDI meetings *(in May-June the FDI methodological meeting and in September the FDI meeting)*.

c. *Discuss the definitions, clustering procedures and allocation of vessels to the fleet segment for FDI and Economic data calls.*

The procedures used by MS for fleet segmentation and clustering have been included as a question in the draft questionnaire available in Annex 1 (see above).

d. *Check and compare the codes and content in the data call templates for both data calls, in case of deviations make a suggestion for changes and unifications in data calls*

structure. Any suggestions for changes should be communicated to JRC and STECF EWG-FDI.

STECF AER and FDI data calls both ask for similar fishing activity variables (landings and effort). One long-term goal following this factual situation is that fishing activity data will be asked in only one data call answering also the data needs from the other data call. FDI data call should be the good option for that as the data which have to be uploaded in this context are more precise and disaggregated. They can be aggregated to answer the AER needs. Then, the aim is that in the future, only socioeconomic data will be submitted in the AER data call.

To achieve this goal, there is a need to harmonize methods and concepts between the two data calls *(see above)* but also that the reference framework used to answer the two data calls are shared and similar *(e.g. fishing technique, fishing gear, fishing area, …)*. Furthermore, for FDI data call to become the reference data call for fishing activity data there is a need that from data uploaded in FDI, fishing activity data needs from AER can be derived.

This analysis first summarizes the fishing activity data requested in the two data calls, to check if there are any missing information in one of the data calls, and then the definition of each fishing activity code requested for the two data calls are described, and it is analyzed if there are any differences in codes and definitions.

Fishing activity data requested in AER data call:

Fleet capacity *(Number of vessels, Mean LOA of vessels, Total vessel tonnage, Total vessel power, Mean age of vessels)* by country, year, supra-region, fishing technique, vessel length range and geo indicator + as optional by “gear”, “fishery” and “activity” indicators

Effort *(Fishing days, Days at sea, KW Fishing days, GT Fishing days, KW Days at sea, GT Days at sea)* by subregion, country, year, supra-region, fishing technique, vessel length range and geo indicator + as optional by “gear”, “fishery” and “activity” indicators

Effort *(Number of fishing trips, Maximum Days at sea)* by country, year, supra-region, fishing technique, vessel length range and geo indicator + as optional by “gear”, “fishery” and “activity” indicators

Landings per species *(Live weight of landings per species, Value of landings per species)* by subregion, country, year, supra-region, fishing technique, vessel length range and geo indicator + as optional by “gear”, “fishery” and “activity” indicators

Fishing activity data requested in FDI data call:

Table A – Catch summary *(Estimated landings in tonnes (live weight) - TOTWGHTLANDG, Estimated total value of the landings in euro - TOTVALLANDG)* per species by country, year, quarter, vessel length range, fishing technique, fishing gear, fishing target assemblage, fishing gear mesh size range, fishing métier, supra-region, subregion, EEZ, geo indicator.

Table G – Effort summary *(Days at sea – TOTSEADAYS, KW Days at sea – TOTKWDAYSATSEA, GT Days at sea – TOTGTDAYSATSEA, Fishing days – TOTFISHDAYS, KW Fishing days – TOTKWFISHDAYS, KW Days at sea – TOTGTFISHDAYS, Hours at sea – HRSEA, KW Hours at sea – KWHRSEA, GT Hours at sea – GTHRSEA)* by country,

year, quarter, vessel length range, fishing technique, fishing gear, fishing target assemblage, fishing gear mesh size range, fishing métier, supra-region, subregion, EEZ, geo indicator

Table J – Capacity and fleet segment effort *(Number of fishing trips – TOTTRIPS, Fishing capacity in kW – TOTKW, Fishing capacity in GT - TOTGT, Number of vessels – TOTVES, Average age – AVGAGE, Average length over all – AVGLOA, Average number of days at sea of the top 10 most active vessels in the fleet segment – MAXSEADAYS)* by country, year, vessel length range, fishing technique, supra-region, geo indicator, principal subregion.

This first comparison of the two fishing activity data requests shows that all the fishing activity variables *(capacity, fishing effort and landings)* asked in the AER data call are available in FDI data call and should be possibly derived from them. Also, it should be possible to derive from the FDI data, the aggregation level asked in the AER data call, at least for the mandatory fields i.e.: by country, year, supra-region, fishing technique, vessel length range and geo indicator. Furthermore, the fishing activity variables for which data is asked in AER data call with the further subregion disaggregation level should be also possibly derived from FDI data where they are available at an even more disaggregated level. Only the sub-segmentation of vessels proposed in the **new** non-mandatory/optional fields "by "gear", "fishery" and "activity" indicators" in the AER data call are not available in the FDI data call (see hereunder).

In addition, to this first comparison & conclusion, and in order to validate it: the different codes used to define the aggregation level needed by the two data calls should be similar e.g., same codification reference framework should be used for example to define "fishing technique". Therefore, the variables codes reference framework has been compared to check if there are any inconsistencies.

Country

FDI: The reference framework of list of codes to answer FDI data call is available in the annexes (*BEL, BGR, DNK, DEU, EST, IRL, GRC, ESP, FRA, HRV, ITA, CYP, LVA, LTU, MLT, NLD, POL, PRT, ROU, SVN, FIN, SWE)*

AER: The country information is not directly informed in the templates to provide but the upload is done by country from which the country code could be easily derived.

Year

FDI: Four digits. From 2013 to 2021 *(2022 new year to be available in September 2023)*.

AER (Data types - European Commission (europa.eu)): Integer between 2008 and 2021.

The two data calls ask for data in integer/four digits' format.

There is an **issue** regarding the **time series available** in the two data calls: AER data are available from 2008 until 2021 while FDI data are available since 2013 until 2021 *(2022 will be made available in September 2023)*.

Furthermore, AER data call asks for some provisional annual fishing activity variables, non-mandatory data on the year N-1 in February/March N when the data are not available in FDI database *(should be made available on September N)*. This issue related to data availability and timing in data exports to answer data calls should

be studied especially the usefulness/needs to have preliminary/non-validated fishing activity data on year N-1for the AER work.

Supra-region

FDI : The reference framework of list of codes to answer FDI data call is available in the annexes *(NAO, MBS, OFR)*.

NAO = Baltic Sea, North Sea, Eastern Arctic, **North of Azores, East Greenland**, NAFO, Extended North-Western waters (ICES areas V, VI and VII), Southern Western waters, **CECAF areas around Madera and the Canary Islands (FAO areas 34.1.1, 34.1.2, 34.2.0)**

MBS = Mediterranean Sea and Black Sea

OFR = Other regions

AER (Supra Regions - European Commission (europa.eu)) : A reference framework of list of codes to answer AER data call is available in the DCF data calls website *(NAO, MBS, OFR)*.

NAO = Baltic Sea, North Sea, Eastern Arctic, NAFO, Extended North-Western waters (ICES areas V, VI and VII) and Southern Western waters.

MBS = Mediterranean Sea and Black Sea

OFR = Other fishing regions.

The codes to be used are similar between the two data calls.

The **definition** of **NAO differs** between the data calls. Indeed, NAO FDI definition includes in addition the North of Azores, East Greenland and CECAF areas around Madera and the Canary Islands (FAO areas 34.1.1, 34.1.2, 34.2.0) which are not included in the definition retained for AER.

In the two data calls it is required to assign “inactive vessels” to the supra-region where they are registered or generally operate in.

In cases where a vessel operates in more than one supra-region, FDI require that the vessel is assigned to the supra-region where most of its activity take place while AER require only that member states explain in their national program to which supra-region the vessel is allocated. This should be specified/harmonized/standardized.

Fishing Technique

FDI: The reference framework of list of codes to answer FDI data call is available in the annexes *(DFN, DRB, DTS, FPO, HOK, MGO, MGP, PG, PGO, PGP, PMP, PS, TM, TBB, INACTIVE, NO)*.

AER (Fleet Segment DCF / EU-MAP - European Commission (europa.eu)) : A reference framework of list of codes to answer AER data call is available in the DCF data calls website *(DFN, DRB, DTS, FPO, HOK, MGO, MGP, PG, PGO, PGP, PMP, PS, TM, TBB)*.

The definition related to the codes shared between the two data calls are similar without any inconsistencies.

For the code "**PG** – Vessels using passive gears only for vessels <12m", there is a footnote available in AER not listed in the FDI annexes: *"Vessels less than 12 meters using passive gears in the Mediterranean Sea and Black Sea may be disaggregated by gear type. Without disaggregation, the gear code is 'PG'"* i.e., that the code "PG" should be avoided for Mediterranean and Black Sea vessels but could be used otherwise. This code remains **confusing** as it corresponds to an aggregation of other passive gears fishing technique which could be used only for some vessel length ranges. The description should be consistent with the EU-MAP (EU 2021/1167) table 8 footnotes on how to assign the fishing technique.

FDI includes explicitly in their annexes the code to be used for non-active/inactive vessels (INACTIVE), code not found in AER, but it is specified that AER requires also explicitly to report inactive vessels for fleet capacity variables.

Finally, **FDI** includes a **new code "NO"** defines as *"No fishing technique (e.g., divers without fishing vessels)".* This code is not required in the AER data call. It should be assessed when this code has been used in the FDI data calls and for which specific uses as the framework of these two data calls should be to submit fishing activity data of the fishing vessels registered in the EU fishing fleet register.

Vessel length ranges

FDI : The reference framework of list of codes to answer FDI data call is available in the annexes by supra-region i.e. for Mediterranean and Black Sea *(VL0006, VL0612, VL1218, VL1824, VL2440, VL40XX)* and for all other waters *(VL0010, VL1012, VL1218, VL1824, VL2440, VL40XX)*.

AER (Fleet Segment DCF / EU-MAP - European Commission (europa.eu)) : A reference framework of list of codes to answer AER data call is available in the DCF data calls and follow the same distinction by supra-region i.e. for Mediterranean and Black Sea – supra-region 2 *(VL0006, VL0612, VL1218, VL1824, VL2440, VL40XX)* and for other supra-regions – supra-regions 1 and 3 *(VL0010, VL1012, VL1218, VL1824, VL2440, VL40XX)*.

Same vessel length ranges are requested in the two data calls with the distinction of two different vessel length ranges to be used depending on the supra-region where the fishing activity is done.

In the FDI it is requested to use the "Mediterranean and Black Sea" vessel length ranges for fishing activity in the Mediterranean and Black Sea while AER request to use these vessel length ranges for vessels allocated to the supra-region 2 which could be different. Indeed, a vessel could have fishing activity in two different supra-regions but will be assigned to the supra-region where most of its activity takes place. **This should be specified and harmonized.** Linking the vessel length ranges used with the belonging supra-region of the vessel seems to be the option to favor as vessel length ranges is linked with the vessel characteristic as its dominant supra-region.

FDI specified that the vessel length ranges are defined from the first length specified (included) to shorter than the second length specified e.g., *"VL1012 – length over all of 10m. to shorter than 12m."* or *"VL40XX – length over all of 40m. or longer"*. This is not actually specified in the AER e.g., *"VL1012 – vessels between 10 meters and 12 meters in length"* and even more in contradiction with the AER specification for *"VL40XX – Vessel greater than 40 meters in length"*. **This should be specified and harmonized.**

Geo indicator

FDI: The reference framework of list of codes to answer FDI data call is available in the annexes *(NGI, NEU, IWE, P2, P3, IC, MA, GF, GP, MQ, MF, RE, YT)*.

AER (Geographical Indicator - European Commission (europa.eu)) : A reference framework of list of codes to answer AER data call is available in the DCF data calls website *(NEU, IWE, NGI, P2, P3, IC, MA, GF, GP, MQ, MF, RE, YT)*.

Geo indicator codes are used to distinguish fleet segments operating in outermost regions and fleet segments operating exclusively in non-EU waters *(international waters + third country including those with fishing partner agreements)*.

The codes and their definition shared between the two data calls are similar without any inconsistencies.

AER specified that the geo-indicator *"MF – Saint-Martin"* for French outermost region *(overseas community)* is available only since 2009 when it is not specified in FDI annexes. This should be kept in mind when data will be requested before 2009 in FDI data call.

Species

FDI: Species coding according to the FAO Fisheries and Aquaculture Statistics and Information Branch 3-alpha code *(http://www.fao.org/fishery/collection/asfis/en)*. The data call upload tool currently uses the species list edition released in 2022. If it is needed to include some species in the dataset with a code agreed after this release, the JRC data submission team should be contacted. In addition, for landings where it is not possible to associate an **FAO 3-alpha code** please use the code **OTH (i.e., other species)**.

AER (Species - European Commission (europa.eu)): Species are identified using the **FAO 3-letter codes** *(https://www.fao.org/fishery/en/collection/asfis).* For species not present in the list then they are identifies using the following codification. **UNKNOWN** = where species is unknown *(e.g., landed as mixed species)*. **OTH** = where species is not on FAO List.

The two data calls do not specify a list of species and request all the species landed in FAO 3-letter codes format.

AER includes a specific code (**UNKNOWN**) where species are unknown because, for example the species have been landed as mixed species to distinguish from the codes OTH to be used for species not listed in the FAO ASFIS List. In contrast, FDI do not allow missing values and do not use the UNKNOWN codes as defined in AER. The use and need of this codification should be assessed and eventually FDI data call should be modified to integrate it.

Furthermore, FDI specify that new FAO codes currently under agreement to be included in the FAO ASFIS List could be used to answer FDI data call when it is not specified in AER. Amendments to the AER could be done to indicate that.

Subregion

FDI: Sub-region codes are defined in combination with EEZ indicator codes associated *(NA, EU, COAST, RFMO, UK)*. Subregion list is defined by FAO area.

FAO area 27 *(Atlantic coast from Baltic Sea to Southern Western waters)*: Subdivision ICES *(level 4)* are asked for Baltic, Skagerrak & Kattegat Sea *(FAO Subarea 27.3, unit ".1" & ".2" for subdivision 27.3.d.28)* and Division ICES *(level 3)* are asked for other FAO 27 Subarea.

FAO area 37 *(Mediterranean Sea)*: GFCM GSA *(level 4).*

FAO area 34 *(CECAF area)*: ICCAT Division *(level 3).*

FAO area 21 *(NAFO Northwest Atlantic area)*: NAFO Division *(level 3)*.

FAO areas 48, 58 & 88 *(CCAMLR Atlantic Antarctic, Antarctic and Southern Indian Ocean, Antarctic area)*: FAO subarea *(level 2)*.

FAO areas 51 & 57 *(IOTC Indian Ocean, Western and Eastern area)*: FAO subarea *(level 2)*.

FAO area 18 *(Arctic Sea)*: FAO area *(level 1)*.

FAO area 31 *(Atlantic Western Central Sea)*: FAO area *(level 1)*.

FAO area 41 *(Atlantic Southwest Sea)*: FAO subarea *(level 2)*.

FAO area 47 *(Atlantic Southeast Sea)*: FAO subarea *(level 2)*.

FAO area 61 *(Pacific Northwest Sea)*: FAO area *(level 1)*.

FAO area 67 *(Pacific Northeast Sea)*: FAO area *(level 1)*.

FAO area 71 *(Pacific Western Central Sea)*: FAO area *(level 1)*.

FAO area 77 *(Pacific Eastern Central Sea)*: FAO area *(level 1)*.

FAO area 81 *(Pacific Southwest Sea)*: FAO area *(level 1)*.

FAO area 87 *(Pacific Southeast Sea)*: FAO subarea *(level 2)*.

AER (FAO - European Commission (europa.eu)) : FAO area level 4 (Baltic), GFCM-GSA (Mediterranean & Black Sea), FAO area level 3 (All other regions).

For **FAO area 27** *(Atlantic coast from Baltic Sea to Southern Western waters)*, the level asked in the two data calls are **consistent** i.e., Subdivision ICES *(level 4)* for Baltic Sea *(Skagerrak & Kattegat Sea are asked at "level 4 – Subdivision ICES" for FDI and "level 3 – Division ICES" for AER)*, Division ICES *(level 3)* for other Seas. The **codes** used in the two data calls are **similar** e.g., *"27.3.c.22"* or *"27.2.a"*.

For **FAO area 37** *(Mediterranean Sea)*, the level asked in the two data calls are also **consistent** i.e., GFCM GSA. Nevertheless, the **codes** used in the two data calls are **different**. In FDI GFCM GSA are coded as "GSAX" with X = 1 to 30 *(included the subGSA – "GSA11.1" & "GSA11.2")* when in AER GFCM GSA are coded as "sa X" with X = 1 to 30 *(included the subGSA – "sa 11.1" & "sa 11.2")*.

For **FAO area 34** *(CECAF area),* the level asked in the two data calls are **consistent** i.e., CECAF division *(level 3)* and the **codes** used are **similar**.

For **FAO area 21** *(NAFO Northwest Atlantic area),* the level asked in the two data calls are **consistent** i.e., NAFO division *(level 3)* but the codes used are **different**. As an example, FDI used the following code "21.0A" when AER used the code "21.0.a".

For **FAO areas 48**, *(CCAMLR Atlantic Antarcti area),* **88** *(CCAMLR Antarctic area)*, **51** & **57** *(IOTC Indian Ocean, Western and Eastern area),* FAO subarea *(level 2)* are asked in FDI when FAO division *(level 3)* are asked in AER. Nevertheless, FAO division are not defined for these FAO areas, FAO subarea is the finest level available and therefore level asked in the two data calls are **consistent**. The **codes** used are also **similar**. The unique exception is for the FAO subarea "57.5" where two FAO division exists: "57.5.1" and "57.5.2".

For **FAO areas 58** (*(CCAMLR Antarctic and Southern Indian Ocean area)*, **41** *(Atlantic Southwest Sea),* **47** *(Atlantic Southeast Sea) and* **87** *(Pacific Southeast Sea),* FAO subarea *(level 2)* are asked in FDI when FAO division *(level 3)* are asked in AER. Therefore, level asked in the two data calls are **inconsistent** and it would be impossible to derive AER data from FDI data at the level asked. Nevertheless, at the common level 2 available in the two data calls, the **codes** are **similar**. The unique exception is for FAO area 47 where FAO subarea asked in FDI are coded as "47.A", "47.B", "47.C", "47.D" when these subareas are not available in AER only as FAO Division coded as "47.a.0", "47.a.1","47.b.0", "47.b.1", "47.c.0", "47.c.1", "47.d.0" & "47.d.1".

For **FAO areas 18** *(Arctic Sea),* **31** *(Atlantic Western Central Sea),* **61** *(Pacific Northwest Sea),* **67** *(Pacific Northeast Sea),* **71** *(Pacific Western Central Sea),* **77** *(Pacific Eastern Central Sea)*, & **81** *(Pacific Southwest Sea),* FAO area *(level 1)* are asked in FDI when FAO division *(level 3)* are asked in AER. Nevertheless, FAO subarea and FAO division are not defined for these FAO areas where only FAO area is defined and constitute the finest level available. Therefore, level asked in the two data calls are **consistent**. The **codes** used are also **similar** e.g. 18.

In conclusion, the Subregion *(area)* asked in the two data calls are generally consistent and it should be possible to derive AER subregion from FDI subregion in most of cases. Major issues are for the FAO areas 41, 47, 58 & 87 where the level asked in the FDI will not allow to derive the ones asked in AER, e.g. subregion "41.1" *(level 2)* will be asked in FDI when AER asked for "41.1.1", "41.1.2", "41.1.3" or "41.1.4" *(level 3)*. Nevertheless, these FAO areas are not those concentrating most of the EU fishing fleets activity. Furthermore, there is some inconsistencies in coding between the two data calls which should be harmonized/standardized e.g., "GSA7" code is used for FDI when "sa 7" code is used for AER for the same subregion GFCM GSA 7.

Gear

FDI: FDI requested **fishing activity data disaggregated by gear** *(gear type coding are defined in Appendix 4)*, **target assemblage** *(defined in Appendix 5)*, **mesh size ranges** *(defined in appendix 6)* and **métier DCF level6** (métier DCF level 7 for tuna fisheries) *(defined in appendix 7, reference list derived from the work done in the RCG ISSG on métier and transversal variables issues)*.

AER (Gear and Fishery - European Commission (europa.eu)) : AER do **not request fishing activity data disaggregated by gear/métier** as data are already available in FDI data base. (!). Gear dimension has been used in AER to further disaggregate and/or identify specific parts of a DCF / EU-MAP fleet segment. FAD *(Fish aggregation device)* is included in this list to identify vessels / fleet segments using this technique.

This use of same notion for different purposes or concepts is very confusing. All the more so that gear codes to be used in AER to distinguish a group of vessels that predominately or exclusively use a specific gear type are very similar with the ones used in FDI to disaggregate fishing activity data by gear. E.g., On one side, AER data with GEAR dimension = "GTR" specified = data of vessels belonging to the DCF Fleet segment "DFN – Drift and/or fixed netters" using predominately "GTR – Trammel nets" gear. On other side, FDI data with Gear = "GTR" = fishing activity data issued by vessels practicing "GTR – trammel nets" fishing gear *(i.e., could be from vessels allocated to the DCF Fleet segment "DFN – Drift and/or fixed netters" but also from vessels allocated in another DCF Fleet segment)*. The two concepts are totally different but used the same coding which is very confusing.

Furthermore, the GEAR dimension asked and defined as it is in AER data call cannot be derived from information available in FDI data base. FAD information possibly added to AER data is also an information not available in FDI data base.

Fishery and Activity level

FDI: FDI do not request this specific information added recently to the AER data call.

AER (Gear and Fishery - European Commission (europa.eu)) : AER introduce "Fishery" dimension and "Activity level" to further disaggregate and/or identify specific parts of a DCF / EU-MAP fleet segment. Fishery dimension is used to distinguish/identify a group of vessels inside a supra-region that operate under a specific fishery, RFMO or SFPA[6] *e.g., RFMO "NAFO – Northwest Atlantic Fisheries Organization", Fishing agreements "SFPA-NA – Northern Agreements" or Other "PELAG – Pelagic fishery".* Activity level indicator is used to distinguish/identify in a DCF fleet segment, vessels with low activity levels from the rest of the vessels with normal or high activity level.

This two supplementary information recently added to the AER data call cannot be derived from information available in FDI data base which could be an issue. Nevertheless, first step would be to assess the use of these new information in the AER data and needs associated.

Conclusions

The conclusion is that in general, the two data calls AER and FDI contain the same fishing activity information, but in some cases, the codes and description of the codes are different. The time series in the two data calls are different, the supra region NAO is defined differently in the two data calls. Unknown/OTH species are handled differently, definitions within the fishing technique and vessel length range fields are not matching. Some area coding in the sub region fields is inconsistent, and the gear codes are used for two different concepts. In addition, two fields specified as fishery and activity level in AER are not found in FDI.

Reference:

[6] For example, to distinguish a group of purse seiners fishing under IOTC (Indian Ocean) from purse seiners operating under ICCAT (Atlantic Ocean).

Scientific, Technical and Economic Committee for Fisheries (STECF) – Fisheries Dependent Information – FDI (STECF-21-12). EUR 28359 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-45887-6, doi:10.2760/3742, JRC127727.

Regional Work Plans

The EU project Fish'n Co, see FISHN'CO - Strengthening EU-MAP data collection (fisheries-rcg.eu) developed suggestions for regional work plans. This has now been taken over by ISSG RWP. The concept is that it is a book on agreements within the region. There is a section called 'Fishing activities data' with only input from SSF. The chairs of the ISSG RWP requested input from this ISSG on agreements on fishing activities data in general.

The RWP proposal will be discussed in the next RCG meetings and after in the September Liaison meeting. The aim is that this book on agreements will be implemented in the next WP 2025-2027 as common things. The work engaged by the group on cross-validation/combination methods could be an input for the future for these RWP.

Suggestion for the RWP: Agreed methods for fishing activity variables

The RCG ISSG on Métier and transversal variable issues have worked on standardizing procedures for assigning métier codes according to the EU-MAP (EU 2021/1167 table 5). Common best practices, an R script and reference tables used to assign métiers have been made available on the RCG GitHub https://github.com/ices-eg/RCGs/tree/master/Metiers.

General principles for effort calculation have been agreed, especially for vessels carrying logbooks *(more than 10 meters length vessels)*, in the 2nd Workshop on Transversal Variables in 2016.

In 2022 the ISSG reviewed specific discussions from several methodological meetings on the issues linked with SSF effort calculations in regards with the data sources available by MS. This shows that for the SSF, the data collection is not as standardized as for the LSF which can lead to difficulties to calculate SSF fishing effort estimates following the general principles agreed in 2016 *(see above)*. Data collection varies from the use of adapted declarative forms in a census approach way *(monthly journal, coastal logbooks, …)* to the application of a sampling approach through a data collection system based mainly on sales notes. This creates challenges to the standardization and harmonization of SSF fishing effort calculation between MS. There is a general agreement that, when reporting SSF vessels fishing effort for data calls, the estimates should be calculated keeping in line as far as possible with the general principles elaborated in 2016 considering also: 1) the specific SSF features and 2) data available *(in particular vessels fishing effort should be calculated on a "day by day" basis rather than on a "fishing trip by fishing trip" basis)*. There is also an agreement with the commonly assumption that SSF have generally a daily activity and that therefore the following assumption could be considered: (1 sales note) = 1 fishing trip = 1 day at sea = 1 fishing day as far as no other information contradict it. Finally, it is also agreed that "vessels" fishing effort measures *(days at sea, vessel fishing days or hours)* are less meaningful for passive gears where relevant fishing effort measures should be better linked with the gear' fishing time *(e.g. soaking time)* but, nevertheless, "vessels" and "gear" fishing effort measures both should be calculated as they can be valuable for different purposes, e.g., bycatch estimates.

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Annex 1: Draft questionnaire for the task on harmonization of variable submission for AER and FDI data calls

ISSG on Métier and transversal variable issues - 2022-2023 – Josefine Egekvist / Sébastien Demanèche

Draft questionnaire Task 7 – v2022-12-09

"Harmonization of variables submission for AER and FDI data calls *(landings, effort)*. In collaboration with JRC and RCG Econ participants".

Background

The following questionnaire is to be completed by the DCF National correspondents and/or "ISSG on Métier and transversal variables issues" experts with knowledge on their national process to answer Fleet Economic *(AER – Annual Economic Report)* and Fishery Dependent Information *(FDI)* STECF JRC data calls.

The "ISSG on Métier and transversal variables issues" is a group of experts mandated under RCG NANSEA and Baltic to work, in the context of EU-MAP, on issues related to the definition and calculation of fishing activity variables *(transversal variables)* dealing also with best practices. The group has been ongoing since 2018 discussing first methods and best practices to assign Métier code to transversal data but expanding its tasks since 2021 with issues related to transversal variables.

The following questionnaire aims to assess the compatibility/interoperability of fishing activity data *(capacity, fishing effort and landings in weight and in value)* available in the STECF AER and FDI data calls. It aims to compare 1) the data coverage/completeness in the two data calls and 2) the definition/methods applied to calculate their common variables. It forms part of the objective that the submission of the final annual fishing activity data should be implemented in the frame of the FDI data call and use in AER STECF WG. AER data call may request provisional annual fishing activity data.

Main questions

1) Could you precise the fishing fleet reference retained to answer the two data calls *(e.g., 31/12/AAAA picture, any vessel active or present in the national fishing fleet register at any point in the year, …)*. In particular, could you precise if "inactive vessels" are provided in capacity tables in the two data calls and if yes, the method applied to define them?

	FDI table J	AER
Fleet register reference	E.g., Vessels active during the year	E.g., Vessels active 31/12
Inactive vessels	Included?	Included?

2) Could you precise the method used to count the number of vessels *(individual vessels, number of companies, ...)*?

	FDI table J	AER
Number of vessels	E.g., Number of vessel ids during the year	E.g., Number of compagnies. The method is currently under review

3) Could you precise the available time-period in your national database for national fishing activity data and the years actually provided answering the two data calls?

	FDI table	AER
Time period with fishing activity data in national database	1987-last week	2005-last year
Time period in data calls	2013-2021	

4) Could you precise the data coverage/completeness when answering the two data calls. In particular, could-you precise if data from all vessels registered are provided and if not which part of the national fisheries are not *(e.g. specific vessel length ranges, fleet segment, fisheries, …)*. Particular emphasis should be done regarding Small-scale coastal Fisheries *(SSF) (mainly less than 12m vessels)*, Large Pelagic Fisheries *(LPF)* and Long-Distance fisheries *(LD)*?

	FDI table J	AER
Completeness SSF	Complete, based on sales notes.	
Completeness LPF	No LPF fleet	No LPF fleet
Completeness LD	Complete (but marked as confidential due to low number of vessels)	One vessel excluded

5) Could you precise also the species coverage/completeness of the provided data *(e.g. all the species landed, only species with biological information available, main species landed, …)*?

	FDI table A	AER
Species coverage/competeness	All species landed (with a sale notes) + discard estimates + BMS	All species landed (with a sale notes)

6) In the frame of the AER data call, could you precise the clustering procedures utilized to provide sensitive *(economic)* data. If clustering procedures applied, could you precise if it also applied to provide fishing activity data?

	FDI table A/G…	AER
Clustering procedures for fleet segments	Clustering procedures not applied	Clustering procedures applied: Description…

7) Could you describe briefly applied method to calculate and assign vessels year by year to:
   a. Fishing technique?
   b. Geo-Indicator?
   c. and Principal Supra-region?

Could you confirm that same method applied for the two data calls or if not explain why?

	FDI table A/G…	AER
Method to assign fishing technique		
Method to assign Geo-indicator		
Method to assign principal supra-region		

8) Could you describe briefly applied method to allocate "métier/gear" to "fishing trips/sequences/days" in the two data calls?

	FDI table A/G…
Method to allocate métier/gear to fishng trips/sequences/days	

9) Could you precise the methodology used to allocate vessel' fishing effort metrics *(number of fishing trips, days at sea, fishing days, fishing hours, ...)* by fishing area in the two data calls especially for vessel having fishing activity in several areas on the same fishing trip. Is-it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*?

	FDI table A/G…	AER
Method to allocate effort	According to Nicosia principles	According to Nicosia principles

10) Could you precise the data type provided for the two data calls i.e. official data *(e.g. data issued from control regulation as logbooks, sales note, VMS data …)* or "scientific" estimate?

	FDI table A/G…	AER
Data type	Logbook data Sales notes data VMS data Sampling data Fleet register data	Logbook data Sales notes data Fleet register data Economical data from compagnies

11) In the frame of the FDI data call, could you precise the methodology applied to define confidential data?

	FDI table A/G…
Metod applied to define confidential data	If less than 3 vessels it is marked as confidential

Annex 2: For task 5: Analysis of variability/variety – homogeneity/heterogeneity of métiers level 4/gears available by current DCF fleet segmentation on the basis of the RDBES 2021 data issued from the 2022 data call.

Reminder: Task5: Link with the alternative fleet segmentation suggested by RCG Econ to enhance the link between the two approaches. Analysis of the variation in métiers within the fleet segmentation.

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Since 2001 and the first Data Collection Regulation in support of the Common Fisheries Policy (EU Regulation 1639/2001), a segmentation of the EU fishing fleet has been in force to collect data and provide aggregated indicators. The current Multiannual Union Programme (EU Regulation 1004/2017 EU-MAP) segmentation inherited from the former Data Collection Framework (DCF, 2009), based on both the main gear used and the vessels' length is often considered imperfect insofar as it may group together vessels with heterogeneous technical characteristics and/or landing profiles. This situation does not always allow to correctly assess the situation of some of the components of these fleets and their evolution and/or to evaluate the biological, economic and social implications of fisheries management scenarios.

Under RCG Econ there have been two workshops considering the development on an alternative fleet segmentation from the current segmentation. To calculate this alternative fleet segmentation, an R-package has been tested considering annual vessel species composition landings but not the métiers practiced by the

vessels during the year. The ISSG considers that a new fleet segmentation should reflect the exploitation strategy of the vessels and that this new segmentation should be linked to the métiers *(a vessel could practice several métiers during the year but belong to only one Fleet segmentation for the year considered which should represent its exploitation strategy)*.

A third workshop on alternative fleet segmentation is scheduled on 3 & 4 May 2023, to prepare this workshop and as an input for it, the ISSG has work on assessing the variability/variety – homogeneity/heterogeneity of gears available by current DCF fleet segmentation based on 2021 data provided for the ICES RDBES 2022 data call. This document describes this analysis. Results could be used/considered to feed a "métier approach" pre-segmentation step specially to define structuring "fishing gears" and/or combination thereof.

The first goal of this analysis was to highlight the polyvalence and diversity of gears *(métiers level 4)* observed in the current DCF Fleet segmentation. Also, this first analysis highlights the issue *(which could provide confusing results)* that combination of gears used i.e., vessels' exploitation strategy could be allocated into different DCF Fleet segments with the "predominant" gear rules. The same exercise could be done at a more disaggregated level of métier (e.g. métier DCF level5 and/or level6) but it will only highlight further the large fishing activity diversity observed in the current fleet segmentation. Furthermore, a first pre-segmentation step considering structuring "fishing gears" and/or combination thereof will be very useful to reduce this diversity.

It should be considered also that "Fishing Tech" is an optional field in RDBES data call. Therefore, the first step has been to evaluate how MSs answer RDBES data call with this information.

A/ General overview - RDBES Data

Data were provided for one year: **2021**.

14 countries supplied data: Spain, France, Denmark, Finland, Netherlands, Estonia, Sweden, Poland, Ireland, Germany, Belgium, Latvia, Lithuania and Portugal. All the countries provided same information as "Official" and "Scientific", therefore only "Scientific" information will be presented.

Table 9 : *Fishing days and landings by country provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage from the country in relation to the total effort/landings.*

Year	Country	FishingDays	Landings (tons)	% FishingDays	% Landings
2021	SPAIN	390 318	245 871	**32**	**10**
2021	FRANCE	327 277	366 869	**27**	**15**
2021	DENMARK	91 004	462 666	8	**19**
2021	FINLAND	74 147	97 582	6	4
2021	NETHERLANDS	59 530	270 643	5	**11**
2021	ESTONIA	55 812	64 555	5	3
2021	SWEDEN	53 313	152 115	4	6
2021	POLAND	44 956	158 069	4	6
2021	IRELAND	43 431	205 423	4	8
2021	GERMANY	41 015	144 115	3	6
2021	BELGIUM	11 959	17 342	1	1
2021	LATVIA	11 171	61 362	1	3
2021	LITHUANIA	8 377	50 347	1	2
2021	PORTUGAL	NA	149 477	NA	6
		1 212 311	**2 446 437**		

Table 1 show that a total of more than **1 200 thousand fishing days** have been provided for almost **2,5 million tons**. **Portugal** did **not** provide any **fishing effort data** *(table CE)*, only landings data *(table CL)*. Almost 60% of the total fishing days provided are concentrated in Spain and France. Spain, France, Denmark and Netherlands contribute each to more than 10% of the total landings provided.

Table 2 show the same information **by vessel length ranges**. All the 14 countries provided data for less than 10 meters *(VL0010)*, 10-12 meters *(VL1012)* and more than 12 meters *(VL12XX)* length vessels. **Ireland** provided **only landings data for less than 10 meters** *(no fishing effort data)*. Belgium do not have any vessels less than 10 meters length and very few 10-12 meters length vessels *(~100 Fishing Days provided)*. Finally, Germany provided few landings data *(20 tons)* with vessel length information not informed *("NK") (with no fishing effort data associated)*.

Table 10: *Fishing days and landings by country and vessel length ranges provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage from the country in relation to the total effort/landings provided. In addition, the column KG/FishingDays show the average landing per fishing day.*

Year	Country	VesselLength	FishingDays	Landings (tons)	% FishingDays	% Landings	KG/FishingDays
2021	SPAIN	VL0010	200 030	6 510	51	3	33
2021	SPAIN	VL1012	34 282	5 912	9	2	172
2021	SPAIN	VL12XX	156 007	233 449	40	95	1 496
2021	FRANCE	VL0010	114 184	31 373	35	9	275
2021	FRANCE	VL1012	89 890	91 099	27	25	1 013
2021	FRANCE	VL12XX	123 203	244 397	38	67	1 984
2021	DENMARK	VL0010	25 597	3 551	28	1	139
2021	DENMARK	VL1012	7 431	3 580	8	1	482
2021	DENMARK	VL12XX	57 976	455 534	64	98	7 857
2021	FINLAND	VL0010	70 919	5 600	96	6	79
2021	FINLAND	VL1012	698	4 148	1	4	5 943
2021	FINLAND	VL12XX	2 530	87 834	3	90	34 717
2021	NETHERLANDS	VL0010	2 192	1 114	4	0	508
2021	NETHERLANDS	VL1012	457	162	1	0	354
2021	NETHERLANDS	VL12XX	56 881	269 367	96	100	4 736
2021	ESTONIA	VL0010	50 043	2 993	90	5	60
2021	ESTONIA	VL1012	2 246	6 106	4	9	2 719
2021	ESTONIA	VL12XX	3 523	55 456	6	86	15 742
2021	SWEDEN	VL0010	31 712	1 396	59	1	44
2021	SWEDEN	VL1012	9 434	3 692	18	2	391
2021	SWEDEN	VL12XX	12 167	147 027	23	97	12 084
2021	POLAND	VL0010	29 083	4 262	65	3	147
2021	POLAND	VL1012	5 835	2 604	13	2	446
2021	POLAND	VL12XX	10 038	151 203	22	96	15 063
2021	IRELAND	VL0010	NA	8 936	NA	4	
2021	IRELAND	VL1012	12 769	8 575	29	4	672
2021	IRELAND	VL12XX	30 662	187 912	71	91	6 128
2021	GERMANY	NK	NA	20	NA	0	
2021	GERMANY	VL0010	12 285	1 955	30	1	159
2021	GERMANY	VL1012	4 962	879	12	1	177
2021	GERMANY	VL12XX	23 768	141 262	58	98	5 943
2021	BELGIUM	VL1012	103	159	1	1	1 542
2021	BELGIUM	VL12XX	11 856	17 183	99	99	1 449
2021	LATVIA	VL0010	6 502	3 114	58	5	479
2021	LATVIA	VL12XX	4 669	58 248	42	95	12 476
2021	LITHUANIA	VL0010	6 627	363	79	1	55
2021	LITHUANIA	VL1012	340	10	4	0	28
2021	LITHUANIA	VL12XX	1 410	49 974	17	99	35 443
2021	PORTUGAL	VL0010	NA	31 060	NA	21	
2021	PORTUGAL	VL1012	NA	27 733	NA	19	
2021	PORTUGAL	VL12XX	NA	90 684	NA	61	
			1 212 311	**2 446 437**			

B/ Fleet segment DCF / EU-MAP (fishing Technique) submission

All the 14 different fleet segments defined in DCF / EU-MAP have been provided. In terms of fishing effort, the main fleet segments are: “Demersal trawlers and/or demersal seiners”, “Drift and/or fixed netters”, “Dredgers” and “Vessels using pots and/or traps”. In terms of landings, the two main fleet segments are: “Demersal trawlers and/or demersal seiners” and “Pelagic trawlers”.

***Table 11**: Fishing days and landings by Fleet Segment DCF / EU-MAP provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage considering the total effort/landings provided.*

Year	Fleet Segment	Fleet Segment DCF / EU-MAP	FishingDays	Landings (tons)	% FishingDays	% Landings
2021	DTS	Demersal trawlers and/or demersal seiners	219 575	551 942	18	23
2021	PMP	Vessels using active and passive gears	163 303	57 473	13	2
2021	DFN	Drift and/or fixed netters	132 406	58 635	11	2
2021	DRB	Dredgers	108 689	76 579	9	3
2021	FPO	Vessels using pots and/or traps	83 557	37 041	7	2
2021	PG	Vessels using passive gears only for vessels <12m	78 219	9 785	6	0
2021	HOK	Vessels using hooks	61 528	51 702	5	2
2021	PGP	Vessels using polyvalent passive gears only	55 390	42 275	5	2
2021	PS	Purse seiners	37 436	201 598	3	8
2021	TBB	Beam trawlers	35 172	30 400	3	1
2021	MGP	Vessels using polyvalent active gears only	20 449	39 630	2	2
2021	TM	Pelagic trawlers	12 094	703 573	1	29
2021	MGO	Vessels using other active gears	10 854	3 067	1	0
2021	PGO	Vessels using other passive gears	3 457	9 626	0	0
2021	*NO*	*Vessels not allocated*	*262*	*10*	*0*	*0*
2021	*INACTIVE*	*Inactive vessels*	*5*	*151*	*0*	*0*
2021		Not available	189 912	572 949	16	23
			1 212 311	**2 446 437**		

Table 3 show that the **polyvalent fleets** "Vessels using active and passive gears", "Vessels using passive gears only for vessels <12 m" and "Vessels using polyvalent passive gears only" are also three **major fleets provided** considering their total fishing effort data. Some fishing activity data have been provided for the fleet segments "Vessels not allocated" *(NO)* & "Inactive vessels" *(INACTIVE)* but it remains minor. Finally, ~190 thousand Fishing Days ***(16%)*** and ~573 thousand tons ***(23%)*** have been provided with the **Fleet Segment DCF / EU-MAP not filled out** which is quite **significant** but could be explained as "Fishing Tech" is an optional field in the RDBES data call.

***Table 4**: Fishing days and landings by country provided for the RDBES 2022 data call for 2021 data, with Fleet Segment DCF / EU-MAP not filled out. The % Fishing Days and % Landings represent the percentage by country of the total effort/landings provided with Fleet Segment DCF / EU-MAP not filled out.*

Year	Country	Fleet Segment	Fleet Segment DCF / EU-MAP	Fishing Days	Landings (Tons)	% Fishing Days	% Landings
2021	GERMANY		Not available	18 400	17 915	45	12
2021	DENMARK		Not available	2	0	0	0
2021	ESTONIA		Not available	55 812	64 555	100	100
2021	IRELAND		Not available	41	404	0	0
2021	LATVIA		Not available	11 171	61 362	100	100
2021	NETHERLANDS		Not available	59 530	270 643	100	100
2021	POLAND		Not available	44 956	158 069	100	100

Table 4 show that this is the case for four countries: **Estonia**, **Latvia**, **Netherlands** and **Poland** which did not fill out "Fleet Segment DCF / EU-MAP" information. For **Germany**, 45% of total fishing effort and 12% of total landings have been provided with "Fleet Segment DCF / EU-MAP" information not filled out. Considering data provided, it concerns the German fleets practicing in the **Baltic Sea** *(27.3.c & 27.3.d)*. The other countries have well provided the "Fleet Segment DCF / EU-MAP" information in their fishing activity data *(except very minor data in Denmark and Ireland)*.

***Table 5**: Fishing days and landings for polyvalent fleets by vessel length ranges provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the % of effort/landings provided by vessel length range for the different polyvalent fleets compared with the total effort/landings provided by vessel length ranges with fleet segment filled in.*

Year	Vessel length	Fleet segment	Fleet segment DCF / EU-MAP	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	NK	PG	Vessels using passive gears only for vessels <12m	NA	0	NA	2
2021	VL0010	PG	Vessels using passive gears only for vessels <12m	77 546	5 745	17	6
2021	VL1012	PG	Vessels using passive gears only for vessels <12m	651	4 040	0	3
2021	VL12XX	PG	Vessels using passive gears only for vessels <12m	22	NA	0	NA
2021	VL0010	PGP	Vessels using polyvalent passive gears only	28 586	15 954	6	18
2021	VL1012	PGP	Vessels using polyvalent passive gears only	8 193	2 850	5	2
2021	VL12XX	PGP	Vessels using polyvalent passive gears only	18 612	23 470	4	1
2021	VL0010	PMP	Vessels using active and passive gears	138 346	16 910	31	19
2021	VL1012	PMP	Vessels using active and passive gears	13 994	29 134	9	20
2021	VL12XX	PMP	Vessels using active and passive gears	10 963	11 430	3	1

Table 5 show that, considering fishing activity data filled in with "Fleet segment DCF / EU-MAP" information, **polyvalent fleets** are more informed in the **smallest vessel length ranges** i.e. for vessels 10-12 meters length and even more for vessels less than 10 meters length. As an example, polyvalent fleet "Vessels using passive gears only for vessels <12m" represent 17% of the total fishing effort informed for vessels less than 10 meters length when "Vessels using polyvalent passive gears only" represent 18% of their total landings. The polyvalent fleet "Vessels using active and passive gears" is particularly informed for vessels less than 10 meters length *(31% of their fishing effort and 19% of their landings)* but also for vessels 10-12 meters length *(9% of their fishing effort for 20% of their landings)*.

***Table 6**: Fishing days and landings for polyvalent fleets by country provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided by country by polyvalent fleet.*

Year	Country	Fleet Segment	Fleet segment DCF / EU-MAP	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	FINLAND	PG	Vessels using passive gears only for vessels <12m	71 559	9 412	97	10
2021	LITHUANIA	PG	Vessels using passive gears only for vessels <12m	6 649	363	79	1
2021	GERMANY	PG	Vessels using passive gears only for vessels <12m	11	10	0	0
2021	DENMARK	PGP	Vessels using polyvalent passive gears only	27 760	5 820	31	1
2021	SPAIN	PGP	Vessels using polyvalent passive gears only	15 287	20 510	4	8
2021	FRANCE	PGP	Vessels using polyvalent passive gears only	11 473	2 722	4	1
2021	SWEDEN	PGP	Vessels using polyvalent passive gears only	870	87	2	0
2021	PORTUGAL	PGP	Vessels using polyvalent passive gears only	NA	13 136	NA	9
2021	SPAIN	PMP	Vessels using active and passive gears	135 783	6 640	35	3
2021	DENMARK	PMP	Vessels using active and passive gears	13 995	11 807	15	3
2021	FRANCE	PMP	Vessels using active and passive gears	13 456	38 565	4	11
2021	SWEDEN	PMP	Vessels using active and passive gears	69	2	0	0
2021	PORTUGAL	PMP	Vessels using active and passive gears	NA	459	NA	0

Polyvalent fleets are not informed in the same way from one country to another. As an example, **Finland** and **Lithuania** informed the **large majority** of their fishing activity data *(in terms of fishing effort)* with the polyvalent fleet segment **"Vessels using passive gears only for vessels <12 m"**. **Denmark** and **Spain** are the main users for the other polyvalent fleets **"Vessels using polyvalent passive gears only"** or **"Vessels using active and passive gears"** with respectively **46%** and **39%** of their total fishing effort provided. Other countries either do not provide fishing activity data associated with a polyvalent fleet or in lesser degree *(less than 10% of their total fishing effort)*.

C| Fleet segment DCF / EU-MAP (fishing Technique) polyvalence in terms of gear used

C1) Demersal trawlers and/or demersal seiners (DTS)

***Table 7**: Fishing days and landings for "Demersal trawlers and/or demersal seiners" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for DTS fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings		
2021	DTS	Demersal trawlers and/or demersal seiners	OTB	153 878	276 457	70	50		
2021	DTS	Demersal trawlers and/or demersal seiners	OTT	35 883	30 632	16	6		
2021	DTS	Demersal trawlers and/or demersal seiners	PTB	7 653	33 387	3	6		
2021	DTS	Demersal trawlers and/or demersal seiners	SDN	4 371	6 039	2	1		
2021	DTS	Demersal trawlers and/or demersal seiners	SSC	3 236	8 473	1	2	93	64
2021	DTS	Demersal trawlers and/or demersal seiners	DRB	5 808	5 976	3	1		
2021	DTS	Demersal trawlers and/or demersal seiners	OTM	2 209	164 592	1	30		
2021	DTS	Demersal trawlers and/or demersal seiners	PTM	1 948	18 571	1	3		
2021	DTS	Demersal trawlers and/or demersal seiners	GES	1 361	8	1	0		
2021	DTS	Demersal trawlers and/or demersal seiners	TBB	1 163	1 069	1	0		
2021	DTS	Demersal trawlers and/or demersal seiners	Other gears	2 066	6 740	1	1		
				219 575	**551 942**				

Table 7 show that **more than 90%** of the total fishing effort and **almost 2/3** of the total landings of the vessels allocated to the "DTS" fleet segment is done with demersal trawls gears *(OTB, OTT or PTB)* or demersal seines *(SDN or SSC)*. Nevertheless, **"Dredgers / Trawlers"** *(3% of the total fishing effort)* or **"Mixed trawlers** using demersal and pelagic trawls**"** *(33% or the total landings)* constitute two major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of demersal trawl or demersal seine with more than 15 other gears including passive gears.

C2) Beam trawlers (TBB)

***Table 8**: Fishing days and landings for "Beam trawlers" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for TBB fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	TBB	Beam trawlers	TBB	33 952	28 618	97	94
2021	TBB	Beam trawlers	OTB	784	1 286	2	4
2021	TBB	Beam trawlers	DRB	374	362	1	1
2021	TBB	Beam trawlers	SSC	43	123	0	0
2021	TBB	Beam trawlers	FPO	20	10	0	0
				35 172	**30 400**		

Table 8 show that the "Beam trawlers" fleet segment regroup especially vessels **specialized** (**97%** of the total fishing effort provided and **94%** of the total landings) in one unique fishing gear: the beam trawl (TBB). Few vessels **combined** this activity with few days with **demersal bottom trawl** *(OTB)* or **dredges** *(DRB)*.

C3) Pelagic trawlers (TM)

***Table 9**: Fishing days and landings for "Pelagic trawlers" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for TM fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings		
2021	TM	Pelagic trawlers	OTM	6 185	473 793	51	67		
2021	TM	Pelagic trawlers	PTM	4 374	178 265	36	25	87	93
2021	TM	Pelagic trawlers	OTB	1 201	50 506	10	7		
2021	TM	Pelagic trawlers	DRB	135	179	1	0		
2021	TM	Pelagic trawlers	OTT	77	83	1	0		
2021	TM	Pelagic trawlers	PTB	68	37	1	0		
2021	TM	Pelagic trawlers	TBB	1	0	0	0		
2021	TM	Pelagic trawlers	Other gears	53	710	0	0		
				12 094	**703 573**				

Table 9 show that **more than 85%** of the total fishing effort and **90%** of the total landings of the vessels allocated to the "TM" fleet segment is done with pelagic trawls gears *(OTM or PTM)*. Nevertheless, **"Mixed trawlers** using demersal and pelagic trawls**"** *(10% of the total fishing effort and 7% of the total landings)* constitute, here also, a major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of pelagic trawls with around 10 other gears including passive gears.

C4) Dredgers (DRB)

***Table 10**: Fishing days and landings for "Dredgers" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for DRB fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings		
2021	DRB	Dredgers	DRB	91 757	71 002	84	93		
2021	DRB	Dredgers	HMD	6 023	130	6	0	90	93
2021	DRB	Dredgers	FPO	5 096	671	5	1		
2021	DRB	Dredgers	OTB	2 462	1 870	2	2		
2021	DRB	Dredgers	TBB	520	407	0	1		
2021	DRB	Dredgers	OTT	122	32	0	0		
2021	DRB	Dredgers	GTR	826	54	1	0		
2021	DRB	Dredgers	LLS	439	44	0	0		
2021	DRB	Dredgers	GNS	393	108	0	0		
2021	DRB	Dredgers	GND	213	3	0	0		
2021	DRB	Dredgers	GTN	2	0	0	0		
2021	DRB	Dredgers	Other gears	835	2 259	1	3		
				108 689	**76 579**				

Table 10 show that **around 90%** of the total fishing effort and total landings of the vessels allocated to the "DRB" fleet segment is done with a dredge gear *(DRB or HMD)*. Nevertheless, **"Dredgers / Trawlers"** *(3% of the total landings)* or **"Dredgers / Passive gears** especially using pots & traps or nets**"** *(>5% of the total fishing effort)* constitute two major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of dredge with more than 15 other gears.

C5) Purse seiners (PS)

***Table 11**: Fishing days and landings for "Purse seiners" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PS fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	PS	Purse seiners	PS	35 234	191 392 550	94	95
2021	PS	Purse seiners	LHP	1 746	9 115 465	5	5
2021	PS	Purse seiners	LTL	142	152 883	0	0
2021	PS	Purse seiners	LHM	24	36 000	0	0
2021	PS	Purse seiners	GTR	134	20 105	0	0
2021	PS	Purse seiners	TBB	94	26 910	0	0
2021	PS	Purse seiners	Other gears	63	854 430	0	0
				37 436	**201 598 343**		

Table 11 show that **around 95%** of the total fishing effort and landings of the vessels allocated to the "PS" fleet segment is done with purse seine gears *(PS)*. Nevertheless, **"Purse seiners"** could **combine** this activity with **"Passive gears"** especially hooks métiers**"** *(~5% of the total fishing effort and landings)* which constitute one major gear combined by these vessels with purse seine gears. Furthermore, these vessels could combine their main activity of purse seine with more than 10 other gears.

C6) Vessels using other active gears (MGO)

***Table 12**: Fishing days and landings for "Vessels using other active gears" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for MGO fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings		
2021	MGO	Vessels using other active gears	GES	6 400	23	59	1		
2021	MGO	Vessels using other active gears	SB	NA	2 681	NA	87	59	88
2021	MGO	Vessels using other active gears	FPO	1 182	49	11	2		
2021	MGO	Vessels using other active gears	LLS	1 034	57	10	2		
2021	MGO	Vessels using other active gears	GTR	754	68	7	2		
2021	MGO	Vessels using other active gears	GND	663	42	6	1		
2021	MGO	Vessels using other active gears	GNS	483	33	4	1		
2021	MGO	Vessels using other active gears	LHP	140	7	1	0		
2021	MGO	Vessels using other active gears	DRB	70	3	1	0		
2021	MGO	Vessels using other active gears	GNC	47	1	0	0		
2022	MGO	Vessels using other active gears	Other gears	81	103	1	3		
				10 854	**3 067**				

Table 12 show that the "Vessels using other active gears" fleet segment regroup especially vessels practicing "**glass eel fishing**" *(GES - 59% of the total fishing effort provided)* or "**beach seines**" *(SB – 87% of the total landings provided)*. Nevertheless, these vessels could **combine** this activity with some **"Passive gears"** *(~38% of the total fishing effort)* especially "pots and/or traps" *(FPO)*, "hooks métiers" *(LLS & LHP)* or "nets" *(GTR, GND, GNS & GNC)*. This constitute a major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of glass eel fishing or beach seine with more than 15 other gears especially passive gears *(very few combined with another active gear)*.

C7) Vessels using polyvalent active gears only (MGP)

***Table 13**: Fishing days and landings for "Vessels using polyvalent active gears only" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for MGP fleet segment by fishing gear.*

Year	Fleet Segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	MGP	Vessels using polyvalent active gears only	OTB	7 583	6 376	37	16
2021	MGP	Vessels using polyvalent active gears only	OTT	180	77	1	0
2021	MGP	Vessels using polyvalent active gears only	PTB	2	4	0	0
2021	MGP	Vessels using polyvalent active gears only	DRB	6 744	8 508	33	21
2021	MGP	Vessels using polyvalent active gears only	OTM	2 264	4 456	11	11
2021	MGP	Vessels using polyvalent active gears only	PTM	1 108	3 035	5	8
2021	MGP	Vessels using polyvalent active gears only	SDN	1 259	2 044	6	5
2021	MGP	Vessels using polyvalent active gears only	MIS	592	14 441	3	36
2021	MGP	Vessels using polyvalent active gears only	TBB	406	680	2	2
2021	MGP	Vessels using polyvalent active gears only	GES	297	2	1	0
2021	MGP	Vessels using polyvalent active gears only	*GNS*	8	1	0	0
2021	MGP	Vessels using polyvalent active gears only	*FPO*	8	5	0	0
				20 449	**39 630**		

Table 13 show that the polyvalent active fleet "Vessels using polyvalent active gears only" fleet segment regroups vessels using a large variety of active gears from "Bottom otter trawls" *(OTB)* to "Glass eel fishing" *(GES)* with no-one of them being used for the major part. The main active gears used are: **"Demersal trawls"** *(OTB, OTT & PTB)*, **"Dredges"** *(DRB)* and **"Midwater trawls"** *(OTM & PTM) (~87% of the total fishing effort and 55% of the total landings)*. "Demersal seines" *(SDN)* account for around 5% of the total fishing activity when "Miscellaneous gears" corresponding to a "seaweeds fishery" practicing in France with large number of landings is also a major fishery practiced, at least in terms of landings. Finally, "Beam trawls" and "Glass eel fishing" remain relatively minor. The 16 Fishing Days allocated to passive gears should be an error.

C8) Drift and/or fixed netters (DFN)

***Table 14**: Fishing days and landings for "Drift and/or fixed netters" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for DFN fleet segment by fishing gear.*

Year	Fleet Segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings		
2021	DFN	Drift and/or fixed netters	GNS	59 865	34 154	45	58		
2021	DFN	Drift and/or fixed netters	GTR	51 080	14 536	39	25		
2021	DFN	Drift and/or fixed netters	GND	2 322	266	2	0		
2021	DFN	Drift and/or fixed netters	GNC	1 763	152	1	0		
2021	DFN	Drift and/or fixed netters	GTN	457	619	0	1	87	85
2021	DFN	Drift and/or fixed netters	FPO	5 950	1 345	4	2		
2021	DFN	Drift and/or fixed netters	FYK	1 015	77	1	0		
2021	DFN	Drift and/or fixed netters	FPN	927	31	1	0		
2021	DFN	Drift and/or fixed netters	LTL	2 258	1 645	2	3		
2021	DFN	Drift and/or fixed netters	LHM	1 533	1 615	1	3		
2021	DFN	Drift and/or fixed netters	LLS	820	107	1	0		
2021	DFN	Drift and/or fixed netters	LHP	631	99	0	0		
2021	DFN	Drift and/or fixed netters	LLD	178	80	0	0		
2021	DFN	Drift and/or fixed netters	GES	1 597	6	1	0		
2021	DFN	Drift and/or fixed netters	DRB	1 288	797	1	1		
2021	DFN	Drift and/or fixed netters	Other gears	720	3 105	1	5		
				132 406	**58 635**				

Table 14 show that **around 85%** of the total fishing effort and landings of the vessels allocated to the "DFN" fleet segment is done with nets gears *(GNS, GTR, GND, GNC & GTN)*. "Set gillnets" (GNS) and "Trammel nets" (GTR) are the main nets' gear used. Nevertheless, **"Netters / Potters"** *(~6% of the total fishing effort)* or **"Netters / Hooks métiers"** *(~5% of the total fishing effort)* constitute two major combined exploitation

strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of nets with more than 15 other gears including active gears.

C9) Vessels using pots and/or traps (FPO)

***Table 15**: Fishing days and landings for "Vessels using pots and/or traps" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for FPO fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings		
2021	FPO	Vessels using pots and/or traps	FPO	69 223	30 036	83	81		
2021	FPO	Vessels using pots and/or traps	FPN	3 574	204	4	1		
2021	FPO	Vessels using pots and/or traps	FYK	2 943	92	4	0	91	82
2021	FPO	Vessels using pots and/or traps	GNS	2 602	555	3	1		
2021	FPO	Vessels using pots and/or traps	GTR	1 777	542	2	1		
2021	FPO	Vessels using pots and/or traps	GND	164	40	0	0		
2021	FPO	Vessels using pots and/or traps	GTN	2	199	0	1		
2021	FPO	Vessels using pots and/or traps	DRB	761	767	1	2		
2021	FPO	Vessels using pots and/or traps	LLS	618	159	1	0		
2021	FPO	Vessels using pots and/or traps	LLD	11	2	0	0		
2021	FPO	Vessels using pots and/or traps	LHP	582	177	1	0		
2021	FPO	Vessels using pots and/or traps	LTL	286	80	0	0		
2021	FPO	Vessels using pots and/or traps	LHM	171	100	0	0		
2021	FPO	Vessels using pots and/or traps	Other gears	844	4 086	1	11		
				83 557	**37 041**				

Table 15 show that **more than 90%** of the total fishing effort and **more than 80%** of the total landings of the vessels allocated to the "FPO" fleet segment is done with pots & traps gears *(FPO, FPN & FYK)*. "Pots" (FPO) is the main fishing gear used. Nevertheless, **"Potters / Netters"** *(~5% of the total fishing effort)* or **"Potters / Hooks métiers"** *(~3% of the total fishing effort)* constitute two major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of pots and/or traps with more than 15 other gears including active gears *("Dredges" (DRB) is the main active gear combined)*.

C10) Vessels using hooks (HOK)

***Table 16**: Fishing days and landings for "Vessels using hooks" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for HOK fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings		
2021	HOK	Vessels using hooks	LLS	33 637	18 109	55	35		
2021	HOK	Vessels using hooks	LHP	9 636	5 757	16	11		
2021	HOK	Vessels using hooks	LTL	5 422	3 661	9	7		
2021	HOK	Vessels using hooks	LLD	3 484	11 061	6	21		
2021	HOK	Vessels using hooks	LHM	2 957	4 122	5	8	90	83
2021	HOK	Vessels using hooks	FPO	2 032	345	3	1		
2021	HOK	Vessels using hooks	GNS	1 234	256	2	0		
2021	HOK	Vessels using hooks	GES	1 212	4	2	0		
2021	HOK	Vessels using hooks	GTR	1 024	120	2	0		
2021	HOK	Vessels using hooks	GND	121	18	0	0		
2021	HOK	Vessels using hooks	other gears	769	8 249	1	16		
				61 528	**51 702**				

Table 16 show that **around 90%** of the total fishing effort and **more than 80%** of the total landings of the vessels allocated to the "HOK" fleet segment is done with hooks gears *(LLS, LHP, LTL, LLD & LHM)*. "Set

longlines" *(LLS)* and "Handlines and pole-lines (hand operated)" *(LHP)* are the main gears used. Nevertheless, **"Hooks métiers / Potters"** *(~3% of the total fishing effort)* or **"Hooks métiers / Netters"** *(~4% of the total fishing effort)* constitute combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of hooks métiers with more than 10 other gears including active gears *("Glass eel fishing" (GES) is the main active gear combined)*.

C11) Vessels using other passive gears (PGO)

***Table 17**: Fishing days and landings for "Vessels using other passive gears" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PGO fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings		
2021	PGO	Vessels using other passive gears	DIV	1 790	347	52	4		
2021	PGO	Vessels using other passive gears	GES	675	3	20	0		
2021	PGO	Vessels using other passive gears	MIS	487	9 170	14	95		
2021	PGO	Vessels using other passive gears	LN	123	23	4	0		
2021	PGO	Vessels using other passive gears	FOO	36	4	1	0	90	99
2021	PGO	Vessels using other passive gears	FPO	138	26	4	0		
2021	PGO	Vessels using other passive gears	LHP	95	7	3	0		
2021	PGO	Vessels using other passive gears	LLS	37	36	1	0		
2021	PGO	Vessels using other passive gears	GNS	26	2	1	0		
2021	PGO	Vessels using other passive gears	GTR	19	0	1	0		
2021	PGO	Vessels using other passive gears	DRB	14	2	0	0		
2021	PGO	Vessels using other passive gears	LTL	10	5	0	0		
2021	PGO	Vessels using other passive gears	LLD	8	1	0	0		
				3 457	9 626				

Table 17 show that the "Vessels using other passive gears" fleet segment regroup especially vessels practicing "**Diving**" *(DIV - 52% of the total fishing effort provided)*, **"Lift nets"** *(LN – 4% of the total fishing effort provided)* or "**Fishing on foot"** *(FOO –1% of the total fishing effort provided)* which combine these **"coastal activities"** with non-structuring gears like **"Glass eel fishing"** *(GES – 20% of the total fishing effort provided)* or "Miscellaneous gears" which correspond to a **"Seaweeds fishery"** practicing in France with large number of landings *(MIS – 95% of the total landings provided)*. These vessels could use other passive gears as nets, pots / traps or hooks métiers but not for the most part. "Dredges" *(DRB)* is the only other active gear combined which is relatively minor.

C12) Vessels using passive gears only for vessels <12m (PG)

***Table 18**: Fishing days and landings for "Vessels using passive gears only for vessels <12m" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PG fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	PG	Vessels using passive gears only for vessels <12m	GNS	44 330	1 534	57	16
2021	PG	Vessels using passive gears only for vessels <12m	FYK	31 407	8 205	40	84
2021	PG	Vessels using passive gears only for vessels <12m	LLS	1 094	17	1	0
2021	PG	Vessels using passive gears only for vessels <12m	*OTM*	*602*	*NA*	*1*	*NA*
2021	PG	Vessels using passive gears only for vessels <12m	FPO	408	18	1	0
2021	PG	Vessels using passive gears only for vessels <12m	LHP	192	5	0	0
2021	PG	Vessels using passive gears only for vessels <12m	*PTM*	*122*	*NA*	*0*	*NA*
2021	PG	Vessels using passive gears only for vessels <12m	LLD	46	0	0	0
2021	PG	Vessels using passive gears only for vessels <12m	*OTB*	*11*	*5*	*0*	*0*
2021	PG	Vessels using passive gears only for vessels <12m	*SSC*	*7*	*NA*	*0*	*NA*
2021	PG	Vessels using passive gears only for vessels <12m	*TBB*	*NA*	*0*	*NA*	*0*
				78 219	**9 785**		

Table 18 show that the "Vessels using passive gears only for vessels <12m" fleet segment has been used mainly for vessels **combining "Set gillnets"** *(GNS)* and **"Fyke nets"** *(FYK)* with no-one of these two gears being used in the major part. The few fishing activities allocated to active gears should be an error.

C13) Vessels using polyvalent passive gears only (PGP)

***Table 19**: Fishing days and landings for "Vessels using polyvalent passive gears" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PGP fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	PGP	Vessels using polyvalent passive gears only	GNS	23 064	9 665	42	23
2021	PGP	Vessels using polyvalent passive gears only	LLS	14 805	16 805	27	40
2021	PGP	Vessels using polyvalent passive gears only	FPO	5 889	2 268	11	5
2021	PGP	Vessels using polyvalent passive gears only	FPN	4 528	463	8	1
2021	PGP	Vessels using polyvalent passive gears only	GTR	2 459	2 249	4	5
2021	PGP	Vessels using polyvalent passive gears only	MIS	1 105	2 927	2	7
2021	PGP	Vessels using polyvalent passive gears only	*OTB*	*969*	*399*	*2*	*1*
2021	PGP	Vessels using polyvalent passive gears only	FYK	758	178	1	0
2021	PGP	Vessels using polyvalent passive gears only	LHP	649	101	1	0
2021	PGP	Vessels using polyvalent passive gears only	Other gears	1 163	7 220	2	17
				55 390	**42 275**		

Table 19 show that the polyvalent passive fleet "Vessels using polyvalent passive gears only" fleet segment regroups vessels using a large variety of passive gears. These vessels especially **combine "Nets"** *(GNS & GTR)*, **"Hooks métiers"** *(LLS & LHP)* and **"Pots and/or traps"** *(FPO, FPN & FYK)* but with no-one of them being used in the major part. In all, these vessels used more than 20 different fishing gears. The few fishing activities allocated to active gears should be an error.

C14) Vessels using active and passive gears (PMP)

***Table 20**: Fishing days and landings for "Vessels using active and passive gears" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PMP fleet segment by fishing gear.*

Year	Fleet segment	Fleet segment DCF / EU-MAP	Gear	Fishing Days	Landings (tons)	% Fishing Days	% Landings
2021	PMP	Vessels using active and passive gears	FPO	54 847	2 712	34	5
2021	PMP	Vessels using active and passive gears	GTR	31 224	1 511	19	3
2021	PMP	Vessels using active and passive gears	GNS	19 012	3 704	12	6
2021	PMP	Vessels using active and passive gears	DRB	16 246	4 100	10	7
2021	PMP	Vessels using active and passive gears	LLS	14 748	1 096	9	2
2021	PMP	Vessels using active and passive gears	OTB	9 809	5 767	6	10
2021	PMP	Vessels using active and passive gears	TBB	4 374	186	3	0
2021	PMP	Vessels using active and passive gears	SDN	3 343	59	2	0
2021	PMP	Vessels using active and passive gears	GND	3 060	125	2	0
2021	PMP	Vessels using active and passive gears	LHM	2 370	1 210	1	2
2021	PMP	Vessels using active and passive gears	MIS	1 308	32 188	1	56
2021	PMP	Vessels using active and passive gears	Other gears	2 962	4 816	2	8
				163 303	**57 473**		

Finally, table 20 show that the polyvalent active/passive fleet "Vessels using active and passive gears" regroups vessels combining different fishing gears with no-one of them being used the major part. The main passive gears combined are **"Pots and/or traps"** *(FPO)*, **"Nets"** *(GTR, GNS & GND)* and **"Hooks métiers"** *(LLS & LHM).* The main active gears combined are **"Dredges"** *(DRB)*, **"Demersal trawls or seines"** *(OTB & SDN)* and **"Beam trawls"** *(TBB)*.

Conclusion

14 countries supplied data: Spain, France, Denmark, Finland, Netherlands, Estonia, Sweden, Poland, Ireland, Germany, Belgium, Latvia, Lithuania and Portugal for a total of more than **1 200 thousand fishing days** and almost **2,5 million tons**. **Portugal** did **not** provide any **fishing effort data**. **Ireland** did **not** provide any **fishing effort data** for the **less than 10 meters** length vessels.

~190 thousand Fishing Days ***(16%)*** and ~573 thousand tons ***(23%)*** have been provided with the **Fleet Segment DCF / EU-MAP not filled out** which is quite **significant** but could be explained as "Fishing Tech" is an optional field in the RDBES data call. This is essentially due to four countries: **Estonia**, **Latvia**, **Netherlands** and **Poland** which did not fill out "Fleet Segment DCF / EU-MAP" information. **Germany** do not fill out this information also for their vessels evolving in the **Baltic Sea**.

The other countries provided data with Fleet segment DCF / EU-MAP informed which cover the 14 different fleet segments available. **Polyvalent fleets** *(MGP, PGP & PMP)* are more informed in the **smallest vessel length ranges** i.e. for vessels 10-12 meters length and even more for vessels less than 10 meters length. **Finland** and **Lithuania** informed the **large majority** of their fishing activity data *(in terms of fishing effort)* with the polyvalent fleet segment **"Vessels using passive gears only for vessels <12 m"** *(PG)*.

The analysis of fleet segment' polyvalence in terms of gear used, confirms that current segmentation, because of the criterion of dominant gear *(notion of 'principal' fishing technique)*, aggregate together vessels with different fishing strategy and consequently heterogenous technical characteristics, landings profiles, investments levels and cost structures.

A significant part of the real polyvalence of the fleets is hidden by this rule, an example being the **"Trawlers / Dredgers"** *(major combination observed)* which could belong to four different fleet segments *(DTS, DRB, MGP or PMP)* depending of the gear' intensity regarding the total fishing activity *(e.g. "trawlers / dredgers"*

will be allocated to DTS DCF fleet segment when demersal trawls métiers represent the majority, i.e. more than 50%, of their fishing activity). **"Mixed Trawlers"** *(using demersal and pelagic trawl gears)*, **"Netters / Potters"** or **"Netters / Hooks métiers"** constitute other combined approaches exploitation strategy which seem to be shared by a number of vessels. The **polyvalent fleets** *(PGP, MGP & PMP – i.e., active, passive or active/passive)* of the current fleet segmentation highlight consequently only a minor part of the real polyvalence of the fleets and do not allow to distinguish inside them, one gear combination from another *(it constitutes **mix fleets** giving them **few meaning**)*.

Furthermore, the current fleet segmentation **does not allow to distinguish exclusive or non-exclusive vessels** as they could be potentially allocated in the same DCF fleet segment. DCF fleet segments are indeed more or less shaped by their dominant structuring fishing gear(s) *("beam trawlers" fishing fleet segment (TBB) seems to be the most specialized fleet)*. An alternative fleet segmentation mainly based on a criterion of gear polyvalence/non-polyvalence would be more adequate considering the large number of fishing gears used by vessels in each DCF Fleet segment *(between 10 & 15 fishing gears for each of them)*. This would presumably constitute better group of vessels with more homogeneous annual exploitation fishing strategy.

The fleet segments "Vessels using other active gears" *(MGO)* and "Vessels using other passive gears" *(PGO)* define some other structuring fishing gears like: **"Glass eel fishing"** *(GES)*, **"Beach seines"** *(SB)*, **"Fyke nets"** *(FYK)*, **"Seaweeds fishery"** *(MIS_SWD)* or **"Other Coastal métiers"** *(DIV, LN & FOO – "Diving métiers", "Lift nets" & "fishing on foot")* which should be considered for an alternative fishing fleet segmentation.

The high diversity in terms of gears used and combination thereof observed in the fleets especially for small scale vessels *(under 12 meters length vessels)* highlight that allocating all the vessels into one unique heterogeneous fleet segment, as Finland and Lithuania have done, i.e. PG *(Vessels using passive gears only for vessels <12m)* provides a biased representation of the structure of the fleet **; indeed using a more detailed segmentation is crucial to capture the diversity of the fleet.**

Finally, the analysis by country suggests some differences in algorithm used to allocate vessels into DCF fleet segments. **Harmonization**, **homogenization** and **standardization** seems necessary in order to monitor fishing activity evolvement over times and across countries and be able to make comparison.

Annex 3: RCG ISSG métier and transversal variables issues - Questionnaire Task 4&6 to evaluate the use of cross-validation methods in MS to combine data coming from different declarative sources and the use of the fecR package (calculating fishing effort)

RCG ISSG on Métier and transversal variable issues - 2022-2023 – Josefine Egekvist / Sébastien Demanèche

Questionnaire Task 4 & 6

The questionnaire addresses the following tasks of the RCG ISSG:

"Review the fecR package (calculating fishing effort) in relation to the RDBES data format".

"Evaluate the use of cross-validation methods in MS to combine data coming from different declarative sources".

Background

The following questionnaire is to be completed by the DCF National correspondents and/or "ISSG on Métier and transversal variables issues" experts with knowledge on their national fishing activity data and the cross-validation methods eventually applied.

The "ISSG on Métier and transversal variables issues" is a group of experts mandated under RCG NANSEA and Baltic to work, in the context of EU-MAP, on issues related to the definition and calculation of fishing activity variables *(transversal variables)* dealing also with best practices. The group has been ongoing since 2018 discussing first methods and best practices to assign Métier codes to transversal data but expanding its tasks since 2021 with issues related to transversal variables.

The following questionnaire aims to make a first European overview on on-going methods in MS to cross-validate and combine different type of available declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* to calculate and consolidate fishing activity data *(capacity, fishing effort and landings in weight and in value)* for national fishing vessels including Small-scale coastal Fisheries *(SSF) (mainly less than 12m vessels)*.

Main questions

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

   Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used :

   a. to assess the value of landings especially for landings not sold at auctions?

   b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

   c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

Annex 4: Replies to questionnaire for the task on the fecR package for calculating fishing effort

A/ Replies to questionnaires compiled by question

Question 1 on data types available to assess fishing activity data

MS	1.1. Summary of data sources and availability	1.2. Are all data available for SSF? If not, short description of exemption	1.3 Weaknesses
DEU	Logbooks (not for small vessels < 10 m); Landings declarations (for small vessels < 10 m, landings are presented as monthly catch reports); Fishing fleet register; Trips register	For small vessels < 10 m the landings are presented as monthly catch report	No information on spatial data and sale notes. Insufficient information on effort level for vessels <10 m
DNK	Sales notes: available for all Danish vessels by trip back to 1987 Logbooks: available for vessels >=10 m, and vessels >=8 m in the Baltic Sea back to 1987 Fleet register: available for all vessels back to 1987. VMS: available for all vessels >= 12 m back to 2012. For vessels >= 15 m back to 2005. AIS: mandatory to have installed for vessels > 15 m but installed on many smaller vessels. It is dependent on a receiver to get the AIS signal, and it can be switched off. Available back to 2006, with increasing coverage of data. BlackBox: geo-localisation data with sensor information mandatory for mussel fisheries and available from some EM trial fisheries	Limited spatial information for vessels under 12 m in length. No effort data for vessels <8 m in the Baltic Sea and <10 m in other areas	SSF is limited covered with spatial data, for vessels <8 m in the Baltic Sea and <10 m in other areas. Effort calculation for SSF is based on sales note
ESP	For vessels < 10 m sales notes data is using for calculation the fishing effort and data on weight/value for vessels. Sales notes is used for value of landings for vessels >=10 m. For the vessels > 10 m , e-logbooks and paper logbooks are used to assess fishing activity data. Geo-localisation data are collected through Vessel Monitoring System.	For small scale fleet < 10 m the effort are based on sales note	No separation by fleet segments spatial data
EST	Fishing activity variables are obtained from the Commercial fishing register, which includes the fishing vessel register and all needed data related to commercial fishing (logbooks, landings declaration, sales notes, geo-localisation data etc.). Fishermen are obliged by law to provide the requested information.	Yes	No separation by fleet segments which may confuse the further conclusions
FIN	Logbook data available per trip for vessels over or 10 meters length. Coastal Logbook data available of non-quota species per month and for quota species per trip for vessels under 10 meters length. Sales Notes data covered by the sales of the quota species only. Vessel register of active & passive vessels including information on vessel characteristics. Discards and Incidental Bycatch (DIB) data corresponding to landings data (LB, CLB, CLBQ) is constructed mainly by utilizing the equivalent fishing journals data.	Non-quota species are reported in coastal logbooks per month. Since 2023 sales notes will be available as well as effort on trip level for all species	No information on spatial data. For historic data no sales note for non-quota species. Issue how to report and calculate the fishing from ice.

FRA	Fishing fleet register is available since 1983 (vessel characteristics (length overall, kilowatt, gross tonnage, vessel' age). In European logbooks (over 10m' vessels) and national monthly declarative fishing forms (less 10m' vessels)is registred the fishing activity data by fishing trip or date/fishing sequence. Data available back to 2000. Data 'completeness differs by area/fishery (e.g. very few data are available for small-scale fisheries from other regions/outermost regions). Sales note data is from auction markets. Do not cover all the French landings as non-auction sales could occur. Data available back to 2000. Vessels geolocation data (longitude, latitude, course and speed) issued especially from VMS devices (hourly basis, mandatory under EU regulations for over 12m' vessels also under national requirements for several specific fisheries e.g. Seine bay' scallop dredgers) and available for some trial fisheries (e.g. in the context of the RECOPESCA research project). Fishing activity calendars using exhaustive survey (vessels registered in the fishing fleet register) data available since 2000 for Northeast Atlantic vessels, since 2002 for Mediterranean and 2007 for other regions/outermost regions. (exhaustively by vessels and month: active/inactive vessel and for active vessel: fishing area, metier(s), exploitation harbour, number of fishermen boarded, monthly fishing effort and fishing gear dimension (for a subsample).	Limited transversal data are available for small-scale fisheries from other regions/outermost regions. Limited spatial information for vessels under 12 m	Sales note data from auction markets only. Limited spatial information for vessels under 12 m
IRL	For vessels >12m available Logbooks and spatial data, for 10-12m- Logbooks data, for <10m: Sales notes. Other resorses of transvertial data for SSF (<15m vessels) : A sentinel fleet representing about 8% of the under 12m fleet provide effort and catch at daily resolution; a Skipper self-sampling programme started in 2021 where Skippers report effort, catch, landings, discards, biological data at operational level; observers at sea programme; port sampling programme for biological data on landings.Inshore VMS; high resolution spatial data are collected for some dredging fleets that provide effort and fishing distribution data.	Limited transversal data are available and no spatial data for small-scale fisheries.	No separation by fleet segments for sales note which may confuse the further conclusions
LTU	The landings declarations and logbooks data available for all vessel's segments since 2019. Until 31 December 2018 the vessel segment which length is <8 m and operated in the coastal area the monthly declarative form with summary of fishing activities. The sales notes are obligately for all fleet. All fleet registration events are available specifically by date. Geo-location data of VMS are available for the vessel segments which length is >15 m. Lithuania is not collecting AIS data.	No spatial data on vessls <12 m. Effort data on trip level since 2019	No spatial information for vessels under 12 m
LVA	For Capacity is using the Latvian Fleet Register; E-logbooks (ERS) for fisheries outside the coastal area (10-12m, 12-15m and >=15m) and the monthly logbooks for coastal areas activities (SSF - <10m and 10-12m). Central Statistical bureau, based on the questionnaire "1-Fishery" contains data on sales for all fleet segments		No spatial information

NLD	Geo-localisation dataavailable since 2005 for vessels > 15 m with frequency every 2 hours as since 2015 the interval was shortened to 30 minutes for some vessels. From 2012 all vessels longer than 12 meters are obliged to carry VMS. Since 2018 vessels smaller than 12m are obliged to report electronic logbooks (e-lite). However, receiving partially of those data. The logbook data is available for all other vessel lengths. The sales notes dataset includes the vessel ID, date, auction, landing harbour, species 3 alpha code, weight, auction size categories (including BMS) and value.	No spatial data and limited effort data on vessls <12 m.	No spatial data and limited effort data on vessls <12 m.
POL	Coastal logbooks, Sales notes and Fishing licences are sources for vessels below 10 meters length; Paper logbooks and sales note - sorces for fishing vessels 10-12 meters length; Electronic logbooks, Sales notes, VMS- sources for vessels over 12 meters length:	No spatial data on vessls <12 m.	No spatial data on vessls <12 m.
SWE	All vessels, 10 meters or more, are required to provide information in logbooks; vessels less than 10 meters fishing with trawls or seiners or land in another country than Sweden and vessels that are 8 meters or more and fish in ICES areas 22-28 and if the vessel has cod onboard that is caught in ICES areas 20-32 also. For other vessels Monthly journals are not obligatory. The Monthly jornal of vessel contains the days at sea, gears,catch of each species up to one month period. Vessels wich use logbooks are copleting the landing declaration. Sales note are exempted for fishing vessels of less than 10 metres' length overall or for quantities landed of fisheries products not exceeding 50 kg of live weight equivalent by species. No spatial information for vessels under 12 m in lenth	Vessel which lenght are less than 10 m and not involved in trawls or seiners fishing, not landing abroad or vessals 8-10 m length range catch cod in ICES areas 20-32, may complete Montly jornal with data on days at sea, gears and catches by species. No spatial information for vessels under 12 m in lenth. Sales note are exempted for fishing vessels of less than 10 metres' length overall	SSF is not covered with spatial data, for some cases mitght be no data for effort or catches. No consistency in use of weight by species: from logbooks or landings declaration

Question 2 on combination/cross-validation of data

MS	2.1. Summary of data sources and availability	2.2. Is there a cross-check/validation system in place? If yes, short description	2.3 Is there a procedure in place that combine several types of data? If yes, short description
DEU	The logbook and landings declaration data are joined by two shared fields, haul number and species. The resulting dataset, in its turn, is joined by trip number field to the trip and vessel registers. The final dataset is then aggregated to the trip level.	No	The logbook and landings declaration data are combined by trip number

DNK	Sales notes data by trip are used as the basis, giving the precise weight and value. Back to 2001, the allocation the weight and value to logbook was by logbook number, as for 1987-2000 period, the trip is defined as vessel-id and landing date in both logbooks and sales notes and used for combining the two data sources. As the sale notes only gives the information by trips, when the information is combined with the logbook information to achieve information on gear, fishing day, ICES rectangle etc., they are distributed out on logbook data relative to the weight of the species. If a species is available in the sales notes, but not in the logbook, the species is allocated to logbook information based on the distribution of the total landings. The fleet register is merged to the combined sales notes – logbook data by landing date.	No	The logbook data are combined by trip number/logbook number/combination of vessel-id and landing date to get the precise weight and value on trip level. The fleet register is merged to the combined sales notes – logbook data by landing date.
ESP	Spain cross-validates different types of data available using an ETL 'consumption algorithm'. The catches associated with the current log will be processed and a line will be generated for each of them in the "Consumption" table, establishing the initial values for the date and time of capture, species, area, country, weight caught and weight caught under size. Cross-checks are between dates of VMS and logbooks or landings.	Verification of the available information. Some cross-checks implemented are the following: - Port errors in declarations of departure, return or landing: These port errors are detected using VMS or previous trips (paper logbooks) in case VMS is not mandatory for these vessels. - Check catches messages that declares an EEZ of a country included in an agreement with active licenses for that vessel: It is checked if vessels have a license or an agreement with that country during that period. Catches whose division and country declared in the DEA do not match with VMS.	Merging information on fishing trip level from logbooks, landings declaration, sales note, information on fish retained on board, transfer information, distribution of weights among consumer lines, assignment of consumption lines to a stock if applicable. In the event that the processed trip had associated landings or declarations of fish retained on board referring to previous trips, this algorithm will be repeated recursively for each of the affected trips.
EST	The active and passive gear data come from different Governmental databases that are combined in R using in house scripts. However, no cross checking is done on a regular basis. Only occasionally misreporting is assessed by comparing the official logbook data to the data from national control authorities. Cleaning the raw data to remove illogical or clearly wrong data but this script is fairly lengthy and does fix only data that is clearly wrong with best guesses based on data of the same fisherman.	Ad-hoc system in case of misreporting	Combined the active and passive gear data which comes from different Governmental databases. Using R script to combine

FIN	Currently cheking the raw data quality from the monitoring point of view. Inaccurately reported data is corrected according to standardized guidelines. A manual error detection is performed to search for any inconsistencies in the raw fishing journal data. The value of landings is calculated by multiplying the average price and the reported amount of catch due to low coverage of the sales notes data. In a nutshell, not a formal cross-validation tool, but the data quality is ensured manually as a part of the production process of official statistics, and then compare the results of each data call against our statistical publications. Detailed information available on https://www.luke.fi/en/statistics/commercial-marine-fishery	Checks of row data quality and inaccurately reported data is corrected according to standardized guidelines.	No
FRA	SACROIS algorithms run by Ifremer (mandated by DGAMPA (French Directorate general for Maritime affairs, Fisheries and Aquaculture)) allow to combine the different declarative data sources based firstly on dates (fishing trip return date declared or estimated, fishing sequences date declared or estimated, landings date, sales date, …) and vessels. Species composition and landings weight associated are considered to assess/strengthen the links specially between fishermen declarative and sales notes data. Specific cases are considered in particular for vessels using fish ponds. The integration and cross-validation of the different data sources is done step by step in a modular manner. Each module integrates a new data sources linked with the fishing trips resulting from the previous steps. First step is to calculate the estimated fishing trips from the geolocation data, then they are combined with the fishermen declarative data and the fishing trips resulting are cross-validated with the vessels sales note data. Fishing activity calendars are considered to complete/enhance the data flow (e.g. to provide better spatial information for non-precise declaration). In the end, the application provides, on this basis, several quality indicators and evaluates the completeness of the final data flow of SACROIS fishing trips.	Each module integrates a new data sources linked with the fishing trips resulting from the previous steps. First step is to calculate the estimated fishing trips from the geolocation data, then they are combined with the fishermen declarative data and the fishing trips resulting are cross-validated with the vessels sales note data. Fishing activity calendars are considered to complete/enhance the data flow (e.g. to provide better spatial information for non-precise declaration). At the end, the application provides, on this basis, several quality indicators and evaluates the completeness of the final data flow of SACROIS fishing trips.	SACROIS algorithms allow to combine the different declarative data sources based firstly on dates (fishing trip return date declared or estimated, fishing sequences date declared or estimated, landings date, sales date, …) and vessels.
IRL	For each vessel length category, used only one data source: for <10m Sales notes; and for >=10m Logbooks. Only raising Daily Operational Estimates to End of Trip declarations to calculate totals per Statistical rectangle.	No	No
LTU	Tthe cross-validate is established for cross checks between the sales notes and logbooks volume of species. Obtained discrepancy causes are investigating and looking for the issue solving. In cases when the data of areas is missed in the logbooks, the geo-location data is using to fulfil gaps. Also there is in place the validation on primary fishing information gaps, such as EEZ, gears with their measurements. The main focuses of the cross-validation are on fixing the primary data.	The cross-validate is established for cross checks between the sales notes and logbooks volume of species. In cases when the data of areas is missed in the logbooks, the geo-location data is using to fulfil gaps. Also there is in place the validation on primary fishing information gaps, such as EEZ, gears with their measurements.	No

LVA	E-logbooks and coastal monthly logbooks are registered in Latvian Fisheries Integrated Control and Information System (LFICIS) which is synchronised with Latvian Fleet register. In the system many of cross-checks are implemented, like: comparison of registered coordinates with VMS data, difference in caught and landed amount by species and other. Sales notes are used to adjust the average price provided by CSB if it's necessary.	The data quality checks are implemented, like: comparison of registered coordinates with VMS data, difference in caught and landed amount by species and other. Sales notes are used to adjust the average price provided by CSB if it's necessary.	No
NLD	The logbook and sales note data sources are matched by vessel ID, date and harbour and if the conditions are met a trip number from the logbooks is assigned. To ensure the right trip number is assigned to each sales note the species composition, the total weight, and the weight by species is examined. When the conditions (quality thresholds) are not met the sale note does get assigned a trip number automatically and a manual examination of the data takes place. The methodology for cross checking the logbooks and VMS data is described in https://edepot.wur.nl/248628 (Appendix B).	The data quality checks established between logbook and sales notes	Combination between the logbook and sales note
POL	Vessels below 10 m register their daily activity in coastal logbooks covering the information on fish species, catch weight, gear type, number of gears, area, fishing time, landings time and harbour. Vessels from 10 to 12 m register their activity in paper logbooks. Data from vessels under 12 m are validated with national reference lists, vessels' patterns and fishing licences. Vessels over 12 m register their activity in electronic logbooks. Data from vessels >=12m are validated with VMS data and national reference lists.	Data from vessels under 12 m are validated with national reference lists, vessels' patterns and fishing licences.	No
SWE	No cross validation across data sources. On some occasions information in landing declarations is merged in using trip identifiers supplied by SwAM in the data. In the case of monthly aggregated data (coastal journals information included in "Catch and effort file"), monthly days-at-sea are considered equivalent to monthly fishing trips. Monthly fishing trips are then split across gear/metier and geographical using a simple algorithm trip identifiers. Values by trip (for logbook data) are extracted from matching sales notes using trip identifiers supplied by SwAM. For trips (logbook data) and coastal journals without matching sales notes, values are assigned based on monthly averages supplied by SwAM or aggregated directly from sales note data.	Vessels over 12 m register their activity in electronic logbooks. Data from vessels >=12m are validated with VMS data and national reference lists.	Coastal journals information combines with logbooks data by merging the trip identifiers supplied by SwAM. The monthly days-at-sea are considered equivalent to monthly fishing trips

Question 2a on assessing value of landings, especially when landings are not sold at auctions

Question 2b on consolidation of species composition

Question 2c on assessing vessel fishing effort, and use of geo-localization data

MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
DEU	All value of landings are presented in the landings declaration.		Days at sea are calculated as a difference between arrival and departure time registered in the trip register. For the >=10m fleet segment, fishing days and fishing hours at sea are taken from the logbook entries directly. For the <10m fleet segment, this information is obtained from monthly catch reports.	No
DNK	All sales are recorded in the sales notes register. However, for BMS fish the information is received from the landing declaration.	The species composition is taken from the sales notes. Before April 2021, only the main species was indicated in the sales notes of the industrial fishery. The species composition was estimated based on samples of the fisheries, and estimated per fishery, year, month, area and ICES rectangle.	The vessel fishing effort is currently calculated from logbook data. For vessels without logbooks, the trips are defined from the sales notes vessel id+landing date, and the effort is set to 1 fishing day and 1 day at sea per trip.	For tasks where higher resolution effort is needed, position data are used (combination of VMS, AIS, BlackBox, EM data and interpolation) and a speed filter is applied to calculate the fishing hours.

ESP	Sales notes are the only available source of value data, so no data cross-validation/combination is needed.	Catches associated with logbooks will be processed and a line will be generated for each of them in the "Consumption" table, establishing the initial values for the date and time of capture, species, area, country, weight caught and weight caught under size. The data between logbook and sales notes are crossed, to identify inconsistencies between landing declarations and sales notes. Mainly, data being crossed are for "stock" species (TAC and quota species), but for the rest of species this cross-check is made too. With this information, it is possible to find differences and errors in species, declarations, etc. Furthermore, for some data calls, the information is aggregated: - Species composition of some congeneric species is estimated based on samples of the fisheries per metier, quarter/month and area. - Catches and length distribution of ray species are reported as SKA and for Sebastes spp. as RED in long distance fisheries. - In some data calls, where it is allowed by the instructions, error reporting in species is grouped in OTH. Percentage and total catches of this OTH related to total catches (all species) is negligible.	VMS system is used to consolidate the "vessel fishing effort", when this information is available. In bottom trawls, speed information is used to determine fishing effort (fishing days, fishing hours..). It is considered vessels are fishing, when speed is higher than zero and lower than five knots. For other gears, it is difficult to calculate fishing effort. Days at sea are calculated taking into account departure date and arrival date.	Yes, VMS data are used.
EST	Not done	Not done	Effort is calculated on the data provided with the highest precision possible. However, VMS data is not used for this and the effort is calculated according to the data provided by fisherman using the script provided in the report of 2nd DCF workshop on transversal variables (Nicosia, 2016)	No

FIN	Value of landings from quota species are assessed through sales notes. For non-quota species are estimated using external information, e.g. through a samle of 20-30 enterprices. An average based approaced is used.	The coverage of the sales notes data is not (at least not yet) good enough for merging each landing with its corresponding first-sale event. However, we made some experiments and calculated the value of landings for herring and sprat directly from sales notes at the last RDBES round. The initial results were promising. We think that, as the new sales notes data starts to cumulate, we could use a vessel-logbook combination and fetch the value of each reported landing directly from sales notes data.	Utilize the reported spatial information (e.g., statistical rectangle) given in the logbooks reported by fishermen.	No
FRA	SACROIS algorithms include a specific algorithm to estimate the value of landings by species based on existing sales note data (sometimes directly deducted from them) or on an average price' estimation. For some fleet segment, estimated price based on expert knowledges is also used. Algorithm main objective is to allocate a value in euro to each SACROIS landings issued from declarative data (European logbooks or national monthly declarative fishing forms, day by day catches and landings declaration) and/or from sales note data. Only sales note data include landings value information. For the landings sold in auction markets (available in sales note data), value or average price (when declarative landings' weight is retained) is directly deducted from sales note. For the other landings (non-auction market sales), an average price by commercial species is assessed from sales note data by "day * landings harbour * fleet segment" considering eventual (dependent of the available data) dynamic hierarchical aggregation: "day->Month->Quarter->Year" or "Landing Harbour -> Maritime district -> Region -> Seaboard" (up to consider the "Year * Seaboard" species' average price). When no sales for a specie during a year on a seaboard raised then estimated price based on expert knowledges are considered (e.g. for trawl freezer or tropical tuna fisheries …). For abroad landings, vessel	SACROIS algorithms include a specific algorithm to consolidate, validate and adjust the SACROIS fishing trips total landings by species and to specify the faunal composition associated. The process considers landings (weight and faunal composition) from declarative data (European logbooks or national monthly declarative fishing forms) and/or from sales note data. Algorithm main objective is to allocate total landings in weight by species and faunal composition associated to each SACROIS fishing trip. Comparison of declarative data (estimated "day by day catches" and "landings declaration") and sales note data are done fishing trip by fishing trip for each species family landed (species aggregation especially developed to compare data at a similar level and, from that, specify the faunal composition associated in terms of commercial species landed at the most disaggregated level possible). The leading principles are the following: 1) "sales note data" and "landings declaration" are prioritized (almost +/-20%) against estimated "day by day catches" (weighting quantification are prioritized against estimated) ; 2) in case of major imbalance between data sources;	SACROIS algorithms include a specific algorithm to consolidate, validate and adjust the vessel' fishing effort data (days at sea, fishing days, hours at sea and fishing hours) associated to each SACROIS fishing trip. The process considers especially the existing geolocation data (e.g. issued from the VMS devices). This information is considered to cross-validate and control the fishing effort data available in declarative data (European logbooks or national monthly declarative fishing forms) and complete the information for SACROIS fishing trips not issued from declarative data (e.g. SACROIS fishing trips issued only from sales note data). Algorithm main objective is to refine/adjust and complete the items (Fishing trip' start and return date, day when fishing occurred and fishing hours associated) needed to calculate the vessel' fishing effort metrics (days at sea, fishing days, hours at sea and fishing hours) for each SACROIS fishing trip. Comparison of declarative data and estimated geolocation data' fishing trips items (e.g. issued from the VMS devices) are done fishing trip by fishing trip. The major leading principles is that estimated	Comparison of declarative data and estimated geolocation data' fishing trips items *(e.g. issued from the VMS devices)* are done fishing trip by fishing trip.

	maritime district registration (up to country registration in a dynamic hierarchical manner) could be considered in replacement of landings harbour.	maximum landings weight is considered up to 140%; beyond sales note data are prioritized and 3) the more precise faunal composition (in term of commercial species landed), available in the different data sources compared, is retained . Comparison are done step by step in live weight (declared landed weight or sale weight are converted into live weight regarding the fish presentation), first comparing "landings declaration" with "day by day catches" (issued from declarative data) and then comparing the achieved result with "sales note data".	geolocation data' fishing trips items are prioritized (issued from a calculation algorithm and observed data) against declarative data. They are also used to complete information when no declarative data are available (e.g. SACROIS fishing trips issued only from sales note data) or in case of missing or outliers' declarative information. Common vessel practices (including the common fishing trip' total landings) could be also considered when neither declarative data either geolocation data are available. In case of no other information than sales note data available for the "vessel*year" considered then the hypothesis "1 Sales note = 1 Fishing trip = 1 Day at Sea = 1 Fishing Day" is retained and "fishing hours" & "hours at sea" are estimated regarding the vessel fleet segment' common practices.	
IRL	The national database system that is used to manage the logbooks information provides an estimated value for each declaration, based on average price per unit (€/kg) values for species and other parameters. The procedure for calculating these average values is hard-coded into the system and is not considered very accurate. This system of allocating values is currently being improved by the national control agency (SFPA) to better account for outliers and variability.	>=10m: We use the Landings Declaration from the Logbooks. If there is a species in the Daily Operational Estimates, but not in the End of Trip Declarations, we do not raise that species (we use only species that are present in the End of Trip Declarations). We do not use the Sales Notes here. <10m: We just use the Sales Notes.	>=10m: We use Logbooks. A daily operational record for each day that the vessel is fishing, including the number of minutes fishing (calculate fishing days and fishing hours). From the trip information we use the Days at sea. <10m: Sales Notes do not have any fishing effort data. For some very specific cases we have estimated fishing effort data, but it is not a very precise method.	No

LTU	Value of landings are based on the sale notes data. There is a link between fishing trip or declarative form and specific sales note. The discrepancy of value are showing in separate report and forward for fixing issue. The majority of sales declarations are submitted by electronic devices using validation tool for submitting. As such, mandatory fields must be completed. The average price per species calculated separately for coastal fisheries (vessel which length is <12 m), the Baltic Sea fleet (vessel which length is >12 m) and Other regions fleet (vessel which length is >24 m)	The species composition is obtaining from landings declaration which proportionally allocated to the catch data for each haul. Therefor spatial information which recorded in effort is used for reports.	The vessel fishing effort is currently calculated from logbook data using fecR package. For the declarative forms data used the algorithm one fishing days=one sea day=one trip.	No
LVA	In LFICIS system the Report of First Purchases is available where is possible to trace the sold fish up to the logbook.	Information from logbooks is used only.	Information from logbooks is used only.	No
NLD	Vessels are only allowed to sell to registered buyers at registered auctions.			
POL	Value of landings for economic data call is estimated based on averages, calculated taking into account: - year and month - port of landing - species - length group (<12 m and >12 m) Value of landings for RDB/RDBES and FDI data calls is estimated based on annual average price per species. Data on fish prices comes from sales notes.	Landings declaration is considered as a final (validated by control authorities) source of information for economic data call. For RDB/RDBES and FDI data calls information on species composition comes from catch data registered in logbooks, which is validated with landings declarations.	All vessels (including SSF) are subject to mandatory reporting of their activity. For vessels under 10 m, each fishing day is considered as one fishing trip lasting approximately 8 hours at sea. For vessels over 10 m, effort is estimated based on the information from logbooks. VMS is used to estimate fishing hours for vessels over 12 m.	VMS is used to estimate fishing hours for vessels over 12 m.

SWE	SwAM: Sweden has 1st hand buyers (these are not necessarily only auctions). All sales that are required to be reported should be sent to SwAM regardless if it is an auction or a first hand buyer. Sales directly to consumers from the fishermen is not required to report, for landings without sales notes SwAM calculates the value using a price matrix. The price matrix estimate average prices using spatial, temporal and auxiliary information regarding the vessel. H-lab assumes all landings are reported in the landing declaration. When sales records do not exist for certain trips, the value is estimated based on an algorithm. Information from landing declaration and sales notes are merged and checked for inconsistencies. Values (by usage/treatment/size class for some species) from matching trips or matching vessel-months from unique subdivisions and gear types are aggregated and used to assign values to fishing events in hierarchical order; by vessel x month, by month x region x fleet, by quarter x region x fleet, by year x region x fleet and finally by year. For some species, typically those for which mainly roe is landed or wrasses sold live, fixed mean values are supplied by SwAM.	SwAM: See answer for question 1. SLU (H-lab) SLU does not cross-validate species composition across data sources, but an algorithm exists that consolidates ”Catch and effort file” with data from landing declarations to ensure all species are included (weights of species already existing in logbooks being split into finer taxonomic resolution but full weight not correct so it still adds to logbook totals. Some reallocations from reported BMS to LCS are carried for quota species without specified minimum legal or commercial size based on information available at SWAM.	SwAM: See answer for question 1. SLU (H-lab) H-lab does not consider geo-localization when producing vessel fishing effort (only ”Catch and effort file” is used)	No

Question 2d on assessing gear information and effort soaking time

Question 2e on spatial information

Question 2f on métier allocation

MS	2.d Methods to get gear information	2.e Methods to get spatial information	2.f Methods assess metier
DEU	No	For the >=10m fleet segment, the fishing effort and landings are distributed haul-wise on the basis of the logbook information. For the <10m fleet segment, the fishing effort is distributed via the landing events.	From 2021, the R-script developed by the ISSG on Métier and Transversal Variables Issues is applied to evaluate the fishing metier for the RDBES datacall.

DNK	Gear information including mesh size is given in the logbooks. Net length is available in the logbooks in some cases, net soaking time is very rarely available. Plan to work on using questionnaire data, EM data and AIS data to estimate soaking time and net length. For vessels without logbooks, the gear is estimated through the métiers, based on the script developed by the ISSG on metier and transversal variable issues.	Area: if available, the area reported in logbooks are used, otherwise, the area reported in sales notes are used. ICES rectangle: if available, the rectangle reported in the logbooks are used, otherwise, it is found from 1. position data if available 2. default from harbour. If mismatch between area and rectangle, position data are used.	The script developed by ISSG is used to assign the metier by haul if available, otherwise by vessel+fishing date. If logbook information are available by haul, the metier is assigned by haul, otherwise by fishing date.
ESP	For gear mesh size, it is checked that data information provided for the fleet complies with the provisions of law. Gear dimension and soaking time, as they are variables not mandatory in the COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009, are not available for all trips	VMS is used to allocate the ICES statistical rectangles, FAO fishing areas and subareas, EEZ, etc, when it necessary to consolidate the information. When VMS information is not available (VMS is not mandatory for these vessels), landing port is used to allocate catches.	ICES area: Two successive concatenated methods are applied. In the first place, the metiers of direct assignment based on administrative criteria (census, license ...) and / or geographic. Next, the métiers that require the application of multivariate analysis on the capture profiles of their trips. For this, Clustering Large Application (CLARA) is used. Mediterranean area: SQL algorithm to identify the metier of each trip is used. The assignation of fishing metier is based on gear reported in the official data and species composition of the trip. East-central Atlantic fisheries: The identification of fisheries/metiers assessment is carried out on the basis of logbook information, from which fleets working in the same area and using the same gears can be identified. In some cases, the percentage of catches by fishing trip is calculated for the main species (standardised catch matrix). In others, the fleet itself is homogeneous and allows identification of the fishery/metier. Tuna and tuna-related fisheries: the logbooks records are introduced into a métier considering: fleet, area, seasonality and target species. Long distance fisheries: Vessel length > 40: Metier codes applied for each fishing area based on species and catches, gear code, mesh size provided in logbooks; also depth data in some fisheries when data are available.

EST	Use the data fishermen have provided.	We do not use the geolocalized data but rather trust the smallest spatial area fisherman have provided as it is considered that the exact catch location (lon, lat) in the provide data is not reported accurately by fishermen.	For active gear the metiers are clear for Estonian data as only SPF is fished in the Baltic. For passive gear previously the target was MIS but now the metier is assigned based on multiple logistic regression models of historical catches where model weights are landing weights. These models are done by ICES areas for each month and then the metier is assigned by looking at model predictions and confirmed by a panel of experts.
FIN	We perform the validation check described in the quality report of Commercial marine fishery statistics. For example, we consider is it possible to catch a certain specie with a certain trap from a certain sea area.	Utilize the reported spatial information (e.g., statistical rectangle) given in the logbooks reported by fishermen and making validation checks described in the quality report of commercial marine fishery statistics. In addition, it is checked, for instance that there's no fishing with fyke/trap net in the middle of sea. We also review possible recording errors, for example, if a vessel fishing in the Gulf of Finland suddenly reports catch in the Bay of Bothnia.	In some cases, we consult fish scientists if we doubt the correctness of the data-based inference of metier.

FRA	At this stage of the SACROIS project, SACROIS algorithms do not include a specific algorithm to consolidate, validate and adjust the information related to the gear mesh size, dimension and fishing effort (i.e. soaking time). Declarative information; when available; (from European logbooks or national monthly declarative fishing forms) are provided for each SACROIS fishing trip without any cross-validation or addition. Nevertheless, a specific algorithm is currently under development to: 1) validate/control declarative information against reference framework in order to highlight possible outliers and 2) complete and cross-validate declarative information with information collected/available in the scientific census survey of annual fishing activity calendars especially for SACROIS fishing trips not issued from declarative data (e.g. SACROIS fishing trips issued only from sales note data) or in case of missing or outliers' declarative information. Furthermore, there is currently ongoing development to estimate/calculate these information from existing geolocation data with high temporal resolution in order they could enhance/complete information available and/or cross-validate it.	SACROIS algorithms include a specific algorithm to consolidate, validate and eventually adjust the spatial information of fishing effort and landings associated to each SACROIS fishing trip. The process considers especially the existing geolocation data (e.g. issued from the VMS devices) and the scientific census survey of annual fishing calendars. These information are considered to cross-validate, control and refine the spatial information available in declarative data (European logbooks or national monthly declarative fishing forms) and complete the information for SACROIS fishing trips not issued from declarative data (e.g. SACROIS fishing trips issued only from sales note data). Algorithm main objective is to allocate fishing effort and species landings by fishing area (including EEZ and regulatory boundaries information) with the aim to better spatialize the declarative spatial fishing activity data especially considering the existing geolocation data. Consolidation, validation and adjustment of the spatial information is done for each SACROIS fishing trip taking into consideration the different information available: a) Declarative data (European logbooks or national monthly declarative fishing forms), b) Estimated spatial information from existing geolocation data which allows to calculate high quality and accurate spatial information and c) monthly spatial information available in the scientific census survey of annual fishing activity calendars. The leading principles are the following: 1) Estimated geolocation data' spatial information is prioritized (issued from a calculation algorithm and observed data) to some extent against declarative data; 2) geolocation data' spatial information is also consider to complete spatial information when no declarative data are available (e.g. SACROIS fishing trips issued only from sales note data) or in case of missing, imprecise or outliers' declarative information and finally 3) fishing activity calendars' monthly spatial information (esp. considering the range of operation and/or, if available, the sub-rectangle level information, information not available in declarative data) is considered to complete and refine data when neither geolocation data either declarative data (or when declarative information is missing, imprecise or outliers, e.g. fishing areas declared at the FAO fishing area level) are available. In some cases, and for precise EEZ or fishing area allocation, pro-rata (i.e. considering the percentage of the different precise fishing area into the global	SACROIS algorithms include a specific algorithm to allocate one or several "fishing metier(s)" to each SACROIS fishing trip. The process considers the dominant landed specie (or group of species) in value, the scientific census survey of vessels annual fishing activity calendars and eventually the declared gear . Algorithm main objective is to allocate a single/unique "fishing metier", "fishing sequence" (i.e. by "day*gear*mesh size*dimension" meaning a new fishing sequence is considered when a vessel changes of "gear*mesh size*dimension" during a day or when the day changes) by "fishing sequence" for each SACROIS fishing trip. The process considers especially the vessels' fishing activity calendars and the dominant landed specie (or group of species, hierarchical species aggregation is used reflecting the possible target species or group of species of the vessels) in value. The methodology to determine the dominant landed specie (or group of species,) is based on the raw ordination of the landed species in value. The leading principles are the following: 1) the vessels' fishing activity calendars constitute the core list of potential metiers practiced by the vessel ("vessel*month") considered and 2) the dominant landed specie (or group of species) in value is prioritized in the metier allocation. Priority is given to the dominant landed specie (or group of species) as it has been proved that it is the most discriminant factor to define the metier, taking also advantage to have access to the common practices of the vessels outlined in the fishing activity calendars. Consequently, the declared fishing gear is only used in last step of the process also because imprecise or mis-reporting have been often observed. Algorithm is done step by step. For example, first step assigns "fishing metier" to fishing sequences when there is a match between the fishing sequence' dominant landed species (or group of species) and metiers core list issued from vessel' fishing activity calendar. Last step assigns directly the metier surveyed in the vessel' fishing activity calendar for the month considered if there is only one without considering the declared fishing gear or dominant landed species (sometimes it could be missing information for the SACROIS fishing trip considered). Lowest and lowest quality is given to metiers when going down into the different steps applied. 'Metier' algorithm is thus extensively based on the fishing activity calendars providing an efficient tool to: 1) taking into

		fishing area calculated) could be applied to estimate the spatial information at the level needed. In some other particular cases, declarative data can be prioritized to be compliant with annex X of the EU Commission Implementing Regulation regarding catch data reporting. Finally, almost all SACROIS fishing trips have spatial information allocated in part emphasized/adjusted considering existing geolocation data. This spatial information constitutes the best available information which could be provided regarding the available data. Based on that, it is also notified that the spread of the vessels' geolocation data (e.g. including less than 12m' vessels for VMS devices regulation) constitutes the best way forward to reach more accurate information on vessels' fishing area.	account possible misreporting (fishing gear, species landed, ...), in particular to assess the reliability and, if necessary, re-evaluate or specify the declared fishing gear, 2) better reflect the fisher' fishing strategy assigning the good aggregating level of target species or assemblage of species and 3) limit the list of possible metiers practiced by each vessel to a validated/appraised frame of references avoiding multiplication of metiers when it is based mainly on a combination of the principal landed target species (or assemblage of species) and declared gear. Finally, 'Metier' algorithm applied is in line with the methodology and principles developed in the "RCG ISSG on Metier and transversal variables issues" (which has the objective to define standardised/harmonised methodologies between MS to allocate metier at DCF level6 to fishing trips/fishing sequences) and allows, in addition, to allocate "fishing metiers" at DCF level7 i.e. considering national needs and specificities. Furthermore, this procedure has the benefit to give priority to the metiers as given by the fishermen himself or appraised by the observers' network expertise which could differ from the observed final principal landed target species or assemblage of species. 'Metier' algorithm prioritized the target metiers/fishing strategy of the vessel' master and not the results of its implementation.

IRL	>=10m: We use Logbooks. Gear information is recorded in Logbooks. <10m: Sales Notes do not have any gear data. For some very specific cases we can allocate gear based on the species caught.	>=10m: In general, we use the Logbooks Statistical rectangle data. However, specifically for the Spatial Fisheries datacall we use the VMS data to allocate the spatial information. In this case we take the Daily Operational Estimates and allocate them to the VMS fishing positions for that day (using the vessel speed rule to determine if the vessel is fishing). We don't systematically compare the spatial information from Logbooks and VMS but we do it for some special situations. <10m: The Spatial information in the Sales Notes is very limited, so we assign the Spatial information based on the landing port	>=10m: We use Logbooks. Métier information is not recorded in Logbooks, but we have a complex algorithm to allocate métiers based on gear, species caught and expert knowledge. This algorithm contains a lot of manually coded exemptions (based on expert knowledge). Part of this coding is needed due to a lack of validation in the logbooks data entry system. <10m: Sales Notes do not have any métier data. For some very specific cases we can allocate métier based on the species caught.
LTU	Gear mesh size, gear dimension and gear fishing effort or soaking time are obtained from logbooks. The main focuses of the cross-validation are on fixing the primary data.	Allocation of the fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ are from logbooks. In case when spatial data is not available or incorrect the VMS data might be used. For vessel is under 12 m. length in overall one and the same ICES statistical rectangles, FAO fishing areas and subareas, EEZ is applied as SSF is operating only in that area.	The fishing metier assess based on trip and gear. When during trip used two and more gear types or gears with different mesh size might be allocated of two or more metiers to one trip.
LVA	Information from logbooks is used only.	Open Sea fishery (10-12m, 12-15m and >=15m): • Information from E-logbooks is used only (coordinates are provided). Coastal fishery (SSF - <10m and 10-12m): • According to the coastal fishermen licensing system, the fishing ground for them is limited by the borders of municipality issued the license. In the coastal logbooks information about ICES rectangle must be provided. Fishermen provide information about fishing start and end dates.	Open Sea fishery (10-12m, 12-15m and >=15m): • Information from E-logbooks is used only (gear and mesh size are provided). Coastal fishery (SSF - <10m and 10-12m): • Each municipality has a limited number of fishing gears (according to the Latvian fishing rules) which are divided between fishermen. In the Latvian fishing rules for each specific fishing gear allowed mesh size range is provided. Métier is defined based on information about the gear.
NLD			

POL	Not for economic data call. For other purposes, soaking time is estimated based on the information from logbooks. The methodology takes into account the gear type and the time intervals between consecutive fishing days. Mesh size is registered in logbooks from vessels over 10 m. For vessels under 10 m, mesh size is derived from the information on catch composition registered in coastal logbooks.	Spatial information from all fishing vessels is registered in FAO areas, ICES statistical rectangles and in the Baltic Sea in national rectangles which are sub-polygons of ICES rectangles. The consistency of different spatial levels is validated using national reference lists. VMS data is used to correct identified errors concerning vessels over 12m. For vessels under 12m, vessels' patterns are used to correct errors.	Not for economic data call. For other data calls, métier codes are assigned on a fishing sequence level based on the information from logbooks or coastal logbooks. The fishing sequence consist of fishing day, location and gear. The target assemblage is determined using the dominance criteria.
SWE	SwAM: See answer for question 1. SLU (H-lab) H-lab does not consolidate gear mesh size, gear dimension and gear fishing effort or soaking time. For the most, data in "Catch and effort file" is used directly, with the exception of fishing effort allocation to gears on coastal journals where an algorithm is used to split monthly aggregated values (days at sea) by gear and location (see above).	SwAM: See answer for question 1. SLU (H-lab) H-lab does not consolidate spatial information using geo-localisation data. Expert judgment is used during effort calculations to carry out minor consolidations of "Catch and effort file" itself (e.g., when rectangles do not match subdivisions, one of these needs to be corrected to pass consistency checks of FDI).	SwAM: Not applicable. SLU (H-lab) H-lab assigns the metiers based on information present in "Catch and effort file". When data comes from logbooks metiers are assigned by haul/set or fishing day, depending on whether the gear is active or passive, respectively. When data comes from coastal journals, monthly fishing effort (days at sea / fishing trips, see above) appears aggregated by month while catches are collected by gear*location so a splitting algorithm needs to be used. The algorithm consists of an even split of total days at sea / fishing trips by the gear*location reported for each month.

Question 2g on data completeness

Question 3 on other concerns regarding data combination methods

MS	2.g Completeness of data	3 Other comments regarding cross validation
DEU	All fishing trips are covered by the considered data sources.	
DNK	In Denmark, we consider the sales notes covering the fishery completely. Vessels below 10 m (8 m in the Baltic) doesn't have logbooks. For these vessels, we join the sales notes with fleet register, and available position data. The métier codes are estimated based on the script developed by the ISSG on métier and transversal variables.	Onboard landings, when part of or all the landings are kept onboard on the next trip, or several trips, to be sold later causes a problem when combining logbooks and sales notes and can result in sales notes without matching logbooks. The onboard landings are marked in the logbooks as OB lines. A solution has been developed to handle the simple cases (looking through 3 last trips, and splitting sales notes where possible), but more complicated cases remain unsolved.

ESP	With the consumption algorithm, all mandatory variables, under COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009, are considered. In the event, that any data are missing, it is checked again, if that information is available or not.	No comments.
EST	We are not doing cross-validation.	No
FIN	The major issue relates to coastal fishing and the incompleteness of the CLB data. The naive approach for calculating the coastal effort is described in Q5. We are aware that our method is not optimal. We are currently working to tackle this issue.	Unfortunately, at least at the moment, we don't have any software-based validation tool in use.
FRA	In the end, different type of SACROIS fishing trips are available in the data flow crossing more or less declarative data sources. SACROIS fishing trips cross-validating declarative data (European logbooks or national monthly declarative fishing forms), sales note data and geolocation data present more precise and higher quality features (most of the fishing trip' items have been cross-validated) than SACROIS fishing trips inferred from a unique "single" declarative data source (e.g. SACROIS fishing trip issued only from sales note data source). Following table detail and summarize the origin and eventual cross-validation applied; for the different type of SACROIS fishing trips; of the different fishing trip features (fishing time, fishing area, landings by species and gear/mesh size/dimension). Cross-validated features present better quality and are more precise than features issued from a unique declarative source. Furthermore, considering the information coming from the scientific census survey of vessels annual fishing activity calendars allows to complete/enhance fishing trips features. SACROIS fishing trips issued from a unique data sources are identified as "orphan". No landings are allocated to SACROIS fishing trips issued only from geolocation data. These fishing trips could highlight missing declarative information and should be close looked into. In addition, no fishing time are allocated to SACROIS fishing trips issued only from sales note data. Nevertheless, fishing effort metrics associated to such fishing trips are estimated in a next step to answer data calls. The estimates are calculated based on vessel common practices (if available) or, in a last step, considering the following hypothesis: "1 sale note = 1 fishing trip = 1 day at sea = 1 fishing day" and estimating hours at sea and fishing time regarding the common practices of the vessel fleet segment. Almost 2/3 of the total fishing trips evaluated for the more than 12m vessels, cross-validate all the declarative data sources i.e. declarative (European logbooks or national monthly declarative fishing forms), sales note and geolocation data ("marées completes"). The less than 12m vessels are generally not geolocated but ~50% of their total fishing trips evaluated cross-validate declarative and sales note data ("marées croisées hors marées complètes"). Around 10% of the SACROIS fishing trips are issued only from sales note data ("ventes orphelines") for more and less 12m vessels. Finally, around 40% of the SACROIS fishing trips for less than 12m vessels are issued only from declarative data ("marées déclarées orphelines") and SACROIS fishing trips issued only	In the end, the definition of all the fishing trips of the French fleet with their associated features (dates, fishing area incl. EEZ and regulatory boundaries, gear, gear dimension and mesh size, total weight and value of landings by species) result from the application of the SACROIS algorithms. The application verifies and controls different source of single-unit dataset, linking and comparing them. SACROIS algorithms do not correct the data but provide several quality indicators. They aim to build a dataset compiling the most accurate and complete information for each individual fishing

	from geolocation data ("marées géoloc orphelines") represent less than 5% of the total SACROIS fishing trips. In the end, it is considered that the SACROIS cross-validation/combination algorithms are a useful tool to supplement/enhance and improve the completeness of the national fishing activity data providing the best use of each data source in order to build the reference fishing activity dataset . This way, SACROIS algorithms aims to answer the following questions: Who fishes? When? Where? How long? With which fishing gear/mesh size/dimension? Targeting which specie or group of species? With what vessel and gear fishing effort? What species are fished? In what quantity? And for what value? Finally, the scientific census survey of annual fishing activity calendars allows to assess the coverage and precision by fleet segment/region of the fishing activity data derived from declarative data (European logbooks or national monthly declarative fishing forms) combined/cross-validated with sales note data and geolocation data by the SACROIS cross-validation tool. When they are evaluated as insufficient/incomplete to meet the end-user's data needs (e.g. DCF requirements) and are judged defective and unreliable to estimate their fishing activity data then complementary data collection (e.g. catch assessment survey) are implemented or re-evaluation methodology based on fishing activity calendars. This is the case for the French fishing fleet less than 12 meters length operating in the Outermost regions (French Guiana, Guadeloupe and Martinique, La Réunion and Mayotte) and for the French fishing fleet less than 12 meters length operating in the supra-region Mediterranean	
IRL	Generally, we are not combining data sources (we only use Logbooks for >=10m and only Sales Notes for <10m). Because most datacalls are at the level of Statistical rectangle. For specific cases VMS data can be used to provide fine scale spatial information. Sales Notes data is hard to match to fishing trips and historically was incomplete, so it has not been used to validate Logbooks. We only started getting Sales Notes data for >=10m in 2019, and most of the datacalls were developed before this.	Any useful methodology that we could learn from other countries and apply it to our data will be welcome, for example: routinely cross-validate data sources information like Logbooks, VMS and Sales Notes. The Irish official statistics are provided based on Logbooks; if our datacall submissions are different from the official statistics there could be questions to be asked about the methodologies.
LTU	The logbooks, landing declaration and sales note are mandatory for all fleet segments. As such, the main focuses are on primary data quality.	No new methods have been developer to share.
LVA	All trips and fishing activities are registered in Latvian Fisheries Integrated Control and Information System (LFICIS).	No specific methods are used in Latvia for the fishery data cross-checking.
NLD		
POL	EU logbooks and coastal logbooks are primary and exhaustive source of information on number and duration of trips.	No

SWE	SwAM: See answer for question 1. SLU (H-lab) H-lab does not generate additional fishing records relative to those it receives from SwAM	SwAM: Not applicable. SLU (H-lab) Data quality of price information and other information only present in the sales notes (such as usage and quality of landings) would greatly improve by a stronger coupling and bi-directionality in the reporting of sales transitions between vessel/trip and 1st hand buyers. At present consistency does not seem to be enforced with reporting in the landing declaration (by the fishermen) and reporting of the sale (by the buyer) being distinct processes, not completely connected, and prone to mismatches. Consistency between the two reports could improve the cross validation of sales and landing declarations happening at SWAM and would significantly help H-lab in its determinations of the value of Swedish fisheries.

Question 4 fecR and effort calculation

MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
DEU	Days at sea are calculated as a difference between arrival and departure time registered in the trip register. For the <10m fleet segment, information on fishing days and fishing hours at sea are obtained from monthly catch reports. (text from Q2c)	-	No	-	- Landings declarations (for small vessels < 10 m, landings are presented as monthly catch reports); - Fishing fleet register; - Trips register (from Q1)	

DNK	The method to calculate fishing effort follows the Nicosia principles, but is programmed in SAS, as part of the scripts that combine the data, and the fishing effort measures are available in the DFAD data set. For vessels without logbooks, sales notes are available, and it is assumed that one sale (vessel and date) equals one trip, one day at sea and one fishing day. For tasks where higher resolution effort is needed, position data are used (combination of VMS, AIS, BlackBox, EM data and interpolation) and a speed filter is applied to calculate the fishing hours. (from Q2.c)	Yes	No, but can be adapted	-	For vessels without logbooks, sales notes are available Fleet register: available for all vessels back to 1987 (from Q1)	
ESP	Effort submitted to DCs is calculated according to the instructions therein. If no instructions are given: - FDI and Fleet Economic: FecR package; under 10m - sales notes info is used. - Mediterranean area: calculate days at sea (as the difference between end and start date) for all fleets (including SSF and passive gears). Most trips are one day trip. - West Africa: Effort (in days fished) is recorded from the logbooks (logbook or electronic logbook DEA), after métier assignment. - Canary islands SSF: polyvalent and multispecific fisheries; vessels with daily activity and no logbooks; can use multiple gears in the same trip; fishing effort is calculated based on the positive days to the métier, based on the occurrence of their target species in the daily catches declared in the sales notes. - Long distance fisheries: Vessel length > 40 (no SSF and passive gears). The fishing effort is calculated as Days-at-sea or Kw-Days depending on the end user requirements.	Yes - FDI and Fleet Economic DCs	Yes - FDI and Fleet Economic DCs		For vessels with no logbooks, sales notes information is used to estimate the effort	

EST	Effort is calculated on the data provided with the highest precision possible. However, VMS data is not used for this and the effort is calculated according to the data provided by fisherman using the script provided in the report of 2nd DCF workshop on transversal variables (Nicosia, 2016) (from Q2c)	Yes	Partly. Using function adapted from Nicosia 2016 script	-	Fishing activity variables are obtained from Commercial fishing register, which includes the fishing vessel register and all needed data related to commercial fishing (logbooks, landings declaration, sales notes, geo-localisation data etc.). Fishermen are obliged by law to provide the requested information. (in Q1)	
FIN	Vessels under 10m - The number of days at sea is estimated to be equal to the number of fishing days. The number of fishing days is estimated to be the same as the number of soaking days, although we know that the fishermen does not visit the trap nets or nets daily.	Partly. SAS code used, was adapted to include guidelines for the effort calculation.	Started to use/test during the latest RDBES DC	The main reason for not applying fecR in previous years implies from the fact that EU-DCF reporting and the production of official statistics have walked hand-in-hand and the determined software in the latter process is SAS. Difficult to implemented under 10m. Crucial information, needed for the FecR, is lost when combining different sources of data to obtain the official statistics. Also coastal logbook data (CLB) is reported by month and lacks information at trip/haul level, that is needed for the FecR. (a) Despite the possibility to calculate the effort for CLBQ data via FecR,	For the CLB, we have been drafting an idea to try to create a single trip pseudo-ID and a pseudo departure and return times based on the soaking hours and/or days aiming to assess the coastal effort more accurately than before. To our knowledge, an implementation to tackle this type of challenge is not (yet) a part of FecR.	(a) Possibility to use FecR for coastal fisheries data in the future because of changes in the legislation.

				this has not been implemented yet. The reason is that when producing official statistics, the data is processed in such way that the CLB and CLBQ data is combined to avoid duplicate reporting in statistical publications. Therefore, we lose some of the crucial information needed in FecR.		
FRA	(1 sales note) = 1 fishing trip = 1 day at sea = 1 fishing day".	Yes	No	An adapted R script has been developed based on the fishing activity data format issued from the SACROIS cross-validation tool especially because the R-script is not suitable for vessels without logbooks *(e.g. for national monthly declarative fishing forms where data are provided on a "day by day" basis)*	All the framework for effort calculation/validation, which uses different sources of data, is performed by SACROIS algorithms (developed by Ifremer)	

IRL	Use a variety of fishing effort calculation methods for different datacalls	Yes, for FDI and RDBES DCs No, RDB and ICES DCs	Yes, FDI DC No, RDBES DC	RDBES DC: FecR does not use metier in its effort calculation (only gear and mesh); also needs effort partitioned by area, rect and metier.	Complementary data - Fishery dependent biological and transversal data on small scale coastal fisheries (SSCF, <15m vessels) are collected under a number of programmes: 1. A sentinel fleet representing about 8% of the under 12m fleet provide effort and catch at daily resolution 2. A Skipper self-sampling programme started in 2021 where Skippers report effort, catch, landings, discards, biological data at operational level 3. Observers at sea programme; provide the same data as in 2 above 4. Port sampling programme for biological data on landings 5. Inshore VMS; high resolution spatial data are collected for some dredging fleets that provide effort and fishing distribution data. (from Q1)	Improvements of the FecR were suggested: - Nationally we should standardize the way we calculate effort; this should be done with the FecR package - Get FecR back into CRAN; - Ensure FecR is suitable for RDBES effort calculations.
LTU	For vessels which provided the declarative forms it was assumed that one fishing day equals one trip, one day at sea and one fishing day. Since 2019 calculation for SSF are based on exact dates provided in logbooks.	(Yes)[a]	Used for vessels over 12 m overall length	-	There is a need for automatic check for overlapping similar gears effort. *(esp. when there are two records of the same gear types with slight difference of the mesh size. There is a risk to double fishing days count)*	[a] - Not stated by the MS in the questionnaire but, if FecR is used, then it's assumed that the procedure follows the Nicosia (2016) principles
LVA	Coastal fishery (SSF: < 10m and 10-12m): - Days at Sea are calculated for each boat (in one fishing activity many boats could be used, as licence is issued for the company and company can own many boats); - Fishing days are calculated for each fishing gear separately	(Yes)[a] - Open Sea fishery	Used for Open Sea fishery (> 10 m)	-	Costal fishery (SSF <10 and 10-12m): - Latvian Fleet Register (for Capacity) - Coastal monthly reports (for fishing effort and landings in weight) (from Q1)	[a] - Not stated by the MS in the questionnaire but, if FecR is used, then it's assumed that the procedure follows the Nicosia (2016) principles

NLD	The methodology for the calculation of fishing effort is in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)* for both passive and active gears	Yes	No			
POL	For vessels under 10 m, each fishing day is considered as one fishing trip lasting approximately 8 hours at sea. (from Q2c) Missing information on fishing trip duration for vessels < 8 meters. Based on known information, from vessels of 8-10 meters, it is assumed that average trip last 8 hours. Soaking time for SSF is available from coastal logbooks (<8 m)	Yes	For the RDB/RDBES and FDI DCs	-	- < 10m: Coastal logbooks; sales notes, fishing licenses; - 10-12m: paper logbooks, sales notes; - > 12m: electronic logbooks, sales notes, VMS (from Q1)	All vessels (including SSF) are subject to mandatory reporting of their activity (from Q2c)
SWE	The estimation of fishing effort at H-lab for purposes of international deliveries related to SSF and passive gears comprises three broad categories: (- ICES spatial fisheries data call (VMS fleet; does not cover the SSF monthly journal data but some passive gear effort from logbooks is included calculations based on VMS records obtained from SwAM; end-user ICES WGSFD)) - less relevant for SSF **- ICES assessment groups, RDBES and FDI data calls (all fleet, calculations based on "Catch and effort file" obtained from SwAM, end-user ICES AWGs, STECF)** With regards to coastal journal data, H-lab also applies the methodology developed during the 2nd DCF workshop on transversal variables (Nicosia, 2016). However, the monthly format requires a previous splitting into "pseudo-trips" before the Nicosia principles and algorithms can be applied. As explained above, the non-existence of trip-level data, makes it require that gear*location combinations reported at monthly level are distributed by the monthly days-at-sea/trips via a splitting algorithm. The latter process necessarily implies some strong assumptions, one of them being that	Yes, for ICES, FDI and RDBES DCs No, RDB DC	Yes, for ICES, FDI and RDBES DCs No, RDB DC	- The monthly aggregation of the coastal journals implies lack of trip-level data. - Days at sea are known but fishing trips need to be assumed similar to days at sea. - It is difficult to identify if gear*locations are fished in parallel or sequentially -> The splitting algorithm assumes they are fished sequentially -> likely leads to underestimation of total fishing days which, according to Nicosia principles may count double when two passive gears are used simultaneously, coming up effectively higher than days at sea. (*)	(*) To improve this situation, it would be important to have trip by trip information on SSF even if submitted at monthly intervals / in monthly journals. Current implementation of e-registration of Swedish monthly journals opens the possibility of achieving that in the future.	

	of unique gear*locations being used each trip. After that initial transformation Nicosia/FecR algorithms are followed just like in the logbook case. **- RDB (all fleet, calculations based on "Catch and effort file", end-user RCG)** Historical data provision into RDB precedes the implementation of the Nicosia principles and to our knowledge Nicosia principles were never a requirement of that data submission. As such, to keep consistency in the time series, effort calculations have been kept the same. In brief, this involves direct calculations (in the case of logbooks) or implementation of a splitting algorithm (in the case of coastal journals, see details above).					

B/ Replies to questionnaires by country

Germany

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

- Logbooks (not for small vessels < 10 m);
- Landings declarations (for small vessels < 10 m, landings are presented as monthly catch reports);
- Fishing fleet register;
- Trips register.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

The logbook and landings declaration data are joined by two shared fields, haul number and species. The resulting dataset, in its turn, is joined by trip number field to the trip and vessel registers. The final dataset is then aggregated to the trip level.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

All landings are presented in the landings declaration.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

Days at sea are calculated as a difference between arrival and departure time registered in the trip register. For the >=10m fleet segment, fishing days and fishing hours at sea are taken from the logbook entries directly. For the <10m fleet segment, this information is obtained from monthly catch reports.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

For the >=10m fleet segment, the fishing effort and landings are distributed haul-wise on the basis of the logbook information. For the <10m fleet segment, the fishing effort is distributed via the landing events.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

From 2021, the R-script developed by the ISSG on Métier and Transversal Variables Issues is applied to evaluate the fishing metier for the RDBES datacall.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

All fishing trips are covered by the considered data sources.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

We didn't use the FecR package yet.

Denmark

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

Transversal data are transferred from the Danish Fisheries Agency to DTU Aqua via SFTP every night. Sales notes: available for all Danish vessels by trip back to 1987 Logbooks: available for vessels >=10 m, and vessels >=8 m in the Baltic Sea back to 1987 Fleet register: available for all vessels back to 1987. VMS: available for all vessels >= 12 m back to 2012. For vessels >= 15 m back to 2005. AIS: mandatory to have installed for vessels > 15 m but installed on many smaller vessels. It is dependent on a receiver to get the AIS signal, and it can be switched off. Available back to 2006, with increasing coverage of data. BlackBox: geo-localisation data with sensor information mandatory for mussel fisheries and available from some EM trial fisheries

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of

data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

Sales notes data by trip are used as the basis, giving the precise weight and value. Back to 2001, the logbook number is defining the trip, and has been added to the sales notes, first by an algorithm run by the Fisheries Agency, but in later years, it is given directly at the auctions. In the years 1987-2000, the trip is defined as vessel-id and landing date in both logbooks and sales notes and used for combining the two data sources. As the sale notes only gives the information by trips, when the information is combined with the logbook information to achieve information on gear, fishing day, ICES rectangle etc., they are distributed out on logbook data relative to the weight of the species. Only lines in the logbooks indicating landings or discards of species are included. If a species is available in the sales notes, but not in the logbook, the species is allocated to logbook information based on the distribution of the total landings. The fleet register is merged to the combined sales notes – logbook data by landing date. The combined data are stored by year in a database called DFAD (Danish Fisheries Analysis Database) in SAS and R datasets.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

All sales are recorded in the sales notes register. However, for BMS fish the information is received from the landing declaration.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

The species composition is taken from the sales notes. Before April 2021, only the main species was indicated in the sales notes of the industrial fishery. The species composition was estimated based on samples of the fisheries, and estimated per fishery, year, month, area and ICES rectangle.

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

The vessel fishing effort is currently calculated from logbook data. For vessels without logbooks, the trips are defined from the sales notes vessel id+landing date, and the effort is set to 1 fishing day and 1 day at sea per trip. For tasks where higher resolution effort is needed, position data are used (combination of VMS, AIS, BlackBox, EM data and interpolation) and a speed filter is applied to calculate the fishing hours.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

Gear information including mesh size is given in the logbooks. Net length is available in the logbooks in some cases, net soaking time is very rarely available. Plan to work on using questionnaire data, EM data and AIS data to estimate soaking time and net length. For vessels without logbooks, the gear is estimated through the métiers, based on the script developed by the ISSG on metier and transversal variable issues.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

Areas are assigned with the following procedure:

i. If available, the area reported in the logbook is used.
ii. Else, the area reported in the sales note is used.
iii. If the area is reported as 3D:
    1. If the rectangle is 34G4 and area is reported as 3D in the logbook, the area is detailed from the sales note.
    2. If area is reported as 3D, the area is detailed from the ICES rectangles reported in logbooks.
    3. If the area is still 3D, the area is detailed from the sales notes.
    4. If the area is still 3D the dominant area from the vessel is used.

ICES rectangles are assigned with the following procedure:

i. If rectangle is available from the logbooks, it is used.
ii. Else, the dominant rectangle by trip is found from position data (AIS/VMS/BlackBox)
iii. If the rectangle is still missing, a default from the harbour is used. This is split between vessels larger than 12 m and vessels smaller than 12 m by harbour.
iv. The area and ICES rectangle relation is checked with the ICES lookup table. If there is a mismatch between area and ICES rectangle following is done:
    1. If it is 2005 or after, VMS data are checked, and if the VMS area equals the assigned area, the ICES rectangle is changed to what is indicated in the VMS data. If the VMS ICES rectangle equals the assigned ICES rectangle, the area is changed to what is indicated in the VMS data. If there is no VMS data available, the ICES rectangle is set to NA.
    2. If it is before 2005, the ICES rectangle is set to NA.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

The script developed by ISSG is used to assign the metier by haul if available, otherwise by vessel+fishing date. If logbook information are available by haul, the metier is assigned by haul, otherwise by fishing date.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

In Denmark, we consider the sales notes covering the fishery completely. Vessels below 10 m (8 m in the Baltic) doesn't have logbooks. For these vessels, we join the sales notes with fleet register, and available position data. The métier codes are estimated based on the script developed by the ISSG on métier and transversal variables.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

Onboard landings, when part of or all the landings are kept onboard on the next trip, or several trips, to be sold later causes a problem when combining logbooks and sales notes and can result in sales notes without matching logbooks. The onboard landings are marked in the logbooks as OB lines. A solution has been developed to handle the simple cases (looking through 3 last trips, and splitting sales notes where possible), but more complicated cases remain unsolved.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

The method to calculate fishing effort follows the Nicosia principles, but are programmed in SAS as part of the scripts that combine the data, and the fishing effort measures are available in the DFAD data set. It could be changed to using the fecR package. For vessels without logbooks, sales notes are available, and it is assumed that one sale (vessel and date) equals one trip, one day at sea and one fishing day.

Spain

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

These data are collected according to **COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy**, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006 SALES NOTES: Sales notes provide data on fishing effort and data on weight and value. - Sales notes are the only declaratory form of catches in vessels <10 m. - Sales notes are the only declaratory form of value in all vessel length ranges. LOGBOOKS: For the rest of vessels length ranges, e-logbooks and paper logbooks are used to assess fishing activity data. VMS: Geo-localisation data are collected through Vessel Monitoring System.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of

data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

Spain cross-validates different types of data available.

An algorithm, called "consumption algorithm", is used. It is an ETL (Extract, transform and Load) type application that extracts information from different information sources, performs the appropriate transformations and, finally, creates tables where the final result is stored. This application runs automatically in periods of time established by parameters. This execution always applies to all fishing trips.

General scheme of process.

The catches associated with the current log will be processed and a line will be generated for each of them in the "Consumption" table, establishing the initial values for the date and time of capture, species, area, country, weight caught and weight caught under size.

1. Reading the information of the fishing trip:
    a. Basic information of the logbook
    b. Catch information.
    c. Landings information.
    d. Information of sales notes.
    e. Information on fish retained on board.
    f. Transfer information (bluefin tuna)
2. Verification of the available information.
3. Generation of consumption lines.
4. Distribution of weights among consumer lines.
5. Assignment of consumption lines to a stock if applicable.
6. Database storage of the information resulting from the processing of the fishing trip
7. In the event that, the processed trip had associated landings or declarations of fish retained on board referring to previous trips, this algorithm will be repeated recursively for each of the affected trips.

Some cross-checks implemented are the following:

- Port errors in declarations of departure, return or landing: These port errors are detected using VMS or previous trips (paper logbooks) in case VMS is not mandatory for these vessels.
- Check catches messages that declares an EEZ of a country included in an agreement with active licenses for that vessel: It is checked if vessels have a license or an agreement with that country during that period.

Catches whose division and country declared in the DEA do not match with VMS.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

Sales notes are the only available source of value data, so no data cross-validation/combination is needed.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

As it is stated before, catches associated with logbooks will be processed and a line will be generated for each of them in the "Consumption" table, establishing the initial values for the date and time of capture, species, area, country, weight caught and weight caught under size. The data between logbook and sales notes are crossed, to identify inconsistencies between landing declarations and sales notes. Mainly, data being crossed are for "stock" species (TAC and quota species), but for the rest of species this cross-check is made too. With this information, it is possible to find differences and errors in species, declarations, etc. Furthermore, for some data calls, the information is aggregated: - Species composition of some congeneric species is estimated based on samples of the fisheries per metier, quarter/month and area. - Catches and length distribution of ray species are reported as SKA and for *Sebastes spp*. as RED in long distance fisheries. - In some data calls, where it is allowed by the instructions, error reporting in species is grouped in OTH. Percentage and total catches of this OTH related to total catches (all species) is negligible.

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

VMS system is used to consolidate the "vessel fishing effort", when this information is available. In bottom trawls, speed information is used to determine fishing effort (fishing days, fishing hours..). It is considered vessels are fishing, when speed is higher than zero and lower than five knots. For other gears, it is difficult to calculate fishing effort. Days at sea are calculated taking into account departure date and arrival date.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

For gear mesh size, it is checked that data information provided for the fleet complies with the provisions of law. Gear dimension and soaking time, as they are variables not mandatory in the COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009, are not available for all trips.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

VMS is used to allocate the ICES statistical rectangles, FAO fishing areas and subareas, EEZ, etc, when it necessary to consolidate the information.

When VMS information is not available (VMS is not mandatory for these vessels), landing port is used to allocate catches.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

ICES area: Two successive concatenated methods are applied. In the first place, the metiers of direct assignment based on administrative criteria (census, license ...) and / or geographic. Next, the métiers that require the application of multivariate analysis on the capture profiles of their trips. For this, Clustering Large Application (CLARA) is used. Mediterranean area: SQL algorithm to identify the metier of each trip is used. The assignation of fishing metier is based on gear reported in the official data and species composition of the trip. East-central Atlantic fisheries: The identification of fisheries/metiers assessment is carried out on the basis of logbook information, from which fleets working in the same area and using the same gears can be identified. In some cases, the percentage of catches by fishing trip is calculated for the main species (standardised catch matrix). In others, the fleet itself is homogeneous and allows identification of the fishery/metier. Tuna and tuna-related fisheries: the logbooks records are introduced into a métier considering: fleet, area, seasonality and target species. Long distance fisheries: Vessel length > 40: Metier codes applied for each fishing area based on species and catches, gear code, mesh size provided in logbooks; also depth data in some fisheries when data are available.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

With the consumption algorithm, all mandatory variables, under COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009, are considered. In the event, that any data are missing, it is checked again, if that information is available or not.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

No comments.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no*

logbooks data are available) and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

Regarding data calls, effort is calculated according to data call instructions. If there is no specifications, effort is calculated as it is stated below:

FDI and Fleet Economic: The effort is calculated according to Nicosia 2016 (FecR). For vessels < 10 m, information comes from sales notes.

For other data calls:

Mediterranean area: The fishing effort is calculated in days at sea, for all fleets (including SSF and passive gears). To calculate the number of days at sea dates of start and finish of the trip are used. In general, most of the trips are one day long.

East-central Atlantic fisheries:
Fishing West Africa: These fisheries are mainly developed within the framework of the Sustainable Fishing Partnership Agreements (SFPAs) between the EU and the coastal states. Effort (in days fished) is recorded from the logbooks (logbook or electronic logbook DEA), after métier assignment (as described in section f).

Canary Islands SSF: Polyvalent and multispecific fisheries. Small vessels with daily activity and without logbooks. They use passive gears such as traps, nets and hooks. The number of gears used, their fishing time and the number of fishing operations carried out on a fishing day are difficult to know.
The allocation of landings to their respective métier is performed on the basis of the species composition of landings.
The fishing effort is calculated by allocating positive days to the métier, based on the occurrence of their target species in the daily catches declared in the sales notes. Sale notes are the available source of information from the fishery, given that logbooks are not required.

Long distance fisheries: Vessel length > 40 (no SSF and passive gears). The fishing effort is calculated as Days-at-sea or Kw-Days depending on the end user requirements.

Estonia

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

Fishing activity variables are obtained from the Commercial fishing register, which includes the fishing vessel register and all needed data related to commercial fishing (logbooks, landings declaration, sales notes, geo-localisation data etc.). Fishermen are obliged by law to provide the requested information.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

The active and passive gear data come from different Governmental databases that are combined in R using in house scripts. However, no cross checking is done on a regular basis. Only occasionally

misreporting is assessed by comparing the official logbook data to the data from national control authorities.

We do clean the raw data to remove illogical or clearly wrong data but this script is fairly lengthy and does fix only data that is clearly wrong with best guesses based on data of the same fisherman.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

Not done

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

Not done

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

Effort is calculated on the data provided with the highest precision possible. However, VMS data is not used for this and the effort is calculated according to the data provided by fisherman using the script provided in the report of 2nd DCF workshop on transversal variables *(Nicosia, 2016)*

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

Use the data fishermen have provided.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

We do not use the geolocalized data but rather trust the smallest spatial area fisherman have provided as it is considered that the exact catch location (lon, lat) in the provide data is not reported accurately by fishermen.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

For active gear the metiers are clear for Estonian data as only SPF is fished in the Baltic. For passive gear previously the target was MIS but know the metier is assigned based on multiple logistic regression models of historical catches where model weights are landing weights. These models are done by ICES areas for each month and then the metier is assigned by looking at model predictions and confirmed by a panel of experts.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

We are not doing cross-validation.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

The FecR package is not used, instead the script from the 2nd DCF workshop on transversal variables *(Nicosia, 2016*) is converted to a function and used on the raw data. Therefore the methodology should be in line with DCF workshop methodology.

Finland

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

The monitoring, control, and surveillance (MCS) of fisheries carried out by the Centre for Economic Development, Transport and the Environment (ELY) forms the cornerstone of FIN fishing activity data. The ELY monitoring data has been made available to Finnish experts involved reporting in the context of EU-DCF. The required information depends on the scope of a particular data call, yet the essential content regarding transversal data consists of • **Logbook (LB) data**: A fishing diary comprising the reported catches per trip for vessels over or 10 meters length. • **Coastal Logbook (CLB) data**: Coastal catches of non-quota species per month for vessels under 10 meters length. • **Coastal Logbook of quota species (CLBQ) data**: Coastal catches of quota species per trip for vessels under 10 meters length. • **Sales Notes (SN) data**: Purchased catches reported by the first-sale buyers of fish. The data is mostly covered by the sales of the quota species only. • **Vessel History and Capacity (VH) data**: Vessel register of active & passive vessels including information on vessel characteristics. • **Discards and Incidental Bycatch (DIB) data** corresponding to landings data (LB, CLB, CLBQ) is constructed mainly by utilizing the equivalent fishing journals data.

The data is stored in Oracle database hosted by Finnish Food Authority. Different data can be merged via database key identifiers, e.g., vessel ID, fishing diary ID, form ID, sales ID and the like.

To summarize the current situation, the core data of trawlers and other vessels over 10 meters length deployed in landing & effort assessments is on a fishing trip level and, thus, quite comprehensive. In addition, the SN data covers most of the catches reported in LB and CLBQ. For these data (LB, CLBQ), it is straightforward to connect a vessel involved in fishing journal to its features in VH data.

In turn, evaluating the fishing effort of coastal fishing (CLB) is more challengeable. This is due several reasons. Firstly, the CLB data is formed via the monthly fishing journal. The fishermen report their within-a-month catch by using a single form. What implies is that we don't know all the details, e.g., day and time of trip departure and return as regards to a single trip or haul. Secondly, CLB is relatively sensitive for erroneous reporting and often includes missing information, at least to some extent. Thirdly, the species reported in CLB are non-quota, and omission of non-quota species' purchase reports has not been controlled. Hence, SN census data on purchase reports of non-quota species has been insufficient. Therefore, value of landings in CLB (also in LB and CLBQ for some species) must be estimated by leveraging external (from the monitoring point of view) data sources, i.e., purchase information obtained from a sample of 20-30 enterprises collected by the Natural Resource Institute of Finland (Luke). Lastly, adding the unconventional feature of Finnish SSF, that is, fishing on ice without a vessel, it is clear that some additional labore is required in order to produce reliable computations especially for the fishing effort.

Fortunately, most of these issues can likely be tackled in the future due to legislative changes. The usage of a fishing trip-level diary will become mandatory also for coastal fisheries and notifying the first-sale purchase will become mandatory for non-quota species as well. These changes will start to appear in the data from 2023. This means a good opportunity to renew our processes such that we can report the coastal data more accurately in the future.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

Introductory comments to Q2 and its sub questions

The current mode of raw data processing related to EU-DCF relies on the processes in the production of official statistics. Having said that ELY examines the source data quality from the monitoring point of view, a proportion of the fishing declarations is checked by the Natural Resources Institute Finland (Luke) before data is processed further. Inaccurately reported data is corrected according to standardized guidelines. A manual error detection is performed to search for any inconsistencies in the raw fishing journal data. For instance, the compatibility of reports by pair trawling vessels is investigated and notifications regarding the quantity of discarded fish are reviewed.

Notwithstanding the value of a particular landing could be calculated in some cases directly via merging SN and the source data (LB, CLBQ), we utilize an average based approach. In practice, this means we exploit a separate process, where per specie-ICES-country (described shortly in Q1) average prices are calculated for statistical reporting. The value of landings is then calculated by multiplying the reported amount of catch and the average price with respect to the mentioned features. We use this approach because the coverage of the SN data is not (at least not yet) good enough for merging each landing with its corresponding first-sale event.

In a nutshell, we do not have a formal cross-validation tool, but we ensure the data quality manually as a part of the production process of official statistics, and then compare the results of each data call against our statistical publications.

For more information, please see https://www.luke.fi/en/statistics/commercial-marine-fishery (Quality Report)

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

The value assessment approach is described in Q1 & Q2.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

The coverage of the SN data is not (at least not yet) good enough for merging each landing with its corresponding first-sale event. However, we made some experiments and calculated the value of landings for herring and sprat directly from SN at the last RDBES round. The initial results were promising. We think that, as the new SN data starts to cumulate, we could use a vessel-logbook combination and fetch the value of each reported landing directly from SN data.

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

We don't use geo-localisation data explicitly (i.e., data collected by some device), but we utilize the reported spatial information (e.g., statistical rectangle) given in the logbooks reported by fishermen.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

We perform the validation check described in the quality report of Commercial marine fishery statistics. For example, we consider is it possible to catch a certain specie with a certain trap from a certain sea area.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

Reference to Q2c & Q2d. In addition, it is checked, for instance that there's no fishing with fyke/trap net in the middle of sea. We also review possible recording errors, for example, if a vessel fishing in the Gulf of Finland suddenly reports catch in the Bay of Bothnia.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

In some cases, we consult fish scientists if we doubt the correctness of the data-based inference of metier.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

The major issue relates to coastal fishing and the incompleteness of the CLB data. The naive approach for calculating the coastal effort is described in Q5. We are aware that our method is not optimal. We are currently working to tackle this issue.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

Unfortunately, at least at the moment, we don't have any software-based validation tool in use.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

The FIN fishing effort computations partly follows the core principles given in Nicosia DCF report. However, we are aware that we have not taken all the advantage from the previous development work. The main reason for not applying fecR in previous years implies from the fact that EU-DCF reporting and the production of official statistics have walked hand-in-hand and the determined software in the latter process is SAS. We are currently renewing our data processing as a whole, and in terms of data call reporting. Meaning, for instance, that we have planned to start to utilize more of the tools, e.g., fecR, created in different development workshops.

The effort regarding the vessels over 10 meters length has been planned to calculate fully via fecR-package over different data calls in the future. The first fecR implementation took place during the latest RDBES data call. We used package version 0.0.2. and downloaded the archive from https://cran.r-project.org/src/contrib/Archive/fecR/

In previous years, and also partly in the transition phase of the moment, the guidelines of effort calculations in the Nicosia report have been adapted to SAS code via which the effort has been calculated during the last years. These two approaches (fecR & tailored SAS code) should produce the same results, and this is planned to be reviewed in the near future.

As was described in Q1, fishing reports of vessels under 10 metres in length, with the exception of species with catch quotas, are given on a monthly coastal fishing journal (CLB). For these vessels, the number of days at sea is estimated to be equal to the number of fishing days. The number of fishing days is estimated to be the same as the number of soaking days, although we know that the fishermen does not visit the trap nets or nets daily. The vast majority of vessels using nets and trap nets are under 10 meters length and, thus, are reporting with the coastal fishing journal.

Despite the possibility to calculate the effort for CLBQ data via fecR, this has not been implemented yet. The reason is that when producing official statistics, the data is processed in such way that the CLB and CLBQ data is combined to avoid duplicate reporting in statistical publications. Therefore, we lose some of the crucial information needed in fecR. Due to the changes in legislation (mentioned in Q1), we think we're able to use fecR in the future for coastal fisheries data as well.

However, the history remains the same. We have discussed the potentiality of fecR against our current CLB data. We have identified that we lack a unique trip ID and the time and date of trip departure and return. As we have a monthly journal form containing all the hauls (per number of days/hours for a

single vessel, specie, trap, rectangle etc.) reported together, we don't know exactly when the fishing operation took place. We have been drafting an idea to try to create a single trip pseudo-ID and a pseudo departure and return times based on the soaking hours and/or days aiming to assess the coastal effort more accurately than before. To our knowledge, an implementation to tackle this type of challenge is not (yet) a part of fecR. Finally, it must be stated that we have just recently started the work towards the introduction of harmonized effort definitions and are not yet familiarized ourselves with the Nicosia report content at a sufficient level.

France

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

To calculate/assess fishing activity data in France, the following different type of declarative data are considered:

French fishing fleet register - Administrative source with the history of French fishing vessels registered in the EU Fishing Fleet Register[7] and ownership movement available **since 1983** *(vessel characteristics (length overall, kilowatt, gross tonnage, vessel' age), vessel' owner and administrative registration geographical information (registration harbour/maritime district)).*

European logbooks (over 10m' vessels) and **national monthly declarative fishing forms**[8] (less 10m' vessels). Fishermen declarative fishing activity data by fishing trip or date/fishing sequence; over 10m' vessels are under EU logbooks reporting requirement[9] *(e-logbook or 'paper' logbook)* when less 10m' vessels are under national legislation[10]. Data harmonized/standardized available **back to 2000**. Data 'completeness differs by area/fishery (e.g. very few data are available for small-scale fisheries from other regions/outermost regions). *(by fishing trip or date/fishing sequence[11]: total weight of landings by species (state of processing/presentation), fishing effort (days at sea, fishing days and hours at sea), fishing area, gear/gear dimension and mesh size).* Declarative data to qualify and validate especially regarding other data sources available.

Sales note data. Landings statistics from auction markets. Do not cover all the French landings as non-auction sales could occur[12]. Data harmonized/standardized available **back to 2000**. *(total weight and value of landings by commercial species (state of processing/presentation/commercial category/destination), date and vessels).*

Geolocation data. Vessels geolocation data *(longitude, latitude, course and speed)* issued especially from VMS devices *(hourly basis, mandatory under EU regulation[3] for over 12m' vessels also under national*

[7] Official EU fleet register database maintained by the EU commission where all the fishing vessels flying the flag of an EU country have to be registered *(EC N°26/2004 & EU N° 1380/2013)*. Any changes in the status of an EU fishing vessel, for example if it has been scrapped, need to be registered by the member country in this database *(https://webgate.ec.europa.eu/fleet-europa/index_en)*.

[8] SSF adapted declarative form established nationally for control purposes.

[9] **Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy.**

[10] **Arrêté du 18 mars 2015 fixant les obligations déclaratives nationales** *(https://www.legifrance.gouv.fr/loda/id/JORFTEXT000030439321)*.

[11] A new fishing sequence is formed for, during a fishing trip, a new fishing day and/or when a vessel changes of "gear/mesh size/dimension".

[12] In France, there is no obligation to sell landings in auction markets *(no auction markets available in some places, e.g. in Guadeloupe)*, such landings are naming "non-auction" sales progressively reported but still incomplete. Also there is an obligation for the first purchaser to declare the landings acquired but again not fully implemented and data remain partial.

requirements for several specific fisheries e.g. Seine bay' scallop dredgers) and available for some trial fisheries *(e.g. in the context of the RECOPESCA research project[13]).*

From Geolocation data, fishing trips and sequences (by dates) are calculated including spatial *(fishing area incl. EEZ and regulatory boundaries)* estimated fishing effort *(days at sea, fishing days and hours at sea)* from the Ifremer FIS ALGOPESCA algorithm[14]. Fishing trips and sequences are calculated/estimated since the inception of the VMS devices EU requirement i.e. **back to 2012** for over 12m' vessels and to **2005** for over 15m' vessels. Estimation issued from a computation algorithm based on objective data measured.

Scientific census survey of annual fishing activity calendars[15]. Exhaustive survey *(vessels registered in the fishing fleet register)* characterizing the inactivity or activity of all the vessels each month of the year and, in the latter case, the metiers practiced and the main fishing areas with the corresponding range of operation[16]. Data available since **2000** for Northeast Atlantic vessels, since **2002** for Mediterranean and **2007** for other regions/outermost regions. *(exhaustively by vessels and month: active/inactive vessel and for active vessel: fishing area, metier(s), exploitation harbour, number of fishermen boarded, monthly fishing effort and fishing gear dimension (for a subsample)).*

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

All these different data sources are cross-validated/combined in order to provide the best possible fishing statistic data. As demanded in article 145 of the EU Commission Implementing Regulation[17], the application is crossing information from different declarative sources of fishing statistics at the most disaggregated level *(declarative data sources multiples, complementary and sometimes inconsistent)* in order to build a dataset compiling the most accurate and complete information for each individual fishing trip. The application verifies and controls the different sources of data, linking and comparing them, with the aim of displaying validated, adjusted and qualified spatial landings per species and fishing effort data series. The application compiles them into a single, verified and consistency, controlled data flow.

SACROIS algorithms run by Ifremer *(mandated by DGAMPA (French Directorate general for Maritime affairs, Fisheries and Aquaculture))* allow to combine the different declarative data sources based firstly on dates (*fishing trip return date declared or estimated, fishing sequences date declared or estimated, landings date, sales date, …)* and vessels. The possibility to sell the landings of a fishing trip during several sales' operation *(sometimes not during the same day)* is considered also the contrary i.e. the possibility to sell during a day the landings of several fishing trips. Species composition and landings weight associated are considered to assess/strengthen the links specially between fishermen declarative and sales notes

[13] Leblond Emilie, Lazure Pascal, Laurans Martial, Rioual Celine, Woerther Patrice, Quemener Loic, Berthou Patrick (2010). **The Recopesca Project : a new example of participative approach to collect fisheries and in situ environmental data.** Mercator Ocean - Quarterly Newsletter, (37), 40-48. Open Access version : https://archimer.ifremer.fr/doc/00024/13500/

[14] Ifremer. Système d'Informations Halieutiques (2021). **Algorithme de traitement de données de géolocalisation ALGOPESCA. Note synthétique.** https://archimer.ifremer.fr/doc/00682/79405/

[15] Berthou Patrick, Guyader Olivier, Leblond Emilie, Demanèche Sébastien, Daures Fabienne, Merrien Claude, Lespagnol Patrick (2008). **From fleet census to sampling schemes: an original collection of data on fishing activity for the assessment of the French fisheries.** ICES 2008 Annual Science Conference, 22-26 september 2008, HALIFAX, CANADA. https://archimer.ifremer.fr/doc/00059/16996/

[16] Distance to the coast, the following range of operations could be informed depending of the area where the "vessel*month" is operating: "Fluvial, Estuarien" (in inland water), "3 milles" (inside the 3 nautical miles), "3-12 milles" (inside the 3-12 nautical miles), "Côtier" (inside the 12 nautical miles), "Mixte" (inside and outside the 12 nautical miles), "Large" (outside the 12 nautical miles) and "Etranger" (exclusively in foreign area).

[17] **Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy.**

data. Specific cases are considered in particular for vessels using fish ponds. The integration and cross-validation of the different data sources is done step by step in a modular manner. Each module integrates a new data sources linked with the fishing trips resulting from the previous steps. First step is to calculate the estimated fishing trips from the geolocation data, then they are combined with the fishermen declarative data and the fishing trips resulting are cross-validated with the vessels sales note data. Fishing activity calendars are considered to complete/enhance the data flow *(e.g. to provide better spatial information for non-precise declaration)*. In the end, the application provides, on this basis, several quality indicators and evaluates the completeness of the final data flow of SACROIS fishing trips.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

SACROIS algorithms include a specific algorithm to estimate the value of landings by species based on existing sales note data *(sometimes directly deducted from them)* or on an average price' estimation. For some fleet segment, estimated price based on expert knowledges is also used.

Algorithm main objective is to allocate a value in euro to each SACROIS landings issued from declarative data *(European logbooks or national monthly declarative fishing forms, day by day catches and landings declaration)* and/or from sales note data. Only sales note data include landings value information. For the landings sold in auction markets *(available in sales note data)*, value or average price *(when declarative landings' weight is retained)* is directly deducted from sales note. For the other landings *(non-auction market sales)*, an average price by commercial species is assessed from sales note data by "day * landings harbour * fleet segment" considering eventual *(dependent of the available data)* dynamic hierarchical aggregation: "day->Month->Quarter->Year" or "Landing Harbour -> Maritime district -> Region -> Seaboard" *(up to consider the "Year * Seaboard" species' average price)*. When no sales for a specie during a year on a seaboard raised then estimated price based on expert knowledges are considered *(e.g. for trawl freezer or tropical tuna fisheries …)*. For abroad landings, vessel maritime district registration *(up to country registration in a dynamic hierarchical manner)* could be considered in replacement of landings harbour.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

SACROIS algorithms include a specific algorithm to consolidate, validate and adjust the SACROIS fishing trips total landings by species and to specify the faunal composition associated. The process considers landings *(weight and faunal composition)* from declarative data *(European logbooks or national monthly declarative fishing forms)* and/or from sales note data.

Algorithm main objective is to allocate total landings in weight by species and faunal composition associated to each SACROIS fishing trip. Comparison of declarative data *(estimated "day by day catches" and "landings declaration")* and sales note data are done fishing trip by fishing trip for each species family landed *(species aggregation especially developed to compare data at a similar level and, from that, specify the faunal composition associated in terms of commercial species landed at the most disaggregated level possible)*. The leading principles are the following: 1) "sales note data" and "landings declaration" are prioritized *(almost +/-20%)* against estimated "day by day catches" *(weighting quantification are prioritized against estimated)* ; 2) in case of major imbalance between data sources; maximum landings weight is considered up to 140%; beyond sales note data are prioritized and 3) the more precise faunal composition *(in term of commercial species landed)*, available in the different data sources compared, is retained . Comparison are done step by step in live weight *(declared landed weight or sale weight*

are converted into live weight regarding the fish presentation), first comparing "landings declaration" with "day by day catches" *(issued from declarative data)* and then comparing the achieved result with "sales note data".

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

SACROIS algorithms include a specific algorithm to consolidate, validate and adjust the vessel' fishing effort data *(days at sea, fishing days, hours at sea and fishing hours)* associated to each SACROIS fishing trip. The process considers especially the existing geolocation data *(e.g. issued from the VMS devices)*. This information is considered to cross-validate and control the fishing effort data available in declarative data *(European logbooks or national monthly declarative fishing forms)* and complete the information for SACROIS fishing trips not issued from declarative data *(e.g., SACROIS fishing trips issued only from sales note data)*.

Algorithm main objective is to refine/adjust and complete the items *(Fishing trip' start and return date, day when fishing occurred and fishing hours associated)* needed to calculate the vessel' fishing effort metrics *(days at sea, fishing days, hours at sea and fishing hours)* for each SACROIS fishing trip. Comparison of declarative data and estimated geolocation data' fishing trips items *(e.g., issued from the VMS devices)* are done fishing trip by fishing trip. The major leading principles is that estimated geolocation data' fishing trips items are prioritized *(issued from a calculation algorithm and observed data)* against declarative data. They are also used to complete information when no declarative data are available *(e.g., SACROIS fishing trips issued only from sales note data)* or in case of missing or outliers' declarative information. Common vessel practices *(including the common fishing trip' total landings)* could be also considered when neither declarative data either geolocation data are available. In case of no other information than sales note data available for the "vessel*year" considered then the hypothesis *"1 Sales note = 1 Fishing trip = 1 Day at Sea = 1 Fishing Day"* is retained and "fishing hours" & "hours at sea" are estimated regarding the vessel fleet segment' common practices.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)*?

At this stage of the SACROIS project, SACROIS algorithms do not include a specific algorithm to consolidate, validate and adjust the information related to the gear mesh size, dimension and fishing effort *(i.e. soaking time)*. Declarative information; when available; *(from European logbooks or national monthly declarative fishing forms)* are provided for each SACROIS fishing trip without any cross-validation or addition.

Nevertheless, a specific algorithm is currently under development to: 1) validate/control declarative information against reference framework in order to highlight possible outliers and 2) complete and cross-validate declarative information with information collected/available in the scientific census survey of annual fishing activity calendars especially for SACROIS fishing trips not issued from declarative data *(e.g. SACROIS fishing trips issued only from sales note data)* or in case of missing or outliers' declarative information. Furthermore, there is currently ongoing development to estimate/calculate these information from existing geolocation data with high temporal resolution in order they could enhance/complete information available and/or cross-validate it.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

SACROIS algorithms include a specific algorithm to consolidate, validate and eventually adjust the spatial information of fishing effort and landings associated to each SACROIS fishing trip. The process considers especially the existing geolocation data *(e.g. issued from the VMS devices)* and the scientific census survey of annual fishing calendars. These informations are considered to cross-validate, control and refine the spatial information available in declarative data *(European logbooks or national monthly declarative fishing forms)* and complete the information for SACROIS fishing trips not issued from declarative data *(e.g. SACROIS fishing trips issued only from sales note data)*.

Algorithm main objective is to allocate fishing effort and species landings by fishing area *(including EEZ and regulatory boundaries information)* with the aim to better spatialize the declarative spatial fishing activity data especially considering the existing geolocation data. Consolidation, validation and adjustment of the spatial information is done for each SACROIS fishing trip taking into consideration the different information available: a) Declarative data *(European logbooks or national monthly declarative fishing forms)*, b) Estimated spatial information from existing geolocation data which allows to calculate high quality and accurate spatial information and c) monthly spatial information available in the scientific census survey of annual fishing activity calendars. The leading principles are the following: 1) Estimated geolocation data' spatial information is prioritized *(issued from a calculation algorithm and observed data)* to some extent against declarative data; 2) geolocation data' spatial information is also consider to complete spatial information when no declarative data are available *(e.g. SACROIS fishing trips issued only from sales note data)* or in case of missing, imprecise or outliers' declarative information and finally 3) fishing activity calendars' monthly spatial information *(esp. considering the range of operation and/or, if available, the sub-rectangle level information, information not available in declarative data)* is considered to complete and refine data when neither geolocation data either declarative data *(or when declarative information is missing, imprecise or outliers, e.g. fishing areas declared at the FAO fishing area level)* are available. In some cases, and for precise EEZ or fishing area allocation, *pro-rata (i.e. considering the percentage of the different precise fishing area into the global fishing area calculated)* could be applied to estimate the spatial information at the level needed. In some other particular cases, declarative data can be prioritized to be compliant with annex X of the EU Commission Implementing Regulation[18] regarding catch data reporting. Finally, almost all SACROIS fishing trips have spatial information allocated in part emphasized/adjusted considering existing geolocation data. This spatial information constitutes the best available information which could be provided regarding the available data. Based on that, it is also notified that the spread of the vessels' geolocation data *(e.g. including less than 12m' vessels for VMS devices regulation)* constitutes the best way forward to reach more accurate information on vessels' fishing area.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

SACROIS algorithms include a specific algorithm to allocate one or several "fishing metier(s)" to each SACROIS fishing trip. The process considers the dominant landed specie (or group of species) in value, the scientific census survey of vessels annual fishing activity calendars and eventually the declared gear[19].

[18] **Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy.**

[19] See detailed methodology explained in **Annex 4** *(as a working document)* of the report of: **DCF Metier Workshop: Sub-group of the RCGs - North Sea and Eastern Arctic and North Atlantic.** 22 - 26 January 2018. DTU Aqua, Lyngby, Denmark. https://datacollection.jrc.ec.europa.eu/docs/other-meetings?p_p_id=110_INSTANCE_YIiNT1qXsG0u&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col2&p_p_col_count=

Algorithm main objective is to allocate a single/unique "fishing metier", "fishing sequence" *(i.e. by "day*gear*mesh size*dimension" meaning a new fishing sequence is considered when a vessel changes of "gear*mesh size*dimension" during a day or when the day changes)* by "fishing sequence" for each SACROIS fishing trip. The process considers especially the vessels' fishing activity calendars and the dominant landed specie *(or group of species, hierarchical species aggregation is used reflecting the possible target species or group of species of the vessels)* in value. The methodology to determine the dominant landed specie *(or group of species,)* is based on the raw ordination of the landed species in value. The leading principles are the following: 1) the vessels' fishing activity calendars constitute the core list of potential metiers practiced by the vessel *("vessel*month")* considered and 2) the dominant landed specie (or group of species) in value is prioritized in the metier allocation. Priority is given to the dominant landed specie (or group of species) as it has been proved that it is the most discriminant factor to define the metier, taking also advantage to have access to the common practices of the vessels outlined in the fishing activity calendars. Consequently, the declared fishing gear is only used in last step of the process also because imprecise or mis-reporting have been often observed. Algorithm is done step by step. For example, first step assigns "fishing metier" to fishing sequences when there is a match between the fishing sequence' dominant landed species (or group of species) and metiers core list issued from vessel' fishing activity calendar. Last step assigns directly the metier surveyed in the vessel' fishing activity calendar for the month considered if there is only one without considering the declared fishing gear or dominant landed species *(sometimes it could be missing information for the SACROIS fishing trip considered)*. Lowest and lowest quality is given to metiers when going down into the different steps applied.

'Metier' algorithm is thus extensively based on the fishing activity calendars providing an efficient tool to: 1) taking into account possible misreporting *(fishing gear, species landed, ...)*, in particular to assess the reliability and, if necessary, re-evaluate or specify the declared fishing gear, 2) better reflect the fisher' fishing strategy assigning the good aggregating level of target species or assemblage of species[20] and 3) limit the list of possible metiers practiced by each vessel to a validated/appraised frame of references avoiding multiplication of metiers when it is based mainly on a combination of the principal landed target species *(or assemblage of species)* and declared gear.

Finally, 'Metier' algorithm applied is in line with the methodology and principles developed in the "RCG ISSG on Metier and transversal variables issues" *(which has the objective to define standardised/harmonised methodologies between MS to allocate metier at DCF level6 to fishing trips/fishing sequences)* and allows, in addition, to allocate "fishing metiers" at DCF level7 i.e. considering national needs and specificities.

Furthermore, this procedure has the benefit to give priority to the metiers as given by the fishermen himself or appraised by the observers' network expertise which could differ from the observed final principal landed target species or assemblage of species. 'Metier' algorithm prioritized the target metiers/fishing strategy of the vessel' master and not the results of its implementation.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from

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[19] For example, a vessel could have a very opportunistic fishing strategy targeting all the demersal fish species (DEF) when another could target specific demersal fish species as Anglerfish (MNZ)._id=column-2&p_p_col_count=1&_110_INSTANCE_YIiNT1qXsG0u_version=1.0&_110_INSTANCE_YIiNT1qXsG0u_struts_action=%2Fdocument_library_display%2Fview_file_entry&_110_INSTANCE_YIiNT1qXsG0u_fileEntryId=1242949

[20] For example, a vessel could have a very opportunistic fishing strategy targeting all the demersal fish species (DEF) when another could target specific demersal fish species as Anglerfish (MNZ).

an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

In the end, different type of SACROIS fishing trips are available in the data flow crossing more or less declarative data sources. SACROIS fishing trips cross-validating declarative data *(European logbooks or national monthly declarative fishing forms)*, sales note data and geolocation data present more precise and higher quality features *(most of the fishing trip' items have been cross-validated)* than SACROIS fishing trips inferred from a unique "single" declarative data source *(e.g. SACROIS fishing trip issued only from sales note data source)*.

Following table detail and summarize the origin and eventual cross-validation applied; for the different type of SACROIS fishing trips; of the different fishing trip features *(fishing time, fishing area, landings by species and gear/mesh size/dimension)*. Cross-validated features present better quality and are more precise than features issued from a unique declarative source. Furthermore, considering the information coming from the scientific census survey of vessels annual fishing activity calendars allows to complete/enhance fishing trips features.

Data Source(s)	Fishing Area	Landings	Gear/mesh size/dimension	Fishing time
GEOLOC trips « orphan »	Calculated GEOLOC fishing area	No landings	Fishing activity calendar or vessel patterns	Calculated GEOLOC fishing time
SALES trips « orphan »	Fishing activity calendar	Landings by sp. from sales notes data	Fishing activity calendar or vessel patterns	No fishing time
LB-MdF trips « orphan »	Declared fishing area in logbooks or monthly fishing forms	Declared landings by sp. in logbooks or monthly fishing forms	Declared gear/mesh size/dimension in logbooks or monthly fishing forms	Declared fishing time in logbooks or monthly fishing forms
GEOLOC / SALES trips	Calculated GEOLOC fishing area–*proportional allocation of landings by fishing area prorata GEOLOC fishing time*	Landings by sp. from sales notes data	Fishing activity calendar or vessel patterns	Calculated GEOLOC fishing time
GEOLOC / LB-MdF trips	Calculated GEOLOC fishing area–*proportional allocation of landings by fishing area prorata GEOLOC fishing time*	Declared landings by sp. in logbooks or monthly fishing forms	Declared gear/mesh size/dimension in logbooks or monthly fishing forms	Calculated GEOLOC fishing time
LB-MdF / SALES trips	Declared fishing area in logbooks or monthly fishing forms	Landings by sp. strengthened cross-validating sales notes & logbooks or monthly fishing forms data	Declared gear/mesh size/dimension in logbooks or monthly fishing forms	Declared fishing time in logbooks or monthly fishing forms
GEOLOC / LB-MdF / SALES trips	Calculated GEOLOC fishing area–*proportional allocation of landings by fishing area prorata GEOLOC fishing time*	Landings by sp. strengthened cross-validating sales notes & logbooks or monthly fishing forms data	Declared gear/mesh size/dimension in logbooks or monthly fishing forms	Calculated GEOLOC fishing time

GEOLOC = calculated fishing trips from geolocation data.
SALES = sales note data
LB-MdF = declarative data *(European logbooks or national monthly declarative fishing forms)*
SACROIS fishing trips issued from a unique data sources are identified as "orphan". No landings are allocated to SACROIS fishing trips issued only from geolocation data. These fishing trips could highlight missing declarative information and should be close looked into. In addition, no fishing time are allocated to SACROIS fishing trips issued only from sales note data. Nevertheless, fishing effort metrics associated to such fishing trips are estimated in a next step to answer data calls. The estimates are calculated based on vessel common practices *(if available)* or, in a last step, considering the following hypothesis: *"1 sale note = 1 fishing trip = 1 day at sea = 1 fishing day"* and estimating hours at sea and fishing time regarding the common practices of the vessel fleet segment.

Following graphics, assess the importance of the different type of 2022 SACROIS fishing trips for less than and more than 12m' vessels:

Almost 2/3 of the total fishing trips evaluated for the more than 12m vessels, cross-validate all the declarative data sources i.e. declarative *(European logbooks or national monthly declarative fishing forms)*, sales note and geolocation data *("marées completes")*. The less than 12m vessels are generally not geolocated but ~50% of their total fishing trips evaluated cross-validate declarative and sales note data *("marées croisées hors marées complètes")*. Around 10% of the SACROIS fishing trips are issued only from sales note data *("ventes orphelines")* for more and less 12m vessels. Finally, around 40% of the SACROIS fishing trips for less than 12m vessels are issued only from declarative data *("marées déclarées orphelines")* and SACROIS fishing trips issued only from geolocation data *("marées géoloc orphelines")* represent less than 5% of the total SACROIS fishing trips.

In the end, it is considered that the SACROIS cross-validation/combination algorithms are a useful tool to supplement/enhance and improve the completeness of the national fishing activity data

providing the best use of each data source in order to build the reference fishing activity dataset[21]. This way, SACROIS algorithms aims to answer the following questions: Who fishes? When? Where? How long? With which fishing gear/mesh size/dimension? Targeting which specie or group of species? With what vessel and gear fishing effort? What species are fished? In what quantity? And for what value?

Finally, the scientific census survey of annual fishing activity calendars allows to assess the coverage and precision by fleet segment/region of the fishing activity data derived from declarative data *(European logbooks or national monthly declarative fishing forms)* combined/cross-validated with sales note data and geolocation data by the SACROIS cross-validation tool. When they are evaluated as insufficient/incomplete to meet the end-user's data needs *(e.g. DCF requirements)* and are judged defective and unreliable to estimate their fishing activity data then complementary data collection *(e.g. catch assessment survey)* are implemented[22] or re-evaluation methodology based on fishing activity calendars[23]. This is the case for the French fishing fleet less than 12 meters length operating in the Outermost regions *(French Guiana, Guadeloupe and Martinique, La Réunion and Mayotte)* and for the French fishing fleet less than 12 meters length operating in the supra-region Mediterranean[24].

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

In the end, the definition of all the fishing trips of the French fleet with their associated features *(dates, fishing area incl. EEZ and regulatory boundaries, gear, gear dimension and mesh size, total weight and value of landings by species)* result from the application of the SACROIS algorithms. The application verifies and controls different source of single-unit dataset, linking and comparing them. SACROIS algorithms do not correct the data but provide several quality indicators. They aim to build a dataset compiling the most accurate and complete information for each individual fishing trip *(with spatial landings by species and fishing effort data series validated, consolidated and qualified)* into a single, verified and consistency, controlled data flow by making the best use of each data source.

Completeness *(evaluated against the exhaustive Ifremer activity survey)* and reliability of the fishing activity data calculated via the SACROIS cross-validation tool are qualified as good quality and sufficient to

[21] **(2022) Sacrois. A data cross-validation tool.** https://archimer.ifremer.fr/doc/00774/88631/

[22] IFOP, 2013. Proceedings of the 7th International Fisheries Observer and Monitoring Conference. Instituto de Fomento Pesquero, Chile.
Session 4. P° 60-63. **Demanèche et al. Methodological issues to estimate catches and fishing effort of small-scale fisheries by sampling fishing trips on-site.**
https://www.ifomc.aq/information/proceedings

[23] Kennelly, S.J. & Borges, L. (eds.) (2018). Proceedings of the 9th International Fisheries Observer and Monitoring Conference, Vigo, Spain. ISBN: 978-0- 9924930-7-3, 395 pages.
Session 3. P° 105-108. **Weiss et al. A new approach to estimate landings and fishing effort of small-scale fisheries by re-evaluating declarative data from the Ifremer exhaustive activity calendar survey. Application to the French Mediterranean vessels.**
https://www.ifomc.aq/information/proceedings

[24] **FRANCE Work Plan for data collection in the fisheries and aquaculture sectors 2022-2024. Version 4. Section 3 - Fishing Activity Data.**
https://datacollection.jrc.ec.europa.eu/documents/10213/1430907/France_WP_2022-2024_text.pdf/4be9822f-7969-4b21-b6a8-103b98713f18
https://datacollection.jrc.ec.europa.eu/documents/10213/1430907/France_WP_2022-2024_tables.xlsx/bfb9fae0-610d-44ab-9a05-8fe3eeed2bce

produce the reference fishing activity' estimates *(capacity, fishing effort and landings)* for the French fleet *(including small-scale fleets, less 12m' vessels)* belonging to the North Sea and North Atlantic regions and for French fishing fleet more than 12 meters length operating in the Outermost regions *(French Guiana, Guadeloupe and Martinique, La Réunion and Mayotte)* and in Mediterranean.

SACROIS cross-validation tool fit with the needs identified: a) to have available a single unique fishing activity data flow validated and qualified to answer all the end-user's requirement *(asset to produce consistent answer for all the fishing data needs)* and b) compulsory EU regulations *(e.g. EU 404/2011 (art. 145)*[25]*)*.
SACROIS produce in this way the official reference framework of fishing activity data for several French fishing fleets for: 1) regulatory monitoring *(quotas and fishing effort, DCMAP regulation, fleet capacity estimation …)*, 2) answering official data calls *(from French ministry to the European Union and Regional fisheries management organisations (RFMOs))*, 3) implementation of fishery management policies, 4) answering mandatory data calls from international statistical agencies *(FAO, Eurostat)* and constitute the official database for fishing experts advices or academic research.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

Fishing effort estimates *(number of trips, days at sea, fishing days, hours at sea and fishing time)* have not been calculated by using the generic R-script provided in the FecR package but follow the common joint methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*. An adapted R script has been developed based on the fishing activity data format issued from the SACROIS cross-validation tool especially because the R-script is not suitable for vessels without logbooks *(e.g. for national monthly declarative fishing forms where data are provided on a "day by day" basis)* and for vessels outside FAO area 27 *(need to have ICES rectangle informed)*. Adaptation of the R-script to take into consideration these two issues would be a valuable improvement.

It should be notified that SACROIS cross-validation tool allows, in most cases, to provide needed information *(esp. considering fishing area or gear)* to apply the principles developed in common joint methodology *(Nicosia, 2016)*. Nevertheless, some methodology' adaptations have to be done especially when data are provided "day by day" *(for less than 10m vessels for which European logbooks are not required)* or for SACROIS fishing trips issued only from sales note data. Selected hypothesis are however in line with the relevant conclusions coming from the various groups[26] which have discussed the issue of effort calculation in the small-scale fishery in regard with

[25] **European Commission, 2011. Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy.** ELI: http://data.europa.eu/eli/reg_impl/2011/404/oj

[26] **Anon, 2017. Report on the PGECON subgroup DCF workshop on small scale fisheries.** 25-29 September, The Hague, Netherlands. https://datacollection.jrc.ec.europa.eu/documents/10213/1407628/2017_Workshop_PGECON+small-scale+fisheries.pdf/451907ac-184e-4df6-86a5-5435057a483d

ICES, 2017. Report of the Working Group on Commercial Catches (WGCATCH), 7-11 November 2016, Oostende, Belgium. ICES CM 2016/SSGIEOM:03. 141 pp. https://doi.org/10.17895/ices.pub.8658

ICES, 2018. Report of the Working Group on Commercial Catches (WGCATCH), 6-10 November 2017, Kavala, Greece. ICES CM 2017/SSGIEOM:09. 132 pp. https://doi.org/10.17895/ices.pub.8684

Scientific, Technical and Economic Committee for Fisheries (STECF) – Fisheries Dependent Information – FDI (STECF-21-12). EUR 28359 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-45887-6,

the principles developed by the 2nd DCF workshop on transversal variables *(see last ISSG report[27] where the relevant conclusions from these different meetings have been summarised)*. Especially, methodology developed follows as far as possible the different principles elaborated during the 2nd workshop on DCF transversal variables but sometimes have to be adapted to take into consideration SSF' special features and ongoing data collection systems *(data available and the way to collect them)*. In particular, the following assumption *(agreed by lots of MS for SSF)* is applied as far as no other data contradicts the hypothesis: *"(1 sales note) = 1 fishing trip = 1 day at sea = 1 fishing day"*.

Ireland

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

- >12m: Logbooks and VMS
- 10-12m: Logbooks
- <10m: Sales notes
- Complementary data:

Fishery dependent biological and transversal data on small scale coastal fisheries (SSCF, <15m vessels) are collected under a number of programmes:

1. A sentinel fleet representing about 8% of the under 12m fleet provide effort and catch at daily resolution
2. A Skipper self-sampling programme started in 2021 where Skippers report effort, catch, landings, discards, biological data at operational level
3. Observers at sea programme; provide the same data as in 2 above
4. Port sampling programme for biological data on landings
5. Inshore VMS; high resolution spatial data are collected for some dredging fleets that provide effort and fishing distribution data.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

For each vessel length category, we use only one data source: for <10m Sales notes; and for >=10m Logbooks.

In Logbooks we have:

- End of Trip Landing Declarations (ICES Division level)

doi:10.2760/3742, JRC127727. https://stecf.jrc.ec.europa.eu/documents/43805/3895664/STECF+21-12+-+FDI+-+Fisheries+Dependent+Information.pdf/975abf56-385f-45de-ac58-984146f803ca

ICES. 2022. Workshop on Geo-Spatial Data for Small-Scale Fisheries (WKSSFGEO). ICES Scientific Reports. 4: 10. 60 pp. http://doi.org/10.17895/ices.pub.10032.

[27] https://github.com/ices-eg/RCGs/blob/master/Metiers/Reports/ISSG_2022_Metier and transversal variable issues Report.pdf

- Daily Operational Estimates (Statistical rectangle level) (these are an estimate of the daily catch – any discards should also be recorded).

Then we raise Daily Operational Estimates to End of Trip declarations to calculate totals per Statistical rectangle.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

The national database system that is used to manage the logbooks information provides an estimated value for each declaration, based on average price per unit (€/kg) values for species and other parameters. The procedure for calculating these average values is hard-coded into the system and is not considered very accurate. This system of allocating values is currently being improved by the national control agency (SFPA) to better account for outliers and variability.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

>=10m:
We use the Landings Declaration from the Logbooks.
If there is a species in the Daily Operational Estimates, but not in the End of Trip Declarations, we do not raise that species (we use only species that are present in the End of Trip Declarations).
We do not use the Sales Notes here.

<10m:
We just use the Sales Notes.

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

>=10m:
We use Logbooks. A daily operational record for each day that the vessel is fishing, including the number of minutes fishing (calculate fishing days and fishing hours).
From the trip information we use the Days at sea.

<10m:
Sales Notes do not have any fishing effort data.
For some very specific cases we have estimated fishing effort data, but it is not a very precise method.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

>=10m:
We use Logbooks. Gear information is recorded in Logbooks.

<10m:
Sales Notes do not have any gear data.
For some very specific cases we can allocate gear based on the species caught.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

>=10m: In general, we use the Logbooks Statistical rectangle data. However, specifically for the Spatial Fisheries datacall we use the VMS data to allocate the spatial information. In this case we take the Daily Operational Estimates and allocate them to the VMS fishing positions for that day (using the vessel speed rule to determine if the vessel is fishing). We don't systematically compare the spatial information from Logbooks and VMS but we do it for some special situations. <10m: The Spatial information in the Sales Notes is very limited, so we assign the Spatial information based on the landing port.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

>=10m: We use Logbooks. Métier information is not recorded in Logbooks, but we have a complex algorithm to allocate métiers based on gear, species caught and expert knowledge. This algorithm contains a lot of manually coded exemptions (based on expert knowledge). Part of this coding is needed due to a lack of validation in the logbooks data entry system. <10m: Sales Notes do not have any métier data. For some very specific cases we can allocate métier based on the species caught.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

Generally, we are not combining data sources (we only use Logbooks for >=10m and only Sales Notes for <10m). Because most datacalls are at the level of Statistical rectangle. For specific cases VMS data can be used to provide fine scale spatial information. Sales Notes data is hard to match to fishing trips and historically was incomplete, so it has not been used to validate Logbooks. We only started getting Sales Notes data for >=10m in 2019, and most of the datacalls were developed before this.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

Any useful methodology that we could learn from other countries and apply it to our data will be welcome, for example: routinely cross-validate data sources information like Logbooks, VMS and Sales Notes.

The Irish official statistics are provided based on Logbooks; if our datacall submissions are different from the official statistics there could be questions to be asked about the methodologies.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

We use a variety of fishing effort calculation methods for different datacalls:

- For the FDI datacall we use the FecR package.
- For the RDBES datacall we use the 2nd DCF workshop on transversal variables methodology, but we do not use the FecR package; instead we apply this methodology through SQL. Reason for not using FecR: the FecR package doesn't use metier in its effort calculation (just gear and mesh) but the RDBES needs the effort partitioned by area, rect, and metier.
- For the RDB datacall we do not use the 2nd DCF workshop on transversal variables methodology.
- Most of the ICES datacalls for demersal species use the COST package, which does not follow the 2nd DCF workshop on transversal variables methodology.
- Generally, our response to ICES data calls do not follow the 2nd DCF workshop on transversal variables

Potential improvements:

- Nationally we should standardise the way we calculate effort; this should be done with the FecR package.
- Get FecR back into CRAN.
- Ensure FecR is suitable for RDBES effort calculations.

Lithuania

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

For calculation/assess fishing activity data the landings declarations and logbooks have been used for all vessel's segments since 2019. Until 31 December 2018 the vessel segment which length is <8 m and operated in the coastal area the monthly declarative form was used as sours of data. The sales notes are obligately for all fleet and even if catch is one kilo of any species. National Fisheries Data Information System (FDIS) automatically crosscheck landing declarations (before 1 January 2019 data from declarative form as well) with the sale notes species volume. The obtained discrepancy causes are investigating and looking for issue solving. FDIS contains all primary data. As such, all fleet registration events are available specifically by data and no need to use fishing fleet register officially published on European Commission website. Geo-location data of VMS are available for the vessel segments which length is >15 m. However, there is restriction that data can be stored for last 3 years in relevant system. Therefore, for earlier years geo-location data is available only on VMS data call level.

In cases when the data of areas is missed in the logbooks, the geo-location data is using to fulfil gaps. Lithuania is not collecting AIS data.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

In Lithuanian data base the cross-validate is established for cross checks between the sales notes and logbooks volume of species. Obtained discrepancy causes are investigating and looking for the issue solving. In cases when the data of areas is missed in the logbooks, the geo-location data is using to fulfil gaps. Also there is in place the validation on primary fishing information gaps, such as EEZ, gears with their measurements. The main focuses of the cross-validation are on fixing the primary data.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

Value of landings are based on the sale notes data. There is a link between fishing trip or declarative form and specific sales note. The discrepancy of value are showing in separate report and forward for fixing issue. The majority of sales declarations are submitted by electronic devices using validation tool for submitting. As such, mandatory fields must be completed. The average price per species calculated separately for coastal fisheries (vessel which length is <12 m), the Baltic Sea fleet (vessel which length is >12 m) and Other regions fleet (vessel which length is >24 m)

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

The species composition is obtaining from landings declaration which proportionally allocated to the catch data for each haul. Therefor spatial information which recorded in effort is used for reports.

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

The vessel fishing effort is currently calculated from logbook data using fecR package. For the declarative forms data used the algorithm one fishing days=one sea day=one trip.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

Gear mesh size, gear dimension and gear fishing effort or soaking time are obtained from logbooks. The main focuses of the cross-validation are on fixing the primary data.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

Allocation of the fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ are from logbooks. In case when spatial data is not available or incorrect the VMS data might be used. For vessel is under 12 m. length in overall one and the same ICES statistical rectangles, FAO fishing areas and subareas, EEZ is applied as SSF is operating only in that area.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

The fishing metier assess based on trip and gear. When during trip used two and more gear types or gears with different mesh size might be allocated of two or more metiers to one trip.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

The logbooks, landing declaration and sales note are mandatory for all fleet segments. As such, the main focuses are on primary data quality.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

No new methods has been developed to share.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

FecR package is used for vessel is over 12 m length in overall. For vessels which provided the declarative forms was assumed that one fishing day is equals one trip, one day at sea and one fishing day. Since 2019 calculation for SSF are based on exact dates provided in logbooks. However, there is a need for automatic check for overlapping similar gears effort. *(esp. when are two records of the same gear types with slight difference of the mesh size. There is a risk to double fishing days count)*

Latvia

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

Open Sea fishery (10-12m, 12-15m and >=15m): • Capacity - Latvian Fleet Register;

- Fishing effort and landings in weight - E-logbooks (ERS);
- Landings in value – average price, calculated by Central Statistical bureau, based on the questionnaire "1-Fishery", which is compulsory for all enterprises.

Coastal fishery (SSF - <10m and 10-12m):

- Capacity - Latvian Fleet Register;
- Fishing effort and landings in weight – coastal monthly logbooks;
- Landings in value – average price, calculated by Central Statistical bureau, based on the questionnaire "1-Fishery", which is compulsory for all enterprises.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

E-logbooks and coastal monthly logbooks are registered in Latvian Fisheries Integrated Control and Information System (LFICIS) which is synchronised with Latvian Fleet register. In the system many of cross-checks are implemented, like: comparison of registered coordinates with VMS data, difference in caught and landed amount by species and other.

Sales notes are used to adjust the average price provided by CSB if it's necessary.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

In LFICIS system the Report of First Purchases is available where is possible to trace the sold fish up to the logbook.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

Information from logbooks is used only.

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

Information from logbooks is used only.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)*?

Information from logbooks is used only.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

Open Sea fishery (10-12m, 12-15m and >=15m):

- Information from E-logbooks is used only (coordinates are provided).

Coastal fishery (SSF - <10m and 10-12m):

- According to the coastal fishermen licensing system, the fishing ground for them is limited by the borders of municipality issued the licence. In the coastal logbooks information about ICES rectangle must be provided. Fishermen provide information about fishing start and end dates.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

Open Sea fishery (10-12m, 12-15m and >=15m):

- Information from E-logbooks is used only (gear and mesh size are provided).

Coastal fishery (SSF - <10m and 10-12m):

- Each municipality has a limited number of fishing gears (according to the Latvian fishing rules) which are divided between fishermen. In the Latvian fishing rules for each specific fishing gear allowed mesh size range is provided. Métier is defined based on information about the gear.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

All trips and fishing activities are registered in Latvian Fisheries Integrated Control and Information System (LFICIS).

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

No specific methods are used in Latvia for the fishery data cross-checking.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

Open Sea fishery (10-12m, 12-15m and >=15m):

- FecR package is used.

Coastal fishery (SSF - <10m and 10-12m):

- Days at Sea are calculated for each boat (in one fishing activity many boats could be used, as licence is issued for the company and company can own many boats).
- Fishing days are calculated for each fishing gear separately.

The Netherlands

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

VMS, logbook data and sales notes are received from the RVO and stored in a local database at Wageningen Marine Research Institute.

- Geo-localisation data

Since 2005 all vessels longer than 15 m are equipped with a Vessel Monitoring System (VMS) which sends a signal every 2 hours to a satellite providing information on the vessel's ID, position, time, date, direction and speed. Since 2015 the interval was shortened to 30 minutes for some vessels. From 2012 all vessels longer than 12 meters are obliged to carry VMS.

- Logbooks

Since 2018 vessels smaller than 12m are obliged to report electronic logbooks (e-lite). Due to a data provision issue WMR has only been receiving partially these data from RVO. The logbook dataset follows the standard format and is considered completed for all other vessel lengths. This is the main source of landed value and what is used for all data provisions.

- Sales notes

The sales notes dataset includes the vessel ID, date, auction, landing harbour, species 3 alpha code, weight, auction size categories (including BMS) and value.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

- Logbooks and sales notes data

The two data sources are matched by vessel ID, date and harbour and if the conditions are met a trip number from the logbooks is assigned. To ensure the right trip number is assigned to each sales note the species composition, the total weight, and the weight by species is examined. When the conditions (quality thresholds) are not met the sale note does get assigned a trip number automatically and a manual examination of the data takes place. These quality checks are in place for internal use and the sales notes are not used for any data provision.

- Logbooks and VMS

The methodology for cross checking the logbooks and VMS data is described in https://edepot.wur.nl/248628 (Appendix B).

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

Vessels are only allowed to sell to registered buyers at registered auctions.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

The methodology for the calculation of fishing effort is in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)* for both passive and active gears. We do not used the FecR package.

Poland

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

Fishing vessels below 10 meters length: - Coastal logbooks, - Sales notes, - Fishing licences, Fishing vessels 10-12 meters length: - Paper logbooks, - Sales notes. Fishing vessels over 12 meters length: - Electronic logbooks, - Sales notes, - Geo-localisation system - VMS

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

Vessels below 10 m register their daily activity in coastal logbooks covering the information on fish species, catch weight, gear type, number of gears, area, fishing time, landings time and harbour. Vessels from 10 to 12 m register their activity in paper logbooks. Data from vessels under 12 m are validated with national reference lists, vessels' patterns and fishing licences. Vessels over 12 m register their activity in electronic logbooks. Data from vessels >=12m are validated with VMS data and national reference lists.

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

Value of landings for economic data call is estimated based on averages, calculated taking into account: - year and month - port of landing - species - length group (<12 m and >12 m) Value of landings for RDB/RDBES and FDI data calls is estimated based on annual average price per species. Data on fish prices comes from sales notes.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

Landings declaration is considered as a final (validated by control authorities) source of information for economic data call. For RDB/RDBES and FDI data calls information on species composition comes from catch data registered in logbooks, which is validated with landings declarations.

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

All vessels (including SSF) are subject to mandatory reporting of their activity. For vessels under 10 m, each fishing day is considered as one fishing trip lasting approximately 8 hours at sea. For vessels over 10 m, effort is estimated based on the information from logbooks. VMS is used to estimate fishing hours for vessels over 12 m.

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

Not for economic data call. For other purposes, soaking time is estimated based on the information from logbooks. The methodology takes into account the gear type and the time intervals between consecutive fishing days. Mesh size is registered in logbooks from vessels over 10 m. For vessels under 10 m, mesh size is derived from the information on catch composition registered in coastal logbooks.

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

Spatial information from all fishing vessels is registered in FAO areas, ICES statistical rectangles and in the Baltic Sea in national rectangles which are sub-polygons of ICES rectangles. The consistency of different spatial levels is validated using national reference lists. VMS data is used to correct identified errors concerning vessels over 12m. For vessels under 12m, vessels' patterns are used to correct errors.

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

Not for economic data call. For other data calls, métier codes are assigned on a fishing sequence level based on the information from logbooks or coastal logbooks. The fishing sequence consist of fishing day, location and gear. The target assemblage is determined using the dominance criteria.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

EU logbooks and coastal logbooks are primary and exhaustive source of information on number and duration of trips.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

Missing information on fishing trip duration for vessels < 8 meters. Based on known information, from vessels of 8-10 meters, it is assumed that average trip last 8 hours. Soaking time for SSF is available from coastal logbooks (<8 m) or EU logbooks (>8 m). For RDB/RDBES and FDI data calls, fishing effort calculations follow the principles specified during the 2nd DCF workshop on transversal variables (Nicosia, 2016) and implemented in the fecR package.

Sweden

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and landings in weight and in value)*. This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

SwAM: SwAM collects data according to the legislation set by the EU (logbooks, landing declarations, sales notes, VMS etc). *Logbooks:* All vessels, 10 meters or more, are required to provide information in logbooks for all fishing activities in the sea. Vessels less than 10 meters fishing with trawls or seiners or land in another country than Sweden and vessels that are 8 meters or more and fish in ICES areas 22-28 and if the vessel has cod onboard

that is caught in ICES areas 20-32 also Have to fill in logbooks. Other vessels are obliged to fill in monthly costal journals. The logbooks contain information on time for departure and arrival from and to port, gear, minimum mesh size and size of the gear, time and position for the fishing activity, effective fishing time, position given in latitude and longitude and quantity per species in live weight. The logbooks further give information about vessels that Have participated in the fishing activity and information on all arrivals to port for those cases the stay in port is a short stop which does not include landing or transhipment. The logbook shall be sent or left to the SwAM no later than 48 hours after the landing has been completed.

Monthly journals: A monthly coastal journal shall be filled in for professional fisheries in the sea when the obligation to fill in logbook does not exist. The monthly journals contain information about the vessel (name, signal code and district name), fishing period (one period may not exceed one calendar month), number of days at sea, catch in kilogram live weight for each species, gear and catch area. The monthly journals shall be sent or left to the SwAM no later than two calendar days from the end of the month of the fishing activity.
Landings declarations: All vessels that fill in logbooks shall after landing of fish fill in a landings declaration. Only one landing may be accounted for per landing declaration. The landings declarations give information on weight per species in kilogram regardless of quantity, for salmon, trout and lobster the number of individuals shall also be specified. Signal code shall indicate which quantities that concerns own catch and which concerns transhipment in case one landing includes catches from transhipment from another vessel. Signal code should also be given to indicate what quantities that shall be counted to respective vessel for joint fisheries. ICES area of the catch shall also be indicated. If fishing activities Have been conducted in several ICES areas each area should be given.
Sales notes: Sales notes shall be filled in by a registered first hand buyer after a sale has been closed. Except for the information stated in article 64 in regulation (EG) no 1224/2009 a sales note should also include a unique number for the first hand buyer, the first hand byers designated code, signal code of the vessel who has landed the product, the social security number of the vessel license holder, manufacturing, purpose of use.
All of the documents above and VMS information is combined with a unique identifier (trip id). For vessels under 12 meters in length no VMS-information is available.
The fishing database performs different cross checks/validations using the different documents/data.

SLU:

SLU is a main data provider of fishing activity information for ICES and STECF work. Within SLU there are different departments and divisions. SLU AQUA is the main data provider in terms of fisheries activity within SLU. With AQUA, the Institute of Marine Research in Lysekil (H-lab) is a main data provider on marine fisheries managed internationally (which we assume to be the focus of this questionnaire), including small scale fisheries

The main end-users using data provided by H-lab are ICES and STECF expert groups. Data is also supplied to databases dealing with commercial catch data (e.g., RDB/RDBES, FDI, InterCatch). These requests frequently involve some sort of fleet segmentation into vessel size classes. For the most, H-lab answers requests that involve the biology of catches which data collection it is responsible for. Direct requests related to capacity, effort, quantities landed and their value are sometimes issued by ICES EGs or STECF groups dealing with commercial catches (e.g., WGCATCH). H-Lab generally answers these if not they are not related to management or economic aspects of the fleet (in which case SwAM is generally requested to handle them). In parallel, H-lab also carries out data analysis involving vessel size classes in answer SwAMs own requests, but that aspect is deemed of less relevance for ISSG work and not covered here.

To answer end-user needs, SLU regularly receives datasets on sales notes, landing declaration, VMS, and a combined logbook and monthly coastal journal file from Ha. In this questionnaire the combined file is referred to as “Catch and effort file”. These datasets all contain vessel information and trip identifier that SLU uses to combine them. The handling of the data does not significantly differ between length classes, with the “Catch and effort file” (see above) being the basis of most data provision made by SLU (to ICES and STECF purposes). In a limited number of cases the EU fleet register and landing declaration are also used (e.g., when full species composition is needed). Sales information is frequently less complete and for the most used only in the computation of values or to assign usage/treatment/size classes, (not for weights or activity).

Capacity

- Auxiliary information on number of vessels, their power and/or their tonnage associated to catches or value is frequently requested by expert groups within ICES or STECF. When so, it is generally compiled from the processed "Catch and effort file". In some situations, information in the "Catch and effort file" is combined with a processed version of the EU fishing fleet register (made unique on CFRs that operated during a calendar year).

Fishing effort

- Days at sea, number of trips, KWdays, fishing days, etc., are compiled from the "Catch and effort file" for all fleet segments. In some cases, information from the EU fleet register is added in analysis. Within the "Catch and effort file", different procedures are used when dealing with logbook data (haul-based) and coastal journal data (monthly). With regards to the latter, number of monthly trips is assumed equal to monthly days at sea and a redistribution algorithm is used to allocate gears to days at sea carried out each month.

Weight

- Weight is generally provided based on the "Catch and effort file". In some cases, Landing declarations are used. When discards are requested, estimates produced by H-Lab from DCF sampling programmes are used. Coverage of SSF in DCF programmes has generally been limited, with a few exceptions (e.g., nephrops fishery with pots; some gillnet fisheries; past eel fishery).

Value

- Value is generally computed by an algorithm that matches sales, Statistics Sweden (SCB) data, etc, with "Catch and effort file" and landing declarations.

2) If there are several types of data available, do you cross-validate/combine them in order to consolidate/optimize national fishing activity data. If yes could describe briefly algorithms in place in order to join the different type of data, especially to bring together declarative data at fishing trip level *(e.g. logbooks, coastal logbooks, …)* and sales note data?

SwAM:

See answer for question 1.

SLU (H-lab)

In general H-lab does not do any cross validation across data sources. Capacity, fishing effort and weight are, for the most, directly derived from logbook data present in "Catch and effort file". On some occasions information in landing declarations is merged in using trip identifiers supplied by SWAM in the data. With regards to coastal journal data (also in "Catch and effort file") where individual trips are not readily identified some special procedures are in place to determine capacity, fishing effort and weight. Special procedures are also in use to associate sales data to "Catch and effort file". and obtain final values. These are described below.

Effort (coastal journals)

In the case of monthly aggregated data (coastal journals information included in "Catch and effort file"), monthly days-at-sea are considered equivalent to monthly fishing trips. Monthly fishing trips are then split across gear/metier and geographical using a simple algorithm (more info below).

Catches (coastal journals)

In the case of monthly aggregated data (coastal journals information included in "Catch and effort file", catches are already discriminated by gear/metier and geographical position, no further processing being necessary.

Value (logbooks and (coastal journals)

Values by trip (for logbook data) are extracted from matching sales notes using trip identifiers supplied by SwAM. For trips (logbook data) and coastal journals without matching sales notes, values are assigned based on monthly averages supplied by SwAM or aggregated directly from sales note data (more extensive description below).

Following the data cross-validation/combination and more specifically, could you briefly *(by vessels length ranges if needed)* describe cross-checking algorithm(s) used:

a. to assess the value of landings especially for landings not sold at auctions?

SwAM:

Sweden has 1st hand buyers (these are not necessarily only auctions). All sales that are required to be reported should be sent to SwAM regardless if it is an auction or a first hand buyer.

Sales directly to consumers from the fishermen is not required to report, for landings without sales notes SwAM calculates the value using a price matrix. The price matrix estimate average prices using spatial, temporal and auxiliary information regarding the vessel.

H-lab assumes all landings are reported in the landing declaration. When sales records do not exist for certain trips, the value is estimated based on an algorithm. Information from landing declaration and sales notes are merged and checked for inconsistencies. Values (by usage/treatment/size class for some species) from matching trips or matching vessel-months from unique subdivisions and gear types are aggregated and used to assign values to fishing events in hierarchical order; by vessel x month, by month x region x fleet, by quarter x region x fleet, by year x region x fleet and finally by year. For some species, typically those for which mainly roe is landed or wrasses sold live, fixed mean values are supplied by SwAM.

b. to consolidate the species composition *(e.g. combining species composition from logbooks, landings declaration and sales note)*?

SwAM:
See answer for question 1.

SLU (H-lab)
SLU does not cross-validate species composition across data sources, but an algorithm exists that consolidates "Catch and effort file" with data from landing declarations to ensure all species are included (weights of species already existing in logbooks being split into finer taxonomic resolution but full weight not correct so it still adds to logbook totals. Some reallocations from reported BMS to LCS are carried for quota species without specified minimum legal or commercial size based on information available at SWAM.

c. to consolidate the "vessel fishing effort" *(i.e. days at sea, fishing days, fishing hours)* especially do you consider geo-localisation data for that?

SwAM:
See answer for question 1.

SLU (H-lab)
H-lab does not consider geo-localization when producing vessel fishing effort (only "Catch and effort file" is used)

d. to consolidate the gear mesh size, gear dimension and gear fishing effort or soaking time *(for gears concerned)?*

SwAM:
See answer for question 1.

SLU (H-lab)
H-lab does not consolidate gear mesh size, gear dimension and gear fishing effort or soaking time. For the most, data in "Catch and effort file" is used directly, with the exception of fishing effort allocation to gears on coastal journals where an algorithm is used to split monthly aggregated values (days at sea) by gear and location (see above).

e. to consolidate the spatial information *(i.e. allocate fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ, …)* of fishing effort and landings, especially do you consider geo-localisation data for that?

SwAM:
See answer for question 1.

SLU (H-lab)
H-lab does not consolidate spatial information using geo-localisation data. Expert judgment is used during effort calculations to carry out minor consolidations of "Catch and effort file" itself (e.g., when rectangles do not match subdivisions, one of these needs to be corrected to pass consistency checks of FDI).

f. to assess/evaluate the fishing métier by fishing trips/sequences/operations?

SwAM:
Not applicable.

SLU (H-lab)
H-lab assigns the metiers based on information present in "Catch and effort file". When data comes from logbooks metiers are assigned by haul/set or fishing day, depending on whether the gear is active or passive, respectively. When data comes from coastal journals, monthly fishing effort (days at sea / fishing trips, see above) appears aggregated by month while catches are collected by gear*location so a splitting algorithm needs to be used. The algorithm consists of an even split of total days at sea / fishing trips by the gear*location reported for each month.

g. Is all the fishing trips resulting from the data cross-validation/combination covered by all the data sources considered or is some fishing trips covered only by a part of the data sources considered resulting from an incompleteness of the data sources *(e.g., some fishing trips could result only from sales note data source or logbooks data source and have not been combined/crossed with other data sources)*. In this case, would you consider that the cross-validation/combination method applied is useful to complete/improve the completeness of the national fishing activity data?

SwAM:
See answer for question 1.

SLU (H-lab)
H-lab does not generate additional fishing records relative to those it receives from SwAM.

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

SwAM:

Not applicable.

SLU (H-lab)

Data quality of price information and other information only present in the sales notes (such as usage and quality of landings) would greatly improve by a stronger coupling and bi-directionality in the reporting of sales transitions between vessel/trip and 1st hand buyers. At present consistency does not seem to be enforced with reporting in the landing declaration (by the fishermen) and reporting of the sale (by the buyer) being distinct processes, not completely connected, and prone to mismatches. Consistency between the two reports could improve the cross validation of sales and landing declarations happening at SWAM and would significantly help H-lab in its determinations of the value of Swedish fisheries.

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

SwAM:

Not applicable.

SLU (H-lab)

The estimation of fishing effort at H-lab for purposes of international deliveries related to SSF and passive gears comprises three broad categories:

- ICES spatial fisheries data call (VMS fleet; does not cover the SSF monthly journal data but some passive gear effort from logbooks is included calculations based on VMS records obtained from SwAM; end-user ICES WGSFD)
- ICES assessment groups, RDBES and FDI data calls (all fleet, calculations based on "Catch and effort file" obtained from SwAM, end-user ICES AWGs, STECF)
- RDB (all fleet, calculations based on "Catch and effort file", end-user RCG)

We focus our answer on the 2nd and 3rd categories since it they are ones most related to effort of SSF and passive gears (most VMS will be on larger vessels fishing with active gears).

ICES assessment groups, RDBES and FDI data calls: Nicosia/FecR principles used

The "Catch and effort file" aggregated two sources of information – logbooks and coastal journals – aggregated into a common format but with different characteristics, namely with regards to temporal resolution.

With regards to logbooks data, H-lab applies the methodology developed during the 2nd DCF workshop on transversal variables (Nicosia, 2016). The calculations used are the same as those used in the FecR package, but implemented outside the package, directly on a national format. The reason for this was first historical (the national code was developed during the development of the fecR package) and later pragmatic (calculations were already implemented, there was no need to convert national data to a different format just for sake of using the package itself).

With regards to coastal journal data, H-lab also applies the methodology developed during the 2nd DCF workshop on transversal variables (Nicosia, 2016). However, the monthly format requires a previous splitting into "pseudo-trips" before the Nicosia principles and algorithms can be applied. As explained above, the non-existence of trip-level data, makes it require that gear*location combinations reported at monthly level are distributed by the monthly days-at-sea/trips via a splitting algorithm. The latter process necessarily implies some strong assumptions, one of them being that of unique gear*locations being used each trip. After that initial transformation Nicosia/FecR algorithms are followed just like in the logbook case.

Depending on the end-user, effort data calculated with the Nicosia algorithm is then (dis)aggregated into RDBES Metiers, InterCatch Metiers or FDI metiers in a way that keeps the Nicosia totals constant (they are just partitioned into subcategories and then re-aggregated to meet end-user needs).

RDB: Nicosia/FecR principles not used

Historical data provision into RDB precedes the implementation of the Nicosia principles and to our knowledge Nicosia principles were never a requirement of that data submission. As such, to keep consistency in the time series, effort calculations have been kept the same. In brief, this involves direct calculations (in the case of logbooks) or implementation of a splitting algorithm (in the case of coastal journals, see details above).

Main difficulties with applying the Nicosia/FecR principles to SSF

The monthly aggregation of the coastal journals implies lack of trip-level data. Days at sea are known but fishing trips need to be assumed similar to days at sea. In our opinion this is a reasonable assumption for the gears involved. However, it is difficult to identify if gear*locations are fished in parallel or sequentially. The splitting algorithm used to generate pseudo-trips out of monthly data, implicitly assumes they are fished sequentially. The latter likely leads to underestimation of total fishing days which, according to Nicosia principles may count double when two passive gears are used simultaneously, coming up effectively higher than days at sea. To improve this situation, it would be important to have trip by trip information on SSF even if submitted at monthly intervals / in monthly journals. Current implementation of e-registration of Swedish monthly journals opens the possibility of achieving that in the future.