

Regional Coordination Groups: Intersessional Sub Group on Métier Issues 2020

May 2020



Regional Coordination Group
Baltic Sea Region



Regional Coordination Group
North Atlantic
North Sea & Eastern Arctic

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1. Introduction

Background

In 2018 a DCF Métier workshop was held as a subgroup of the RCG's. Work was done on writing a historic background of the métiers and why they are needed. Participants of the workshop described the national procedures of assigning métiers, and it was clear that different methods and criteria are used for assigning metier codes by the different nations. During the meeting, major issues and possible best practices were discussed, e.g. the target species assemblage should reflect the fishing intention, and that a métier should be defined for a fishing sequence. Work was started on the reference lists on metiers, species and gears. A general workflow for assigning métiers was developed, and a repository for storing reference lists and scripts was suggested.

A result of the workshop was that there was a consensus regarding the need to standardize and harmonize métier codes and reference tables as well as the methods to assign métiers to transversal data.

In 2019 the work was followed up by a pan-regional RCG Intersessional Subgroup on Métier Issues that set up a public repository on GitHub for storing reference lists, scripts, métier descriptions and documentation of procedures. A system for harmonizing the metier reference lists without overlapping métiers (especially about mesh-size ranges) was suggested and an R-script for assigning métiers to transversal data was developed and tested for the Baltic Sea. A template for documenting the method used by countries was developed and tested. A script for making métier descriptions based on data uploaded to the RDB was developed. A reference list of species grouped into species groups was agreed on and tested. The impact of using value vs. weight of landings as metric for assigning target species assemblage groups was tested.

The 2020 work

The RCG's in 2019 recommended that the work was to be followed up and continued in 2020, with a stronger focus on an operational metier list and script to assign metiers. This includes testing reference tables and script and making sure that all relevant métiers and reference codes are included.

2. ToR's for the ISSG on Métier issues 2020

- **ToR 1:** If the new system for métier codes are approved: Make an operational métier list with all relevant métiers and test it.
 - Ensure all relevant métiers are included?
 - Agree on codes for selectivity devices between relevant countries.
- **ToR 2:** Further develop métier descriptions based on new métier codes. These will be used both as descriptions and for quality checking.
- **ToR 3:** If a list of non-overlapping métiers is approved, the R script to designate métiers can be used and further developed/refined e.g. to analyse vessel patterns.

- **ToR 4:** Investigate other species lists (e.g. Fish Pi) with similar usage and consolidate into a single reference list.
- **ToR 5:** Investigate further subdivision/refinement of métiers which would benefit from further refinement – eg. OTB_DEF_XX

2.1 Highlights and questions for RCG's to consider

Key points from the ISSG on Métier issues 2020

Based on the work done and agreed principles, the ISSG has had an operational focus on development and testing of:

- Métier list
- Reference lists on species and area codes.
- Development of R script implementing the agreed best practices.

Instead of the target assemblage group FIF (e.g. for gears LHM, LHP ...), the group suggest to use the un-grouped target assemblage groups DEF, ANA, SPF, LPF etc. in order to be coherent with other gears' target assemblage group codification and as, most of time, FIF is used to aggregate DEF' species (e.g. métiers LHM_FIF, LHP_FIF ...). Furthermore, these can be aggregated up to FIF if needed.

The lists and scripts are available on GitHub (<https://github.com/ices-eg/RCGs/tree/master/Metiers>).

The ISSG agrees that the métier codes, reference lists and script are ready for implementation next year. The ISSG would like to continue assisting the implementation and expect that there will be changes to codes when more MS implement the new codes and reference lists. The group can via Skype meetings support MS implementation and via a mail list give updates on changes in codes and script.

Outcomes of the ISSG on Métier issues 2020

- Métier list with suggested standardized and harmonized codes (especially on mesh-size ranges). Reference to old codes uploaded to the RDB (2009-2017 data).
- Reference list on area grouped to regions.
- Reference list on species codes grouped to target species assemblage groups. Comparisons with the species list from R Data package, Fish Pi list, RCM NS 2017 list and DWS regulation 2336/2016 or LPF report 2016. The comparison of 1059 species codes show there are differences in 78.
- Development of R script for assigning métier codes to transversal data, implementing the best practices agreed on and an additional module that analyse vessel patterns.
- Reference lists and scripts available on GitHub

What needs to be decided

- Can the RCG recommend that the new codes for metiers and reference lists will be used and implemented if followed by an implementation group?
- Can the RCG recommend use of the script (with national adjustments), and that national scripts are uploaded to GitHub for documentation, if followed by an implementation group?

Suggested for next step in intersessional work (tasks)

- Following and assisting on implementation of the new métier codes and script with open Skype meetings for MS and mail list informing about updates on reference lists and script on GitHub.

- Write a manual for use of the script and code lists and document the script with a flow chart.
- Update metier code list and reference lists if needed.
- Further development on script:
 - To assign métiers where information on e.g. gear is missing or imprecise (e.g. gear OT)
 - To improve the use of "vessel pattern" to avoid "rare" metiers and complete fishing sequences without any metier assigned in the first step of the script (*e.g. gear "FPO" and dominant species group "LPF" highlighting a probable typing error for the fishing sequence considered*)
 - Other development needed for implementation
- When data are uploaded with the new métier codes to the RDB/RDBES, this year's ToR 2 will become relevant: Further develop métier descriptions based on new métier codes. These will be used both as descriptions and for quality checking.

2.2 ToR 1: Operational métier list

An operational metier level6 list has been proposed and tested based on principles from the 2019 work. The resulting list is available on GitHub: https://github.com/ices-eg/RCGs/blob/master/Metiers/Reference_lists/RDB_ISSG_Metier_list.csv (also available as excel-file). A subset describing the metier level5 list (without mesh-size ranges) can be also found on GitHub.

Background

Based on principles agreed in the 2018 workshop, in 2019 the ISSG on Métier issues suggested metier lists for the regions with the purpose of removing overlapping métiers and harmonize the codes across the regions (especially on mesh size ranges).

Métier lists were suggested for the regions: North Sea and Eastern Arctic (NSEA), Baltic Sea (BALT), North Atlantic (NAtl), Long Distance Fisheries (LDF) and Mediterranean and Black Sea (MBS).

The principles for harmonizing the metier codes are described in the RCG ISSG on Metier issues 2019 (<https://github.com/ices-eg/RCGs/blob/master/Metiers/FINAL%20Report%20RCG%20ISSG%20on%20Metier%20Issues%2020052019.pdf>, section 2.6). It follows the principles:

Metiers are grouped into level 5 (gears and species groups). Mesh size ranges are suggested so that overlapping mesh size ranges are avoided and in order to standardize/harmonize the mesh size ranges by gear/species groups.

- Use the code _0_0_0 for gears with no mesh size (e.g. longlines, hand lines, trolling lines)
- Use the code _>0_0_0 for unknown mesh size
- For traps, pots, beach seines and dredges use the code _>0_0_0
- Métier level 5 was identified by region
- Non-overlapping mesh size ranges consistent within gear types were defined by region
- Define selection device codes
- For unknown métier use MIS_MIS_0_0_0
- Use FIF (Finfish group) for Hooks and Longlines
- Use of combined target species assemblage groups (MCD) was left to be confirmed

It was suggested that data with historic métier codes can be kept in the database, but when uploading new data, the new codes should be used.

Work done in 2020

The focus in 2020 has been to make the métier list operational that can be read into a script and used for assigning métier codes. The details of the codes have been discussed, e.g. use of mixed target assemblage groups and codes for selection panels. The list has been tested by members of the ISSG.

Métier list

In 2019, overviews of the métiers in the data uploaded to the RDB were generated. In the files there are columns indicating which countries have used the codes in the datasets and the total sum of number of trips used. If the codes that have been used previously doesn't match with the new suggested code, it is marked with red.

In general, following mesh size ranges are suggested:

Baltic Sea (BALT):

Fixed gears	Towed gears
16-31	<16
32-89	16-31
90-109	32-89
110-156	90-104
>=157	105-115
	115-120
	>=120

North Atlantic (NAtl):

Fixed gears	Towed gears
10-30	<16
31-39	16-31
40-49	32-39
50-59	40-54
60-69	55-64
70-79	65-69
80-89	70-99
90-99	100-119
100-119	>=120
120-219	
>=220	

North Sea and Eastern Arctic (NSEA):

Fixed gears	Towed gears
10-30	<16
31-49	16-31
50-70	32-69
71-89	70-89
90-99	90-99
100-119	100-119
120-219	>=120
>=220	

Long Distance Fisheries (LDF):

Fixed gears	Towed gears
NA	10-31
	32-69
	70-119

	>=120
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Mediterranean and Black Sea (MBS):

Fixed gears (GND/GNS/GTR)	Towed gears (PS/LA)
<16	<14
>=16	>=14
	Towed gears (PTM/OTM)
Towed gears (OTB/TBB)	<14
<40	14-19
>=40	>=20

The new suggested métier codes are based on what has been previously used for a gear group in a region, and where there were overlapping métier mesh sizes ranges, they have been split up into smaller mesh size ranges. The new codes doesn't necessarily follow the legislation, so there might be métier codes where the fishery is not legal.

Suggestion for new métier list uploaded to GitHub based on the work done in 2019. The list has the following columns:

- RCG: BALT, LDF, MBS, NATl, NSEA (the area codes linked to the RCG can be found in the AreaRegionLookup table for FAO area 27 and 21 (e.g. 27.7.D => RCG NSEA) and in the AreaSupraRegionLookup table for other FAO area (e.g. FAO 37 => RCG MBS).
- Metier_level6: The suggested list of valid métier codes.
- Start_year: If the métier code has a starting year, it is added.
- End_year: If the métier code as an ending year, it is added.
- Old_code: The métier code in the old reference list corresponding to the new code. It is often a list of métier codes. In some cases there is not a direct overlap, if the mesh size ranges have been made smaller.
- Used_by_country_in_RDB: A list of countries that have used the old metier codes in data uploaded to the RDB, for the years 2009-2017.
- Total_n_trips_RDB_2009t2017: Count of number of trips for the old métier codes from data uploaded to the RDB.

RCG	Metier_level6	Start_year	End_year	Old_code	Used_by_country_in_RDB	Total_n_trips_RDB_2009t2017
NSEA	OTB_CRU <16_0_0			OTB_CRU <16_0_0	ENG, NIR, SCT	53
NSEA	OTB_CRU 16-31_0_0			OTB_CRU 16-31_0_0	BEL, DEU, DNK, ENG, FRA, NLD, SCT	1984
NSEA	OTB_CRU 32-69_0_0			OTB_CRU 32-69_0_0, OTB_CRU 40-59_0_0	DNK, ENG, EST, FRA, LTU, SCT, SWE	12854
NSEA	OTB_CRU 32-69_2_22			OTB_CRU 32-69_2_22	EST, SWE	17709
NSEA	OTB_CRU 70-89_0_0			OTB_CRU 70-89_0_0, OTB_CRU 70-99_0_0	DEU, DNK, ENG, FRA, NIR, SCT, WLS	88341
NSEA	OTB_CRU 70-89_2_35			OTB_CRU 70-89_2_35	DEU, DNK, SWE	30328
NSEA	OTB_CRU 90-99_0_0			OTB_CRU 90-119_0_0	DEU, DNK, SWE	89641
NSEA	OTB_CRU 90-99_1_120			OTB_CRU 90-119_1_120	SWE	1057
NSEA	OTB_CRU 90-99_1_140			OTB_CRU 90-119_1_140	SWE	44
NSEA	OTB_CRU 90-99_1_300			OTB_CRU 90-119_1_300	SWE	23
NSEA	OTB_CRU 100-119_0_0			OTB_CRU 100-119_0_0	DEU, DNK, ENG, NIR, SCT	3625
NSEA	OTB_CRU 100-119_1_120					
NSEA	OTB_CRU 100-119_1_140					
NSEA	OTB_CRU 100-119_1_300					
NSEA	OTB_CRU >=120_0_0			OTB_CRU >=120_0_0, OTB_CRU >=120_1_120	DEU, DNK, ENG, SCT, SWE	2587
NSEA	OTB_CRU >0_0_0			OTB_CRU 0_0_0	FRA	420
NSEA	OTB_DEF <16_0_0			OTB_DEF <16_0_0	DEU, DNK, ENG, FRA, LTU, NLD, SCT, SWE	9514
NSEA	OTB_DEF 16-31_0_0			OTB_DEF 16-31_0_0	DNK, ENG, FRA, LTU, NLD, SCT	1996
NSEA	OTB_DEF 32-69_0_0			OTB_DEF 32-69_0_0	DNK, ENG, FRA, NIR, NLD, SCT, SWE	3062
NSEA	OTB_DEF 70-89_0_0			OTB_DEF 70-89_0_0, OTB_DEF 70-99_0_0, OTB_DEF >=70_0_0	BEL, DEU, DNK, ENG, FRA, IRL, NIR, NLD, SCT, WLS	116310
NSEA	OTB_DEF 90-99_0_0			OTB_DEF 90-119_0_0	DEU, DNK, NLD, SWE	36104
NSEA	OTB_DEF 90-99_1_120			OTB_DEF 90-119_1_120	SWE	918
NSEA	OTB_DEF 90-99_1_140			OTB_DEF 90-119_1_140	SWE	121
NSEA	OTB_DEF 90-99_1_180					
NSEA	OTB_DEF 90-99_1_270					
NSEA	OTB_DEF 90-99_1_300			OTB_DEF 90-119_1_300	SWE	32
NSEA	OTB_DEF 100-119_0_0			OTB_DEF 100-119_0_0, OTB_DEF 100-129_0_0, OTB_DEF >=105_1_120, OTB_DEF >=105_1_140	BEL, DEU, DNK, ENG, FRA, IRL, NIR, NLD, POL, PRT,	22627
NSEA	OTB_DEF 100-119_1_120					
NSEA	OTB_DEF 100-119_1_140					
NSEA	OTB_DEF 100-119_1_180					
NSEA	OTB_DEF 100-119_1_270					
NSEA	OTB_DEF 100-119_1_300					
NSEA	OTB_DEF >=120_0_0			OTB_DEF >=120_0_0, OTB_DEF >=120_1_120, OTB_DEF >=130_0_0	BEL, DEU, DNK, ENG, ESP, EST, FRA, IRL, LVA, NLD, I	94589
NSEA	OTB_DEF >0_0_0			OTB_DEF 0_0_0	DEU, FRA, NLD	2698
NSEA	OTB_DWS 32-69_0_0					

Figure 1: Example of métier code list from the North Sea

RCG	Metier_level6	Start_year	End_year	Old_code	Used_by_country_in_RDB	I_n_trips_RDB_2009t20
BALT	OTB_CRU >0_0_0			OTB_CRU >0_0_0	DEU, DNK, SWE	529
BALT	OTB_DEF <16_0_0			OTB_DEF <16_0_0	DEU, DNK, POL	260
BALT	OTB_DEF 105-115_1_110		2010	OTB_DEF >=105_1_110	DEU, DNK, LVA, SWE	14010
BALT	OTB_DEF 105-115_1_120	2011		OTB_DEF >=105_1_120	DEU, DNK, FIN, LTU, LVA, POL, SWE	128171
BALT	OTB_DEF 115-120_3_115					
BALT	OTB_DEF >=120_3_120			OTB_DEF >=120_0_0	LTU, SWE	2652
BALT	OTB_DEF >0_0_0					
BALT	OTB_DEF 16-31_0_0					
BALT	OTB_DEF 32-89_0_0					
BALT	OTB_DEF 90-104_0_0			OTB_DEF 90-104_0_0	DEU, DNK	11633
BALT	OTB_FWS >0_0_0			OTB_FWS >0_0_0	DEU, DNK, POL, SWE	4596
BALT	OTB_SPF <16_0_0					
BALT	OTB_SPF 105-115_1_110		2010			
BALT	OTB_SPF 105-115_1_120	2011		OTB_SPF >=105_1_120	DNK	4
BALT	OTB_SPF 115-120_3_115					
BALT	OTB_SPF >=120_3_120			OTB_SPF >=120_0_0	POL	108
BALT	OTB_SPF >0_0_0					
BALT	OTB_SPF 16-31_0_0			OTB_SPF 16-31_0_0, OTB_SPF 16-104_0_0	DEU, DNK, LTU, LVA, POL, SWE	9057
BALT	OTB_SPF 32-89_0_0			OTB_SPF 32-89_0_0, OTB_SPF 32-104_0_0	DEU, DNK, POL, SWE	2022
BALT	OTB_SPF 90-104_0_0			OTB_SPF 90-104_0_0	DNK	8
BALT	OTM_DEF <16_0_0			OTM_DEF <16_0_0	DNK, POL	1540
BALT	OTM_DEF 105-115_1_110		2010	OTM_DEF >=105_1_110	DEU, DNK, EST, SWE	720
BALT	OTM_DEF 105-115_1_120	2011		OTM_DEF >=105_1_120	DEU, DNK, FIN, STU, LVA, POL, SWE	1435
BALT	OTM_DEF 115-120_3_115					
BALT	OTM_DEF >=120_3_120			OTM_DEF >120_0_0	LTU, SWE	14
BALT	OTM_DEF >0_0_0					
BALT	OTM_DEF 16-31_0_0					
BALT	OTM_DEF 32-89_0_0					
BALT	OTM_DEF 90-104_0_0			OTM_DEF 90-104_0_0	DEU	1
BALT	OTM_FWS >0_0_0			OTM_FWS >0_0_0	FIN	1058

Figure 2: Example of métier code list from the Baltic Sea

In 2019 it was suggested to use the target species assemblage group FIF for the hook and longline, pot and beach seine fisheries, which is in accordance to the directive EC 2010/93. After discussions in 2020, there was a preference to use the un-grouped target assemblage groups (e.g. DEF, SPF, CEP) to be coherent with other gears' target assemblage group codification and as, most of time, "FIF" was used to aggregate DEF' species (e.g. métiers LHM_FIF, LHP_FIF ...). Furthermore, these can be aggregated up to FIF if needed and using target assemblage group FIF will be not easily taking into account by the developed script as species are aggregated in only one species group.

Be aware that the LDF metier list is insufficient to represent all the metiers of the other regions' small scale fisheries (e.g. La Réunion, Mayotte, Guyane, Guadeloupe, Martinique ...). The LDF metier list has been tested and validated only for the long distance fleet (large vessels operating outside the FAO areas 21/27 & 37).

Selection panels

A questionnaire was sent out to identify métiers that uses selection panels, with information on country, FAO fishing areas, type, description and time range where the selection panel is valid.

In the Baltic Sea, the selection panel code for demersal trawls with mesh size larger than 105 was 1_110 until 2010 and changed to 1_120 in 2011.

In the input format for the script, the selection device code should be given in the field "selection" and the script will assign the code if valid. In the case of area 27.3.a (Skagerrak and Kattegat), there are different options for selection panels with 1_120, 1_140, 1_180, 1_270 and 1_300, which can be derived from logbook information. In some cases, the codes are not entered in the logbooks, but can be assumed based on legislation. This is done nationally and entered into the input format for the script, which will then assign the métier code.

The selection devices creates duplicate level6 métiers in the métier list, therefore it is important that the script can handle it.

In some cases there are gears with both selection panels and exit windows. This was raised by Belgium which has a TBB_DEF fleet with two exit panels with different mesh sizes: one with 360 mm to avoid the round fish being captured and one with 150 mm to let the smaller sole escape. The

group agreed that the smallest mesh size of the selection window should be entered into the selection panel mesh size, but the selection panel code number can indicate that there are exit windows with different mesh sizes.

Suggested selection panel code numbers:

Code	Description
0	No selection device
1	Selection panel
2	Grid
3	T90
4	There is both selection device and escape window. There could be several mesh sizes. Specify the smallest mesh size.

The ≥ 120 métier in the Baltic Sea

In the Baltic, métiers for demersal trawls with ≥ 120 and ≥ 105 are overlapping. The group discussed how to handle it.

According to the Council Regulation (EC) 2187/2005 annex II and 2018/47 the mesh sizes below are allowed for demersal trawlers and seiners in 27.3 subdivisions 22-32:

$\geq 105_1_120$: This is with mesh size ≥ 105 and a BACOMA window of 120 (before 2011 the bacoma window could have a mesh size 110).

$\geq 115_3_115$: This is with mesh size ≥ 115 and a T90 mesh of 115 mm that is turned 90 degrees.

$\geq 120_3_120$: This is with mesh size ≥ 120 and a T90 mesh of 120 mm that is turned 90 degrees.

The group suggest to handle with this issue using the following no overlapping métier' codification for demersal trawls in the Baltic Sea:

OTB_DEF_105-115_1_110: This is with a mesh size between 105 and 115 and a BACOMA window of 110 (before 2011)

OTB_DEF_105-115_1_120: This is with a mesh size between 105 and 115 and a BACOMA window of 120 (after 2011)

OTB_DEF_115-120_3_115: This is with a mesh size between 115 and 120 and a T90 mesh of 115 mm that is turned 90 degrees

OTB_DEF_ $\geq 120_3_120$: This is with a mesh size ≥ 120 and a T90 mesh of 120 mm that is turned 90 degrees

Reference tables: AreaRegionLookup and AreaSupraRegionLookup

Following RCG codes are proposed to be used: BALT, LDF, MBS, NATl, NSEA.

The Long-distance (LDF) and Mediterranean (MBS) have been added.

To define them a new table AreaSupraRegionLookup has been suggested defining the FAO area (e.g. 27, 21, 37, 51, 34, ...) and corresponding supraregion (*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" and LDF = "Long Distance Fisheries"*).

SupraRegion MBS and LDF define the RCGs corresponding, for the NAO (*FAO areas 21 & 27*), the reference table "AreaRegionLookup" is still needed. The table has been revised and completed

based on « <http://www.fao.org/fishery/area/Area27/en> » &
« <http://www.fao.org/fishery/area/Area21/en> »:

- 1) Duplicated area "21.0.A" and "27.1" have been deleted
- 2) Proposition to switch the codification of RCG "North Atlantic" from "NA" to "NAtl" to avoid confusion with "Not Available" codification
- 3) The "AreaRegionLookup" table include the different levels "Area/SubArea/Division/SubDivision/Unit" and has been updated/completed with the "Area level/type". To be noted that only the "Division" level¹ is the level sufficient and necessary to define NAO' RCGs corresponding (*NSEA* = "North Sea and Eastern Arctic", *NAtl* = "North Atlantic" and *BALT* = "Baltic Sea"). It is suggested to define area at this level in the input format.

Future work

The métier list and reference lists will probably have to be updated when more MS use them, it is therefore suggested that the group will continue supporting this, and before codes are added, it should be discussed in the group.

2.3 ToR 2: Metier descriptions

The metier descriptions made in 2019 were based on data uploaded to the RDB. As the new metier codes have not yet been uploaded to the RDB, it has not been relevant to run these reports in 2020.

The R-script for assigning métiers to transversal data creates an output with the following fields "Country, RCG, metier_level_6 and number of trips" to be exchanged and combined and can be used as an output of the work of this ISSG to analyse how the new suggested métier codes are used by countries.

When data are uploaded to the RDB/RDBES with new métier codes, the métier descriptions can be run on these data. It is suggested that this work will be done by the ISSG in 2021.

2.4 ToR 3: R-script for assigning métiers to transversal data

Basic script for assigning métiers to transversal data

An R-script was developed and tested in 2019 for assigning métiers in the Baltic Sea, which has been further developed in 2020 to cover more areas and details. The script is available at https://github.com/ices-eg/RCGs/blob/master/Metiers/Scripts/script_metiers_test.R and functions available at <https://github.com/ices-eg/RCGs/tree/master/Metiers/Scripts/Functions>.

The script uses an input format with the information needed for assigning metiers (see example in : https://github.com/ices-eg/RCGs/blob/master/Metiers/Metier_data_format_Example_test_input.csv).

The script reads the métier list and split up the codes to use them as a lookup table for assigning métiers. It now reads the métier list directly from GitHub at https://github.com/ices-eg/RCGs/blob/master/Metiers/Reference_lists/RDB_ISSG_Metier_list.csv.

It also reads the species list used for grouping species into target assemblage groups from GitHub at https://github.com/ices-eg/RCGs/blob/master/Metiers/Reference_lists/Metier%20Subgroup%20Species%202019%2004.xlsx

The function to assign the métier codes (getMetier) has three steps:

¹ The « SubArea » level is not sufficient to define the RCG for the following SubAreas: 27.3, 27.5 and 27.7.

1. step with selection device
2. step without selection device
3. assign >0 mesh size ranges to metier if no mesh size or abnormal mesh size (*e.g. <16 for fixed gear in Baltic*) is available for the fishing sequence considered

The métier is set by fishing sequence. In the script it is possible to define the fishing sequence. The default is defined by country, year, vessel id, vessel length, trip id, haul id, fishing day, area, ices rectangle, gear, mesh size, selection panel, registered target assemblage. The variables to include in the fishing sequence can be changed in the script.

National corrections

It is the idea that the script can be used as the basic method to assign the métiers, but that countries could add national corrections. This could be correcting a species grouping if the species is fished within another métier nationally. It could also be corrections of gear codes (e.g. grouping or recoding imprecise gear codes (GN, TB)).

It is encouraged that the countries upload their script with national corrections to GitHub under https://github.com/ices-eg/RCGs/tree/master/Metiers/Documentation_by_MS as documentation of the methods and for other countries to use same methods if relevant. The lines with national corrections can be marked with #Country code. The scripts uploaded doesn't need to be final, but can be updated as they improve.

Script looking at vessel patterns for assigning métiers

A more advanced métier allocation script has been developed that takes the vessel pattern into account. It was decided to keep both methods in the script, and giving two outputs that can be compared.

This script will identify the main métier used by a vessel. If a "rare" métier is assigned based on one different catch composition or a mis-assigned métier code, it will be set to one of the main métiers of the vessel belonging to this pattern.

This advanced script could be also used as an input to assign métiers where information on e.g. gear is missing or imprecise also for fishing sequences where first step does not assign a metier. Script must be further developed on this specific tasks.

The advanced script use following steps:

1. Assign the métier level 5
2. Consolidate metier level 5 based on vessel patterns
3. Define mesh size ranges corresponding to the level 5
4. Define the metier level 6 and add information on selective devices

The vessel pattern analysis is coded in the script to output the column `metier_level_5` in the resulting dataset, based on the pseudo code specified in ANNEX I. The values in this column are entered in the following steps:

1. Initially it is filled in with gear type merged with target assemblage.
2. For every row the percentage of the number of sequences by year, vessel_id and metier level 5 is calculated.
3. Percentage threshold of the number of sequences has to be specified. Below this threshold (by default set to 13, but can be changed) a metier is considered rare.
4. Rare metiers are erased from the "metier_level_5" column. Remaining metiers are considered a vessel pattern (main métiers of the vessel).

5. The algorithm is searching for a metier in vessel pattern based in a first step on the target assemblage and in a second step on the gear declared.
 - a. If it succeeds then a new metier code is entered in "metier_level_5" column with a prefix "pattern_".
 - b. If the new metier code (issued from the vessel pattern, main métiers of the vessel) is not found but gear type and target assemblage are valid then rare metier is entered with a prefix "rare_".
 - c. If gear type or target assemblage is not valid then NA is entered in "metier_level_5" column.

The main advantages of the advanced script:

- 1) Enable the possibility to complete the script for the definition of "metier DCF level5" based on the "vessel patterns" i.e. dominant metiers used by vessels. This new step will contribute to 1) limit the multiplication of metiers calculated (*by erasing "rare" metiers, focus on the year*vessel' main metiers*), 2) enable the metier calculation when gear is missing, inaccurate/imprecise (*e.g. .TB, FIX, GN...*) or wrong (*e.g. typing error, reporting error, ...*), 3) enable the metier calculation for fishing sequences where gear declared and target assemblage are not coherent/adequate (*e.g. gear "FPO" and target assemblage "LPF" highlighting a probable typing error for the fishing sequence considered*) and 4) enable the metier calculation for fishing sequences without any catches (*"zero catches" fishing sequences*).
- 2) Ease assigning the ">0" mesh size ranges coding for outlier or missing mesh (*e.g. NA, > 99, <16 for fixed gears in Baltic*).
- 3) Take into consideration the standardized mesh size ranges determined by gear (*based on the last year' performed tasks to standardize the metier DCF level6 list*) with some exceptions for target species group.
- 4) Ease the definition of the selective devices' attribute (*selective device type + mesh size*) when there is one or add "_0_0" when it is missing.
- 5) In a last step, metier DCF level6 calculated by the script are checked against the "metier DCF level6 list" to highlight potential errors.

Deep water species

If the DWS column from the species list is not blank it is considered a deep water species. If the deep water species sums up to more than 8% of the weight of the catch, the target assemblage species group of the fishing sequence is set to DWS, according to the Deep Sea Regulation. Metiers are then assigned based on the gear declared and the target assemblage DWS.

Future improvements to the script

- Estimating métiers where the gear is unknown but the landing composition is known (e.g. from sales notes) or where the gear is imprecise (*e.g. gear OT.*)
- Estimating métiers for fishing sequences without any catches (*"zero catches" fishing sequences*)
- Improve the use of "vessel pattern" to avoid "rare" metier and complete fishing sequences without any metier assigned in the first step of the script (*e.g. gear "FPO" and dominant species group "LPF" highlighting a probable typing error for the fishing sequence considered*)

2.5 ToR 4: Species lists

In the 2018 Metier workshop, a species reference list was constructed to use for assigning target species assemblage groups. It was based on the FAO ASFIS list. As the ASFIS list contains around 12000 entries, where the majority is not used for commercial fisheries reporting, the species list was filtered to only include the codes that have been reported to Eurostat by Member States.

Species groups were defined at three levels:

Level 1: Crustaceans, Molluscs, Finfish, Seaweeds and Miscellaneous

Level 2: The Finfish category is split up into anadromous, catadromous, demersal, small pelagic, large pelagic and freshwater species. Cephalopods are separated from other molluscs.

Level 3: Identifies deep water species from the regulation (EC) 2016/2336.

This list was updated by the ISSG in 2019. In 2020 this ISSG has been given the ToR to investigate other species lists (e.g. Fish Pi) with similar usage and consolidate into a single reference list.

Following species lists with similar usage have been identified:

1. **Species list from R Data package**
2. **Species list made in FishPi project**
3. **Species list from NS RCM 2007, Annex 3**

Comparison of the species lists

The three species lists have been added to the list developed by the metier group, with the 1059 codes reported as commercial species to Eurostat. The most recent **Deep Sea Regulation (EU 2336/2016)** was used for defining Deep Water Species. Outcome of the primary comparison showed issues with 78 species where classifications into different groups varied between lists. There can be differences in how these species are caught in different parts of Europe and they can be in different life-stages or belong to more than one group (i.e. be deep water and demersal at the same time). In the case of these species, each participant reported how they think species with issues that are relevant for their fishery should be coded, and the results were compared.

As a result for 11 species a proposal to change the grouping was made, 3 species were added to the list, 999 species remained unchanged and in 49 species cases were left unsolved (figure 3). The outcome was sent to **RCG Large Pelagic** to get a clear idea of species they consider LPF (at the moment there is no such list) and hopefully many of those unsolved cases will get an answer.

The revised codes in grouping 2 and grouping 3 will be used in the script, but if a country need to group species differently, it can be done in the national level via changes to the script.

In case species are missing from the list, they can be added and the list updated on GitHub.

FAO code	Scientific Name	English Name	ISSC AAP Code	ISSCAAP Description	Grouping 1	Grouping 2	Grouping 3 DWS Reg./DWS	R Data package compared to grouping 2	FishPI compared to grouping 2/3	RCM NS 2007 compared to grouping 2/3	DWS regulation 2386/2016 OR IN LPF report 2016, FAO page	MS opinion on highlighted				Differences between current source	New proposal			Logsum mast Differences between different sources															
												DNK	SWE	IRL	FRA		Grouping 1	Grouping 2	Grouping 3 DWS Reg./DWS	Revised/ changed															
AAS	Astacus astacus	Noble crayfish	41	Freshwater crustaceans	CRU	CRU		CRU	CRU								same	CRU	CRU		11														
ABJ	Haliotis discus	Japanese abalone	52	Abalones, winkles, conchs	MOL	MOL		MOL	MOL								same	MOL	MOL	new	3														
ABK	Blicca bjoerkna	White bream	11	Carp, barbel and other cyprin	FIF	FWS		FWS	FWS								same	FIF	FWS	same	999														
ABZ	Anmodytes tobianus	Small sandeel	53	Miscellaneous coastal fishes	FIF	DEF		DEF	DEF								same	FIF	DEF	differences	49														
ABX	Haliotis spp	Abalones nei	52	Abalones, winkles, conchs	MOL	MOL		MOL	MOL								same	MOL	MOL	Üstökokuviite	1062														
ACC	Gymnocephalus cernuus	Ruffe	13	Miscellaneous freshwater fishes	FIF	FWS		FWS	FWS								same	FIF	FWS																
AES	Pandalus montagui	Aesop shrimp	45	Shrimps, prawns	CRU	CRU		CRU	CRU								same	CRU	CRU																
AFK	Apollus fuscus	African forktail snail	33	Miscellaneous coastal fishes	FIF	DEF		DEF	DEF								same	FIF	DEF																
AFT	Agonus cataphractus	Hooknose	53	Miscellaneous coastal fishes	FIF	DEF		DEF	DEF								same	FIF	DEF																
AGD	Gymnothorax maderen	Sharktooth moray	53	Miscellaneous coastal fishes	FIF	DEF		DEF	DEF								same	FIF	DEF																
AGK	Gymnothorax unicolor	Brown moray	53	Miscellaneous coastal fishes	FIF	DEF		DEF	DEF								same	FIF	DEF																
AGN	Squatina squatina	Angels shark	58	Sharks, rays, chimaeras	FIF	LPF		DEF	elasmobranchs		LPF (DEF)			DEF (Sharks)			same	FIF	LPF																
AHN	Anthias anthias	Swallowtail seaper	33	Miscellaneous coastal fishes	FIF	DEF		DEF	DEF								same	FIF	DEF																
AUQ	Aurelia aurita	Common jellyfish	77	Miscellaneous aquatic inverte	MIS	MIS		MMS	benthos					MIS/DES			same	MIS	MIS																
AKK	Acanthocardia aculeata	Spiny cockle	56	Clams, cockles, arkshells	MOL	MOL		MOL	MOL								same	MOL	MOL																
AKL	Acantholatirus palloni	Scale-rayed wrasse	33	Miscellaneous coastal fishes	FIF	DEF		DEF	DEF								same	FIF	DEF																
ALB	Thunnus alalunga	Albacore	56	Tunas, bonitos, billfishes	FIF	LPF		LPF	pelagic		LPF						same	FIF	LPF																
ALC	Alepocephalus bairdii	Baird's slickhead	54	Miscellaneous demersal fishes	FIF	DEF	DWS	DWS	DEF								same	FIF	DEF	DWS															
ALE	Alosa pseudoharengus	Alewife	54	Shads	FIF	SPP		ANA	diadromous				SPP ANA		ANA		different	FIF	SPP																
ALF	Beryx spp	Alfonso's nei	54	Miscellaneous demersal fishes	FIF	DEF	DWS	DWS	DEF				DWS				same	FIF	DEF	DWS															
ALH	Alepocephalus spp	Slickheads nei	54	Miscellaneous demersal fishes	FIF	DEF	DWS	DEF	DEF						DWS		different	FIF	DEF	DWS															
ALI	Alepisaurus spp	Lancetfishes nei	53	Miscellaneous coastal fishes	FIF	DEF		DEF	DEF						DWS		same	FIF	DEF																
ALL	Alloctytus verrucosus	Warty dory	54	Miscellaneous demersal fishes	FIF	DEF		DEF	DEF								same	FIF	DEF																
Species Reference List																					Gear vs spec group	R package Data	FishPI	RCM 2007 NS	MS opinion										

Figure 3: Example of species codes list

2.6 ToR 5: Further refinement of metiers

This ToR has been interpreted, as looking at the mixed species groups (e.g. MCD), finding the criteria used for classifying the target assemblage groups as mixed and possibly agreeing on methods or thresholds, which can be included in the script.

Looking at the RCG data, it was identified in which métiers and by which countries the mixed target species assemblage groups have been used. Where possible, the criteria for using them have been identified as well as the current relevance of including them.

Sweden and Denmark have agreed on a procedure for area 3.a (Skagerrak and Kattegat): all OTB and OTT with mesh size 90-119 will be set to MCD as it is a mixed fishery for nephrops and demersal fish.

Netherlands use following criteria for assigning MCD codes: Landings by trip are divided into nephrops and other species. If a trip has more than 30% nephrops by weight it is set to CRU, if it has less than 30% it is set to MCD.

In Portugal a similar approach is used for the MCD fishery. In addition the code MCF (mixed cephalopods and demersal fish) is also used.

Ireland has previously used the mixed group MCF, but it is not relevant anymore. France and Ireland doesn't used mixed target assemblage groups to define métiers.

3. Participants

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Annex I: Functional specifications of the second step of the script to assign a "metier DCF level5" to the fishing sequences.

- a) Calculate by "year*vessel" the number and % of fishing sequences by "metier DCF level5" **calculated** (based on the fishing sequences completed i.e. for which a "metier DCF level5" has been calculated in the first step of the script. Fishing sequences for which no "metier DCF level5" has been calculated will be considered after).
- b) **Fishing sequences** for which the "metier DCF level5" associated has been calculated for **less than 5-10%** of the fishing sequences completed, **are reset** (reset "metier DCF level5" to Null). Such "metier DCF level5" are considered are "rare" metier for the "year*vessel" and have to be faced with the principal practices of the "year*vessel".
- c) Other "**metier DCF level5**" calculated for **more than 5-10%** of the fishing sequences are kept. They constitute the "**vessel pattern**" i.e. dominant metiers used by the "year*vessel" on which the following script will be based on.
- d) For the fishing sequences reset ("*rare*" metier first attributed) or not completed in the first step of the script, compare "target species group" calculated with the "target species group" of the dominant metiers of the "year*vessel". If there is, at least one "metier DCF level5" corresponding with the "target species group", then:
 - a. If there is one unique dominant "metier DCF level5" corresponding with the "target species group" then attribute it to the fishing sequence considered
 - b. Else, if there is more than one dominant "metier DCF level5" corresponding with the "target species group" but there is among them one unique "metier DCF level5" corresponding to the same "gear family" (e.g. GND, GNS & GTR belong to the same "gear family", OTB, TBB, PTB and OTT belongs to the same "gear family", ...) then attribute it to the fishing sequence considered.
 - c. Else attribute to the fishing sequence considered among the "metier DCF level5" corresponding with the "target species group" (and eventually to the same "gear family" if there is more than one), the one attributed to the maximum "fishing sequences" of the "year*vessel".
- e) Else for the fishing sequences reset ("*rare*" metier first attributed) or not completed in the first step of the script and for which the "target species group" does not match with the "target species group" of at least one of the dominant "metiers DCF level5" of the "year*vessel" then compare the gear declared of the fishing sequence considered with the gear of the dominant "metiers DCF level5" of the "year*vessel".
 - a. If there is one unique dominant "metier DCF level5" corresponding to the same "gear family" then attribute it to the fishing sequence considered.
 - b. Else if there is more than one dominant "metier DCF level5" corresponding to the same "gear family" then attribute the one attributed to the maximum "fishing sequences" of the "year*vessel".
- f) Else attribute to the fishing sequences reset and not completed at this stage the previous "rare" metier first attributed. In this case, this second step of the script validate the "rare" metier attributed in the first step.
- g) Else and for the fishing sequences not completed in the first step of the script and also not completed at this stage of the second step of the script, NA will be attributed for "metier DCF level5" of the fishing sequence considered. "MIS_MIS_0_0_0" will be attributed to the fishing sequence as "metier DCF level6" in further step of the script (see function "getMetier_level_6").