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Report of the Working Group on Spatial Fisheries Data (WGSFD)

8-12 June 2015

ICES Headquarters, Copenhagen, Denmark

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International Council for the Exploration of the Sea

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Executive summary

The Working Group on Spatial Fisheries Data (WGSFD) met at ICES Headquarters, Copenhagen, 8–12 June 2015. ICES had issued a data call for aggregated VMS and logbook data for the years 2009–2013, and all participants signed the ICES Conditions for VMS data use. The group quality assured the data submitted and reviewed the data exchange format used for the submission. To improve data quality in the future, the group also worked on production of a best practices document, based on an R-script, which will be finished by October 2015.

The data received contained information on fishing hours, kw fishing hours and average fishing speed. All data was provided at DCF métier level 6 (i.e. fishing gear + target species assemblage + mesh size range + selection device) and at a 0.05 degrees spatial resolution.

A workflow was developed to estimate surface and subsurface fishing intensity from these data. In estimating intensity, values of both gear width and the proportion of the gear that contacts with the sea floor (surface and sub-surface) are required. As this information is not readily available from the logbook, values were derived from the EU funded BENTHIS project. Thus, as an initial step in estimating fishing intensity, some preliminary work was required to assign DCF level 6 métiers to the Benthis metiers.

The method for calculating DCF indicators 5, 6 and 7 was improved, and these indicators were reported by ICES Ecoregion. In 2015, WGSFD received additional ToRs to answer queries from OSPAR and HELCOM regarding fishing intensity and the proportion of fishing effort captured by the available data. These outputs will serve as input for work on MSFD descriptor 6 to be done by OSPAR and HELCOM.

To estimate the proportion of total fishing effort captured by by VMS data, logbook data was used to compare the amount of landings from small vessels with that of larger VMS-enabled fleets.

As it was the third year of appointment, WGSFD conducted a self-evaluation and agreed that there was value in continuing as a working group. Future ToRs were discussed, with the group concluding that time at the meeting would be better spent focusing on streamlining of the analytical process and on development of robust methodologies that can be implemented by the ICES datacentre rather than routine data processing.

1 Administrative details

Working Group name
Working Group on Spatial Fisheries Data (WGSFD)
Year of Appointment
2013
Reporting year concluding the current three-year cycle
3
Chair(s)
Josefine Egekvist, Denmark
Meeting venue(s) and dates
ICES HQ, Copenhagen, Denmark, 11–13 September 2013, 8 participants
ICES HQ, Copenhagen, Denmark, 10–13 June 2014, 13 participants
ICES HQ, Copenhagen, Denmark, 8–12 June 2015, 15 participants

2 Terms of Reference a) – e) and Summary of Work plan

a) An annual update of an aggregated product based on VMS and logbook data giving the DCF environmental indicators 5, 6 and 7 as well as MSFD descriptor 6. The aggregated output will contain data from as many ICES member states as possible.

b) b) Work on standardized data products for inter alia WGDEEP, WGDEC, WGECO. Ensure standardized methods and quality assurance.

c) c) Review ongoing work for analysing VMS data and developing standardized data products. This might also include new technical solutions like e-logbook, AIS and CCTV data to improve the effort estimate

d) 2015/4 Support for the development of common and candidate OSPAR biodiversity indicators for benthic habitats: Benthic habitats

ICES is requested to support on-going OSPAR indicators work on benthic habitats, in support of the requirements under the MSFD[1].

1. Using mobile bottom contacting gear data, produce fishing abrasion pressure maps[2] (2009–2013) using the BH3 approach as a follow-up of the OSPAR request to ICES (Request5/2014). Fishing abrasion pressure maps should be analysed by gear distribution, and type, in the OSPAR maritime area and be

[1] Any analysis relating to main threats and development of abrasion maps should not be applied to the Portuguese continental shelf

[2] There should be consultation with OSPAR in the drafting of the data call that will be required to deliver of this request. This should build on the experience and lessons learned from the 2014 VMS/Log book data call.

based on the methodology proposed for the physical damage indicator (BH3). Specifically ICES is requested to:

i. collate relevant national VMS and logbook data;
ii. estimate the proportions of total fisheries represented by the data;
iii. using methods developed in Request 5/2014, where possible, collect other non-VMS data to cover other types of fisheries (e.g. fishing boats < 12m length);
iv. prepare maps for the OSPAR maritime area (including ABNJ) on the spatial and temporal intensity of fishing using mobile bottom contacting gears (BH3 approach);

2. Evaluate the applicability of a reduced list of habitats in support of the development of the Typical Species indicator (BH1)[3]. This work should consider those habitats that have previously been identified by the COBAM Benthic experts group. Evaluation should consider data availability, and suggest possible prioritisation of habitats already included in the OSPAR list of threatened and declining habitats.
3. Evaluate monitoring and assessment requirements for multimetric indicator (BH2)[2] and/or typical species (BH1)[2], by providing:
    i. an overview of existing monitoring programmes with associated benthic sampling stations (e.g. WFD, MPA, Natura2000, impact assessment studies, etc.), taking into account the work done under the JMP project/art 11 reporting by countries.
    ii. an overview of existing network of sampling stations and monitoring frequency across all OSPAR regions.
    iii. an evaluation of on-going monitoring with regard to, geographical coverage, parameters consistently measured across the whole network, monitoring design and sampling strategy for assessment requirements (BH2/BH1). Evaluation should identify any gaps and indicate how they could be completed (monitoring sampling strategy and/or methods).

e) **Pressures from fishing activity (based on VMS/logbook data) in the HELCOM area relating to both seafloor integrity and management of HELCOM MPAs**

1. Produce maps and shape-files of fishing intensity for the HELCOM area based on a 0.05 x 0.05 c-square degree grid. The maps should consist of a set of the polygonal feature classes and be submitted in the ESRI shape file format. Polygons should indicate the areas with equal fishing intensi-

[3] In the implementation of this request ICES should ensure that there is a dialogue established between the relevant Working Group chairs and coordinators of the relevant OSPAR subsidiary bodies, including the ICG-COBAM Expert group for Benthic Habitats and ICG-Cumulative Effects. This is to ensure consistent interpretation of the request to meet the needs of OSPAR and avoid duplication in supporting the development and testing of OSPAR common indicators. Where data has been analysed as part of the work to deliver this request, the advice should be delivered in a form that will enable its use in subsequent analyses (including spatial analysis).

ty measured in hours per year or per season being classified in a similar way to the maps produced for the OSPAR region where possible.

2. The maps and shape files of fishing intensity should be calculated for bottom contact gear and mid-water trawl and longline for every year in the period from 2009 to 2013 and for each quarter of 2013. In particular the following maps should be produced:
   i. intensity of fishing by each fishing activity for each year in the period from 2009 to 2013;
   ii. total intensity for each year in the period from 2009 to 2013;
   iii. total intensity and by each fishing activity by quarter in 2013.
3. Where available and possible, provide information on fishing intensity for bottom contact gear and mid-water trawl and longline in the 174 official HELCOM MPAs for all of 2013 and for the first quarter of 2013. The information should be provided in the forms listed in paragraph a) of the current request. Information on overall fishing effort should also be provided.
4. Estimate the proportion of total fisheries represented by the data.

Summary of Work plan

In addition to ToRs a, b and c, WGSFD had received requests from OSPAR and HELCOM (ToRs d and e) as well as recommendations from WGDEC and WGBYC.

As in 2014, ICES had issued a data call for aggregated VMS and logbook data, so again this year, WGSFD had data available to work with. Data quality reports and an overview data quality table had been generated before the meeting. The group was informed about the ICES policy on Conditions for VMS data use and signed the document. The group was also informed about the review of the 2014 report taking the output of the review as a basis for improvement in the 2015 work.

Presentations were given on new developments in the area of spatial fisheries data, which served as a context for the group's work:

- Update on OSPAR BH3 indicator – Extent of Physical damage, by Cristina Vina-Herbon
- BH3 – Fishing Abrasion Layers Methodology & Challenges, by Declan Tobin
- Benthic impact from a fisheries perspective (WP2 EU-FP7 BENTHIS), by Francois Bastardie
- Habitat-specific effects on fishing disturbance on benthic species richness in marine soft sediments, by Niels Hintzen
- Mapping fishing effort from VMS data, by Gilles Guillot
- Validation data: keystone to assess performance of state-space models for movement, by Mathieu Woillez
- Mapping of fishing effort in Europe using AIS data, by Maurizio Gibin

The group split into the following subgroups to deal with specific issues associated with answering all the ToRs and requests:

- Data quality (ToR b)

- Review of data call (ToR b)
- Data guidelines/Best practices (ToR b)
- Method to calculate fishing abrasion pressure/swept area/intensity from available data (ToR b, d and e)
- Production of maps/outputs to answer requests (ToR b, d and e)
- Estimation of the proportions of total fisheries represented by the VMS data (ToR d and e)
- Information on fishing activity within HELCOM MPA's (ToR e)
- DCF indicators 5, 6 and 7 and MSFD descriptor 6 (ToR a)
- Recommendations from WGDEC and WGBYC (ToR b)

Regarding ToR d, WGSFD was asked to focus on part 1 to produce fishing abrasion pressure maps; the ICES EG's BEWG and WGMHM have looked into point 2 and 3.

3 Summary of Achievements of the WG during its 3-year term

2013:

- Setting up a workflow for data handling procedures
- Work on method for DCF indicators 5, 6 and 7
- Work on example data from a few countries

2014:

- Evaluation of aggregated VMS data received following the ICES data calls, data clean-up, resubmission of data and generation of a corrected, aggregated dataset.
- Applicable caveats were listed for all potential users of the aggregated VMS dataset
- Maps that compared the distribution of fishing effort from VMS data with that derived from STECF data were created.
- Cleaned datasets of aggregated VMS data with fishing effort in hours by year and main gear groups for the OSPAR and HELCOM areas were created for other ICES groups to work on.
- A suggestion was made for logbook and VMS data exchange format for future data calls.
- Maps of fishing effort in hours were generated by 0.05 degrees c-squares, year and main gear groups for the OSPAR and HELCOM regions.
- DCF indicators 5, 6, and 7: Maps and tables with indicator values per ICES subdivision were produced for OSPAR and HELCOM areas. Indicator values were grouped by both gear and total.
- A map of the relative change in fishing effort over years was produced
- To meet the WGBFAS request, maps of fishing effort distribution by year, quarter and main gear group were produced for Kattegat and the Baltic Sea. The hours effort within each ICES subdivision were summarized to give an effort estimate.

- To meet the ADGVME request, availability and the pros and cons of using AIS data were reviewed.
- A map of main gears in the OSPAR region was produced.
- Example maps of swept area for the OSPAR region were produced, based on assumptions for mean speeds and gear width, using the data available.

2015:

- Work was done to assess the quality of the submitted data. Quality reports and a summary table on data quality were produced
- Estimates of the proportions of fisheries covered by VMS were derived for both OSPAR and HELCOM requests
- DCF level 6 metiers were grouped into Benthis metiers and alsointo a more generalised set of gear groups
- The list of caveats applying to interpretation of the maps was updated
- The data call format was reviewed
- The data exchange format used for ICES data calls for VMS and logbook data was revised
- Work was conducted to draw up a best practice/data guidelines document
- The method to produce DCF indicators 5, 6 and 7 by ICES Ecoregions was further developed, and an output was produced.
- A method to calculate fishing intensity from the data available through the data call was developed, including a workflow and an R-script. Where possible, gear widths and surface/subsurface proportions were estimated using findings from the EU FP7 BENTHIS project
- A request from WGDEC to produce an output from data provided by NEAFC was answered
- A request from WGBYC was answered
- A request from OSPAR to produce fishing intensity maps and underlying data was answered using the outputs above.
- A request from HELCOM was also answered using the outputs above.

4 Final report on ToRs, workplan and Science Implementation Plan

The work of WGSFD 2015 is outlined in this section. Please see Annex 6 for a list of abbreviations.

4.1 Data

In December 2014, ICES issued a data call for VMS and logbook data for fishing activities in the North East Atlantic and Baltic Sea for the years 2009–2013. The data was to be used to estimate the spatial distribution and extent of bottom contact of fisheries and was to be submitted by 31 January 2015. The exchange format of the data call was based on recommendations made by WGSFD in 2014. The data call asked for two datasets:

Annex 1 of the data call: Coupled VMS and logbook data providing information on country, year, month, c-square, vessel length category (12–15 m or >=15 m), gear code, DCF metier level 6, average fishing speed, fishing hours, kW*fishing hours, total weight of the landed species and value of the landings in euro. The information on average fishing speed, kW*fishing hour and total value were optional.

Annex 2 of the data call: Based solely on logbook data information was provided on: country, year, month, ICES statistical rectangle, gear code, DCF metier level 6, vessel length category, fishing days, kW*fishing days, total weight of the landed species and value of the landings in euro.

Data was submitted by most countries, but not all. Some countries had difficulties processing the data, and therefore submitted raw VMS and logbook data to the ICES datacentre. Generally the quality of the data was good, but there were still issues to deal with. The following sections describe specific issues related to the data submitted.

4.1.1 Data security

The VMS data are considered to be sensitive, and therefore precautions need to be taken when sharing these data. All participants were informed about the ICES policy on Conditions for VMS data use (http://ices.dk/marine-data/Documents/VMS_DataAccess_ICES.pdf) and signed the document. The data received from the data call is only to be used for the purpose of answering the ToRs and have to be deleted after the work has finished. Data were exchanged via a secure SharePoint.

4.1.2 Data coverage

Not all counties answered the data call, and the outputs produced by WGSFD will reflect the data coverage. The data call was sent to following countries: Belgium, Denmark, Estonia, Faroe Islands, Finland, France, Germany, Greenland, Iceland, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, and UK. Iceland, Faroe Islands and Greenland did not submit data. Spain submitted data in an incorrect format. Portugal only submitted data for part of the fleet. In addition data from the NEAFC area were available through a MoU between ICES and NEAFC. Figure 4.1.2.1 gives an overview of the data coverage. The total fishing hours, kW*fishing hours, landed weight and value of the landings are shown for all gears for 2012. In Annex 7 the same output is given for all years 2009–2013. The maps reflect the fact that information for all fields was not available for all submissions. E.g. the data from NEAFC contain fishing hours, but not kW*fishing hours, landed weight and value of the landings. It can also be seen that the value of the landings are missing in the Norwegian data.

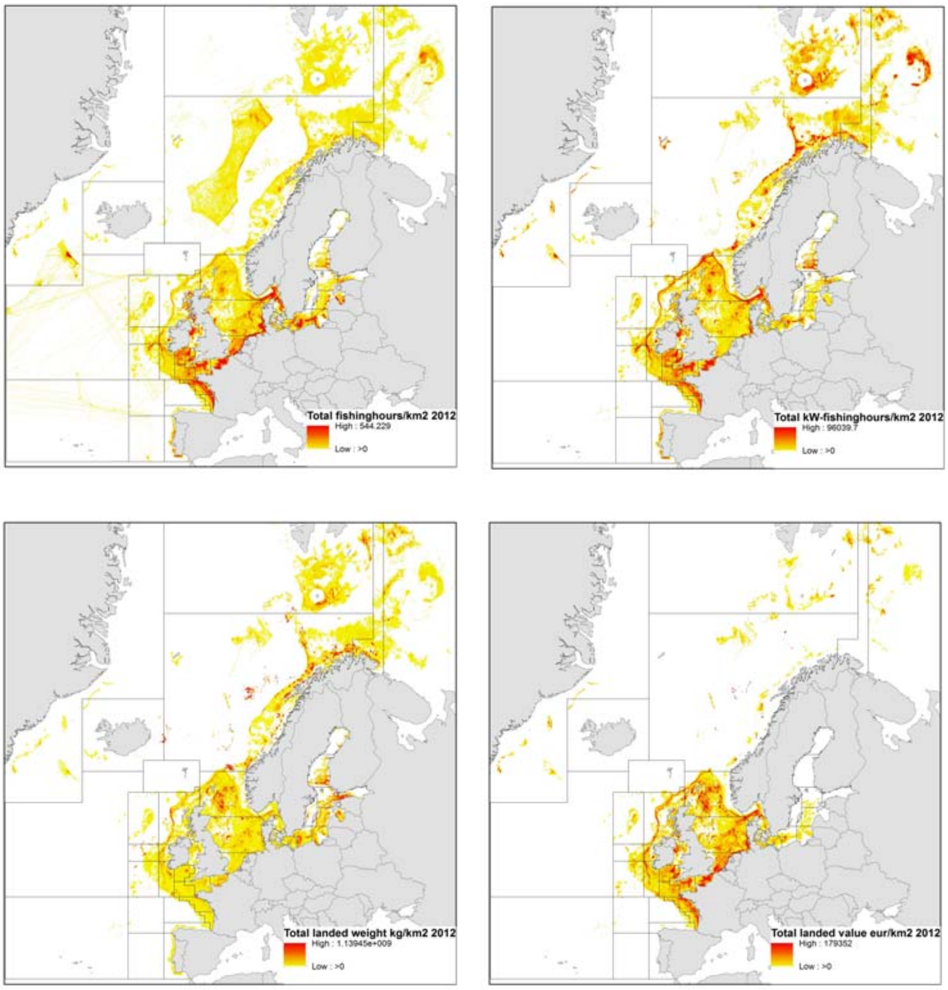


Figure 4.1.2.1. Maps showing the data coverage in the received data. The maps show the total fishing hours, kW*fishing hours, landed weight and value of the landings for 2012.

Due to potential variation in interpretation of the data call, it is possible that countries may vary in the extent of data submitted. However, such variation (e.g. whether data for parts of the fleets have been omitted) is hard to assess. Omissions are only identified when members of the group have specific knowledge regarding a country's fisheries.

For the years 2009–2011 VMS was mandatory for fishing vessels larger than 15 m, and during the years 2012/2013 VMS was mandatory for fishing vessels larger than 12 m. For a number of reasons, not all vessels in the 12–15 m category were VMS enabled by 2013 so it is likely that more vessels will transmit data in this size class over the coming years.

There is currently no high-resolution data available for vessels less than 12 m. AIS (a marine safety system) data could be a potential data source. Although, some smaller vessels choose to have AIS installed, it is currently not mandatory for fishing vessels smaller than 15 m.

Logbook data was requested to provide information on fishing activity from vessels that are not VMS enabled. Reporting of logbook data is mandatory for vessels larger than 10 m (8 m in the Baltic Sea). For some countries, fishing haul positions are reported directly into the electronic logbook. This is potentially a better way (than speed filtering) to establish fishing operations.

4.1.3 Data quality

Vessel monitoring systems are primarily intended for compliance and monitoring purposes and the data collected were not specifically designed to enable effort mapping. As such, there remain some data quality issues. It should be highlighted that, due to revisions in the 2014 data call, the data submitted this year was more fit-for-purpose than that submitted in 2013. In general, the data looked consistent across years and patterns of activity appeared similar across years.

Simple data quality checks were undertaken before the meeting, and an example of a data quality report is inserted in Annex 8. Fields that were optional in the data call were not reported by all countries. There is a need for standard quality checks to be reported back to the data submitter soon after submission.

WGSFD performed further tests to see if other issues could be detected. The following tables (4.1.31 – 4.1.3.2 provide summaries of VMS and logbook data returns for all years:

Table 4.1.3.1. Summary table for submitted VMS data (i.e. Annex 1 of the data call).

Year	No Recs	Fishing Hours	KW Fishing Hours	Total Weight
2009	855 537	5 732 109	2 317 642 063	2 219 170 597
2010	819 814	5 857 690	2 283 854 374	2 283 319 933
2011	908 524	6 070 306	2 874 924 755	3 298 719 335
2012	977 441	6 402 518	2 882 685 829	3 279 819 004
2013	998 732	6 244 698	2 904 091 683	3 435 768 009

Table 4.1.3.2. Summary table for submitted logbook data (i.e. Annex 2 of the data call).

Year	No Recs	Fishing Days	KW Fishing Days	Total Weight
2009	25 816	510 870	74 888 875	478 722 845
2010	26 866	530 817	77 104 156	468 154 824
2011	27 491	557 481	76 342 991	505 946 131
2012	25 114	529 376	68 744 050	460 334 526
2013	24 067	504 540	66 301 750	481 244 888

Some countries submitted raw VMS and logbook data and are welcome to do so when they can't comply with the format specified in the data call.

One country has submitted data for all the vessels in annex 2 of the data call, including the VMS enabled vessels. However looking at the summary the data it appears to be consistent with that expected.

Quality issues found

WGSFD performed a visual test and discovered that one of the data submissions had not distinguished between westerly and easterly co-ordinates of longitude. This was evidenced due to data being mapped on-land.

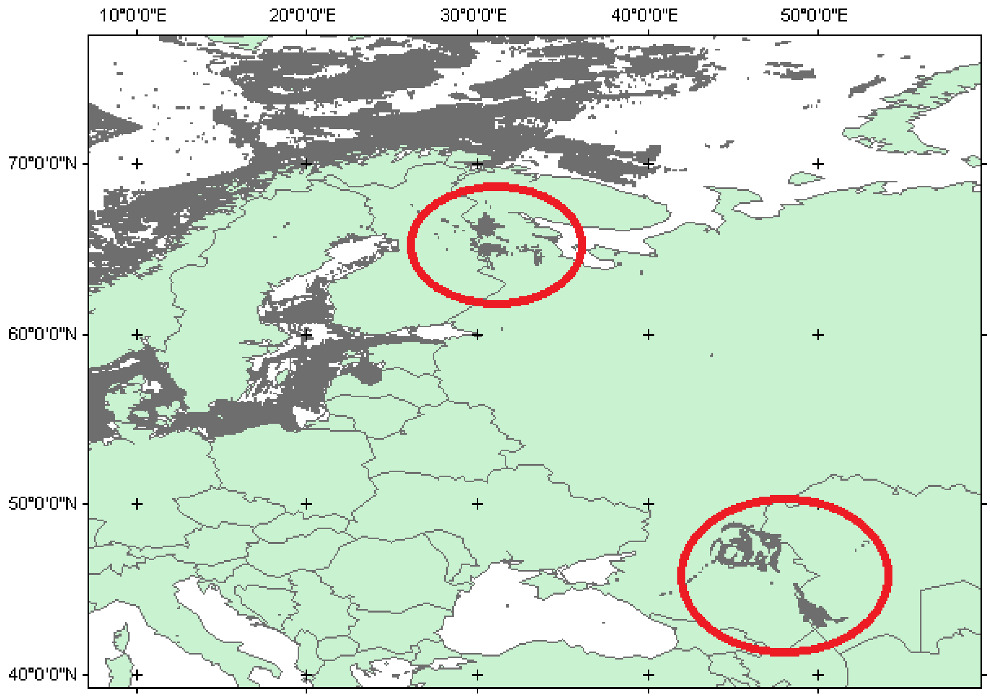


Figure 4.1.3.1. Example of some outliers on land.

A Quality control report was produced before the meeting and sent to all the data submitting countries (see example in Annex 8). The quality control report analysed the data of each country and made a summary of each field highlighting the number of distinct values and showing some of the values, to check if the coding looked correct. In case of the numeric value fields, the intervals and the averages of the value fields were presented. This way it is expected that some of the data-submitters can read the report and identify where issues may have existed within their data.

In the case of the NEAFC areas there were two sources of data for the same area, both the data submitted for the data call by the countries and the data coming from NEAFC, so the dataset was checked for overlap. As an overlap was detected, this was factored in all subsequent analysis by the group. In the data from NEAFC there is not information on country, so it is not possible to filter the NEAFC data by country to only use data from countries that didn't answer the data call.

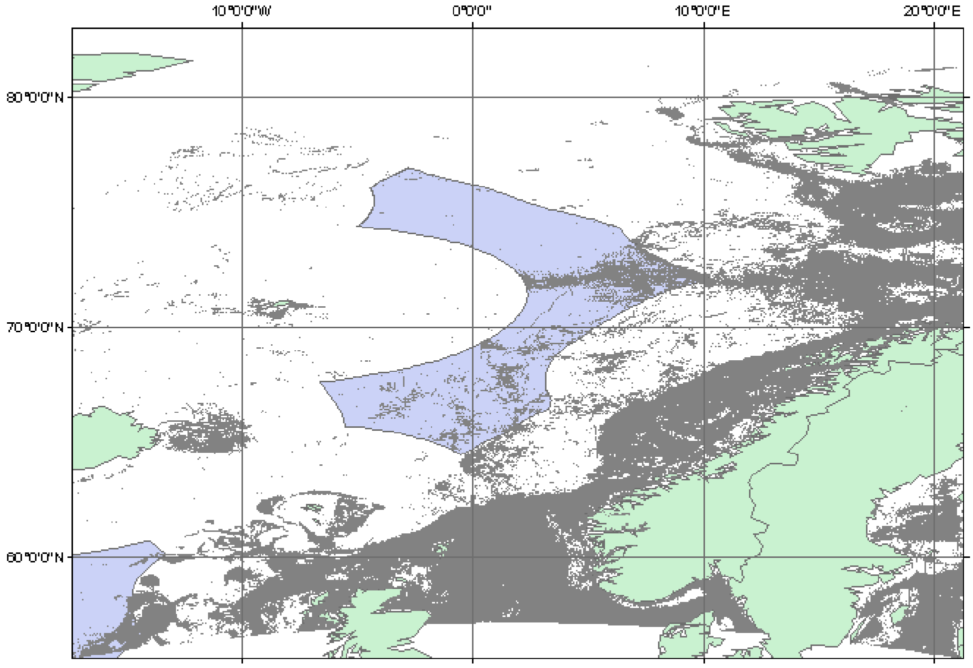


Figure 4.1.3.2. Map representing overlap between the NEAFC Regulatory Area (i.e. extent of NEAFC data submission) and VMS submitted by individual states (grey dots). The NEAFC Regulatory Area is presented in blue.

A table summarizing the quality of all data submitted was created, see tables 4.1.3.3 and 4.1.3.4. These tables provide a summary audit of the completeness and quality of all submissions.

Table 4.1.3.3. Summary quality report of data sumbmissions under Annex 1 of the data call (VMS data).

	Record type	Vessel flag country	Year	Month	C-square	vessel length category	Gear code	DCF metier	Average fishing speed	Fishing hour	kW*fishing hour	Tot weight	Tot value
Belgium	VE	BEL	2009-2013	1-12	11410 codes	>=15 12-15	7 codes	21 codes	No info	0.1- 251	22- 155394	0- 47128	0- 125163.8
Germany	VE	DEU	2009-2013	1-12	47690 codes	>=15 12-15	4 codes	75 codes	0-4.99	0.011-378.78	2.93- 349832.4	0- 654821.3	0- 1060072
Denmark	VE	DNK	2009-2013	1-12	31626 codes	>=15 12-15 <12	27 codes	97 codes	0-4.4	0-883.7	0- 493284.7	0- 7045157	0- 2767038
Estonia	VE	EST	2009-2013	1-12	6310 codes	?15 10-15 15<	4 codes	15 codes	0-4.5	1-252	54.5-323985	0-140154	No info
Faroe Islands	No data												
Finland	VE	FIN	2009-2013	1-12	7116 codes	>=15 12-15	5 codes	11 codes	0-4.42	1-28	153 - 42900	1- 230678.5	No info
France	VE	FRA	2009-2013	1,4,7,10	53404 codes	>=15 12-15	18 codes	275 codes	No info	0-1056	0- 406002	0- 1759939	0- 4268252
Greenland	No data												
Iceland	No data												
Ireland	VE	IRL	2009-2013	1-12	20452 codes	>=15 12-15	14 codes	117 codes	0.12-6	0.02 - 356	2.74 - 152146.4	0- 5774152	0- 990261.3

Lithuania	VE	LTU	2009-2013	1-12	6406 codes	>=15	5 codes	15 codes	0-4	1-247	132- 40128	0- 266666.7	0- 47600
Latvia	VE	LVA	2009-2013	1-12	4152 codes	>=15	3 codes	5 codes	No info	0-8240.21	0-1114915	0-313801	0
Netherlands	VE	nld	2009-2013	1-12	14053 codes	>15 12-15	7 codes	65 codes	0-8.2	1.9-845.2	0-7350.1	0-508852.8	0-1133301
Norway	VE	NO	2011-2014	1-12	97600 codes	[11 - 14, (12 - 14, [15 - 20, [21 - 27, [28 +]	23 codes	308 codes	0.1-51	0- 1726.169	0- 2155985	0- 8e+06	No info
Poland	VE	POL	2009-2013	1-12	8014 codes	>=15 12-15	10 codes	40 codes	No info	0- 390.67	No info	0- 490972	No info
Portugal (partial submission)	VE	PRT	2009-2013	1-12	9459 codes	>=15 <10 12-15	2 codes	4 codes	1.5-5	0.01- 150	0.9- 16.6	0- 105498	
Russia	No data												
Spain	Data in incorrect format												
Sweden	VE	SWE	2009-2013	1-12	13230 codes	>=15 12-15	14 codes	100 codes	0-3.52	0.033 - 208.6	7.1 - 134069.9	0.099 -1063396	No info
UK	VE	GBR	2009-2013	1-12	42122 codes	No info	7 codes	74 codes	0.1-6	0-655	4.46- 389754.2	0- 3033885	0-3221624

Table 4.1.3.4. Summary quality report of data sumbmissions under Annex 2 of the data call (logbook data).

	Record type	Vessel flag country	Year	Month	ICES rectangle	Gear code	DCF metier	Vessel length category	Fishing days	kW*fishing days	Tot weight	Tot value
Belgium	No data											
Germany	LE	DEU	2009-2013	1-12	752 codes	23 codes	105 codes	<8 8-10 10-12 12-15 >=15	0.25-1050	2-409553	0.758-12180581	0-6763997
Denmark	LE	DNK	2009-2013	1-12	118 codes	31 codes	86 codes	<8 <10 8-10 10-12 12-15	0.3-283	3-40150	0-2650434	0-862861
Estonia	No data											
Faroe Islands	No data											
Finland	No data											
France	LE	FRA	2009-2013	1, 4, 7, 10	319 codes	27 codes	365 codes	<10 10-12 12-15	0.125- 3150	0- 431181	0- 9511280	0- 8235672
Greenland	No data											
Iceland	No data											
Ireland	LE	IRL	2009-2013	1-12	110 codes	15 codes	113 codes	10-12 12-15	0.33 - 258.5	1.87 - 16493.24	0- 498450	1- 282363

Lithuania	LE	LTU	2009-2013	1-12	1 code	3 codes	6 codes	<8 8-10 10-12 12-15	2-16	30- 9057	10- 53372	3.3- 53598.82
Latvia	LE	LVA	2009-2013	1-12	8 codes	6 codes	12 codes	<8 8-10 10-12	1-467	0.95-6986.5	1-342069	No info
Netherlands	LE	nld	2009-2013	1-12	82 codes	8 codes	32 codes	<8 8-10 10-12 >12	0-8.2	1.9-268.3	4.1-6578.5	0-29211.5
Norway	No data											
Poland	LE	POL	2011-2013	1-12	34 codes	17 codes	125 codes	<8 8-10 10-12	1-767	No info	1- 1256966	No info
Portugal	No data											
Russia	No data											
Spain	No data/Incorrect format											
Sweden	LE	SWE	2009-2013	1-12	133 codes	19 codes	119 codes	[0,8) [8,10) [10,12) [12,15) [15,100)	0.25 - 206	8.82 - 39973.82	0 - 570000	No info
UK	LE	GBR	2009-2013	1-12	209 codes	7 codes	64 codes	<=10 10-<12 12-<15	-18 -360	-1468- 55737.19	0- 1733500	0- 991003.3

Data quality issues found

- Outliers on land (see figure 4.1.3.1)
- Additional vessel length categories to those specified in the data call format. Often these data could not be allocated to the standardised categories.
- There was a single instance where gears were aggregated and gear codes were not provided e.g. all passive gears aggregated.
- Occasional geographic co-ordinate errors were encountered (e.g. 986 latitude).
- Data from NEAFC were available, but information on gear codes were missing for much of the data from 2004–2012. These data have no information on DCF metier.

WGSFD recommends that a data quality report should be sent to the submitter and, where possible, to a WGSFD member from that country soon after the data submission. The data quality report should include a map, number of c-squares on land and c-squares outside the ICES area.

4.1.4 Proportion of fisheries covered by VMS data

OSPAR and HELCOM requested estimates of the proportions of total fisheries effort represented by the VMS data. This could be an estimate based on effort (e.g. hours/kwhours), but based on the available data, effort derived from the aggregated VMS dataset is reported as fishing hours while effort in the aggregated logbook data is reported as fishing days (of which true fishing effort is likely to only be a fraction) . As such, these two variables can’t be compared directly. However, both datasets contain information on landed weight which can be used as a rough proxy for the proportion of total fisheries effort captured by the VMS dataset. Using landed weight may skew simple estimates of effort (e.g. hours) as larger VMS enabled vessels typically have higher landing capacity than smaller vessels that only report via logbook. On the other hand, catching capacity is relevant when looking at fishing intensity as bigger boats with larger landings also have bigger footprints.

Up to 2011 only vessels larger than 15 meters were obliged to have VMS on-board, so when comparing landings between VMS and non-VMS enabled sectors, the landings derived from Annex 1 (VMS data) were used for >15 m vessels while landings derived from Annex 2 (logbook data) were used for <15 m vessels. In 2012 the legislation changed, so vessels larger than 12 meters were obliged to have VMS on-board, However due to variation between countries in the vessel length categories reported in the data submitted, it was not always possible to partition into these cateories. From the quality reports (tables 4.1.3.3 and 4.1.3.4) it can be seen that countries have used different vessel length classifications, which had to be combined into the vessel length categories used for this estimation. In the VMS data, e.g. Estonia reported the categories “?15”, “10–15” and “15<”. There was no division at 12 m, so in 2012/2013, it was not possible to make a division in the VMS data at 12 m. Likewise Norway had the category “[11–14”. In the logbook data, Netherlands reported the the category “>12”, so it was not possible to make a division at 15 m. UK didn’t include information on vessel length categories in the VMS data, so all VMS data from UK is used.

The gear groups used for assessing the proportion of fisheries covered by VMS data correspond to the gear groups defined for the OSPAR/HELCOM requests, see section 4.1.5. To summarize by OSPAR and HELCOM region, an additional field was created to indicate occurrence of each C-square (in the VMS data) or ICES rectangle (in the logbook data) in the OSPAR and/or HELCOM region.

The tables with the percentage of total landed weight represented by the VMS data by gear group in the OSPAR and HELCOM regions are found in sections 4.5.1 and 4.6.3.

Below are maps of distribution of the logbook data for vessels less than 12 meters in 2012 and 2013. The logbook effort is generally highest close to the coasts. Note that Ireland was not included.

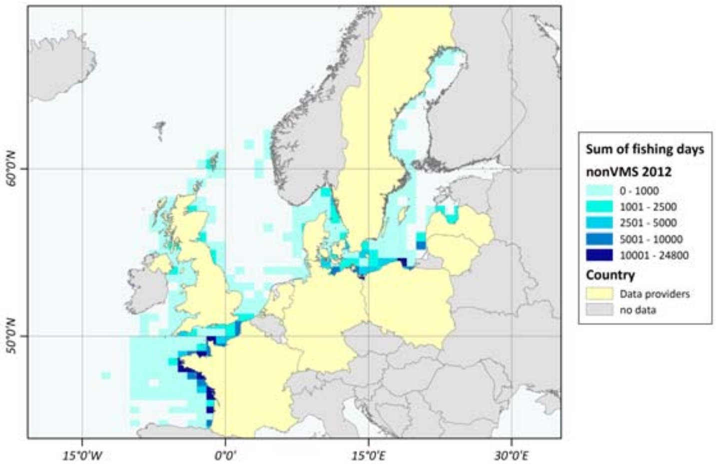


Figure 4.1.4.1. Map showing number of fishing days from submitted logbook data from vessels less than 12 m in 2012. Note that Ireland was not included.

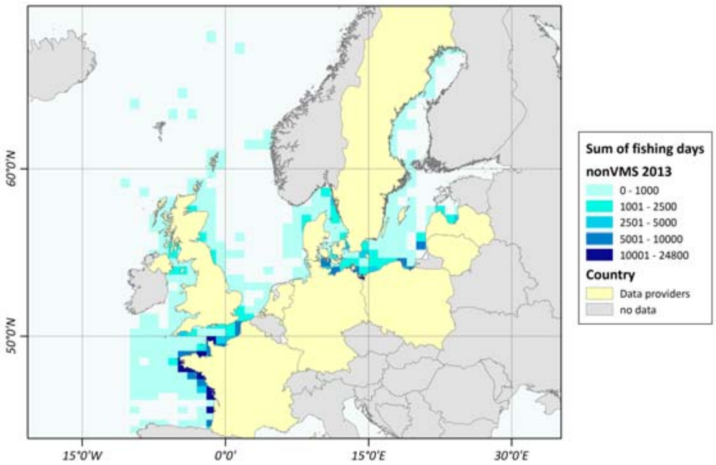


Figure 4.1.4.2. Map showing number of fishing days from submitted logbook data from vessels less than 12 m in 2013. Note that Ireland was not included.

Figure 4.1.4.3. Map showing sum of total weight from submitted logbook data from vessels less than 12 m in 2012. Note that Ireland was not included.

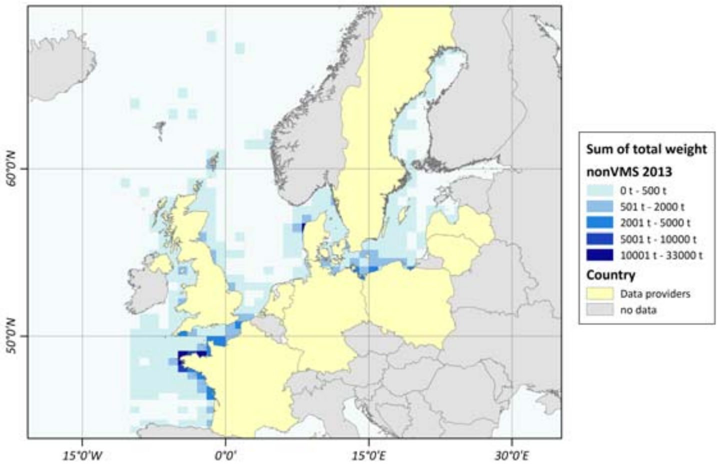


Figure 4.1.4.4. Map showing sum of total weight from submitted logbook data from vessels less than 12 m in 2013. Note that Ireland was not included.

It should be noted that there are landings from smaller vessels (<10m, <8m in the Baltic), not obliged to fill in logbooks that have not been included in this analysis.

4.1.5 Gear groups/Metiers used for analysis in WGSFD 2015

To answer some of the requests put to the group it was decided to deliver a spatially resolved index of fishing intensity for mobile bottom contacting gears. WGSFD defined fishing intensity as the area swept per unit area of the respective c-square grid cell (i.e. swept area ratio). In order to calculate swept area values certain assumptions about the spread of the gear, the extent of bottom contact and the fishing speed of the vessel need to be made.

The VMS datasets submitted following the data call contained information on gears used based on standard DCF métiers (from EU logbooks) usually at the resolution of métier level 6. However, they contained no information about the gear size and geometry. Therefore, the group decided to use vessel size – gear size relationships developed by the BENTHIS project (e.g. Eigaard *et al.*, 2015), to calculate spatially resolved swept area ratios. To do this, it was first necessary to aggregate métier level 6 to lower and more meaningful gear groups, for which assumptions regarding extent of bottom contact were more robust. WGSFD developed a look-up table, which listed all level 6 métiers encountered in the submitted data sets. To each level 6 métier the group assigned the relevantmétier levels 5 and 4, the métier groups defined by the BENTHIS project (if available), the métier groups of the JNCC project (if available), and a series of simple coarse gear group categories (distinguishing seven gear groups: otter trawls, beam trawls, seines, dredges, midwater trawls, static gears, and others that could not be related to any of the other six). Not all level 6 metiers could be assigned to a Benthis métier or a JNCC métier, as the Benthis métiers and JNCC groupings doesn't include passive gears and midwater trawls. For illustrative purposes we further added an extra text field with a descriptive name to each of the entries. The final look-up table was used to assign the most appropriate gear contact and average fishing speed (if missing in the VMS data set) values to the muti-national VMS dataset.

This table (Annex 9) should be a "living document", which means that it should be routinely revised to update, complement and correct the table, e.g. by taking other aggregation levels into account.

4.1.6 Caveats applying to all VMS data products and maps resented in this report

In 2014 WGSFD made a list of caveats applying to all VMS maps and indices presented in the report. As the data have changed for 2015, this list is updated below. It is important that they are considered when interpreting the results.

- The methods for identifying fishing activity from the VMS data varied between countries; therefore there may be some country-specific biases. Additionally, activities other than active towing of gear may have been incorrectly identified as fishing activity. This would have the effect of increasing the apparent fishing intensity in ports and in areas used for passage.
- Vessels are only obliged to allocate landings for any 24hr period to a single ICES rectangle, irrespective of the number of rectangles in which they may have been active over the period. As some countries may have restricted their data submission to only include VMS pings from those rectangles for which there are associated landings values, it is likely that effort and intensity will be underestimated in certain areas. Due to the lack of a standardized audit of pre-submission extraction routines, the extent of this issue was difficult to determine.
- The outputs can only reflect the data submitted. Iceland, Greenland, Faroe Islands and Russia did not submit data; Spain submitted data by ICES rectangle which did not answer the request. Therefore the maps are incomplete for any areas where vessels from these countries operate. WGSFD identified some partial submissions where data from part of the fleet were not submitted.

- NEAFC data were available but gear codes were missing for a substantial part of the data from 2004–2012. There was also an issue of data duplication in the NEAFC area with data submitted both by NEAFC and by states whos vessels operate in the area, so data from both data sources had to be mapped separately in this report.
- The data for 2012 and 2013 is not directly comparable to the data of previous years in the data call (2009–2011) due to the gradual increase in VMS-enabled vessels in the 12 to 15 m range. This is likely to be most relevant when examining trends in effort for inshore areas.
- Many countries have substantial fleets of smaller vessels that are not equipped with VMS (< 15 m prior to 2012, < 12 m thereafter); logbook data is at the spatial resolution of ICES rectangles
- For calculating fishing intensities, as well as surface and subsurface abrasion, fishing hours, gear widths and fishing speeds are used as input. Where possible, gear widths are an estimate based on BENTHIS project relationships between gear widths and vessel lengths or engine power. As information on exact vessel lengths and engine power are not available in the aggregated dataset from the data call, very broad assumptions on average vessel sizes and engine power had to be made regarding gear widths. Estimates of fishing speed were based on average fishing speed values of requested in the exchange format. However, as an optional field, data on speed was not always submitted, so WGSFD used available information on the same or similar gears to fill any gaps .

4.1.7 Revision of data exchange format

A sub group was established to consider revision of the data call for 2015 to better meet the output requirements of WGSFD for 2016. It was recommended that an additional "data QA" section be included, requesting the completion of a questionnaire/tick box documenting the processing steps taken during the extraction of data for submission. To assist data analysts, a standardized VMS processing workflow guidance document will be developed by WGSFD to support future ICES data calls.

Looking to the future:

- To provide better estimates of bottom contact/fishing impact (MSFD descriptor 6), the possibility of mandatory reporting of gear width in electronic logbooks was discussed. Alternatively, this information could be collected as part of the DCF observer programme.
- Consideration was given to including species information in future data calls. This could be of value for ICES stock assessment groups.
- To improve the resolution of the outputs, WGSFD discussed the potential of refining the data call over the coming years to request "raw" VMS. This will be further discussed at next year's meeting.

4.1.7.1 Aggregated VMS data exchange format

To enable better estimation of fishing speed for individual gear categories, it was recommended that the "average fishing speed" field be listed as mandatory.

To capture vessels that are VMS enabled but fall below the legislated 12m size threshold for reporting, it was recommended that an extra category be listed for the "vessel length category" field (i.e. <12m).

It was also recommended that additional fields be added to the data exchange format. Measures of both the average vessel power (kW) and average vessel length (m) for each métier per c-square will enable better estimation of bottom contact values for individual gears based on the relationship between gear size and vessel power/length as published by Eigaard *et al.* (2015).

See annex 10 for revised data exchange format tables.

4.1.7.2 Aggregated logbook effort data exchange format

To enable an estimate of the data gap resulting from the lack of VMS from the small vessel fleet, it was recommended that the landings data request be expanded to include all vessels in the record and to increase the number of categories in the "Vessel length category" to also include an "all vessels greater than 15m" category. In addition, it was suggested that an additional field be added to categorize the data into vessels that are VMS enabled and those that are not.

See annex 10 for revised data exchange format tables.

4.1.8 Data guidelines/Best practices

The quality of the work produced by the WGSFD is highly dependent on the data provided by the member states. Due to the complexity of the data and the different setups individual countries have for holding and extracting VMS / Logbook data, trying to standardize workflows and/or final products can be a challenging task. To address these issues, WGSFD proposed developing a best practices guide and workflows in R to help states stream line data extraction, cleaning, aggregating and submission processes.

The best practice guide is aimed at individuals working on the VMS/logbook data call to help them deliver the best (most consistent/reliable) data outputs. It will take the format of a table with three columns, in which each row will have:

- action needed;
- common errors found in this action;
- solutions to avoid potential errors.

Two workflows will also be provided to help in the extraction, analysis and aggregation of the VMS and logbook data into the data call exchange format. The software used for the workflow will be R, the choice being down to its widespread usage, the readily available tools (developed to work with VMS data) and finally the fact that R is free. To prepare for making the workflow, a questionnaire will be sent to data submitters by the end of august 2015 asking about the methods and software currently used.

The workflows will be made so any person, independently of their skill in the use of R should be able to follow it through. The workflow will describe step by step each part of the process providing the necessary code to run it and when applicable what should be expected as a result.

Within the work flow there will be some code designed to collect information that will be used to check the quality of the data and that provides a summary of the pre and post cleaning process indicating potential errors in the data. The summary will include information on the ranges, before and after data cleaning, for fields like speed, latitude, longitude, course, number of rows, number of points on land, number of points in harbour, among other attributes. This should lead to a more efficient assessment of data quality.

The aim of both the best practice guide and the workflows is to standardize and enhance quality assurance for all data submitters. If followed, data will be comparable and the resulting products will have increased reliability. Also, as a result of the usage of the workflows, WGSFD can concentrate on developing innovative methods and products and spend less time checking the quality of data. The proposed best practice guide and workflows should be available on the ICES website by the end of October 2015 in time to be used in the next data call. A link to the guidelines should be included in the data call to make it clear where information can be found.

Of note, the ICES VMStools training course is expected to take place in the week 9–13 November 2015.

4.2 ToR a: DCF indicators and MSFD descriptor 6

The method was updated this year, taking into account the comments from the review of the WGSFD 2014 report.

4.2.1 Distribution of fishing activities (DCF indicator 5)

Last year, the area of presence or positive area (Woillez *et al.*, 2007; 2009) was considered to describe the distribution of fishing activities. It consisted of summing the area of all c-squares (0.05 x 0.05 $degree^2$ resolution) that reported effort, under the course assumption that each c-square that is associated with any amount of effort is fully trawled.

To prevent bias introduced for c-squares where swept area is lower than the c-square area, the group agreed to produce a new indicator that consists of summing the areas corresponding to the swept area of a c-square, when the swept area was lower than the c-square area, and to the area of a c-square, when the swept area was greater than the c-square area.

The new indicator was reported in absolute and in relative terms, i.e. in proportion to the total area of an ICES ecoregion. The new indicator was computed per year and per ICES ecoregion for all mobile bottom contacting gears only.

Table 4.2.1.1. Total swept area computed per ICES ecoregions and per year for all mobile bottom contacting gear.

ICES ecoregions	2009	2010	2011	2012	2013
Arctic Ocean	620	648	649	807	140
Baltic Sea	83927	87262	88326	84183	65220
Barents Sea	13588	15246	35296	36673	35240
Bay of Biscay and the Iberian Coast	115530	111337	109918	108944	99245
Celtic Seas	258341	256489	254393	245803	237379
Faroes	1758	1684	64	117	145
Greater North Sea	341014	341339	342098	324837	289913
Greenland Sea	12210	10509	10653	10075	7031
Iceland Sea	418	374	224	216	260
Norwegian Sea	10943	10720	13857	13248	12191
Oceanic Northeast Atlantic	16693	13640	13244	9783	7780

Table 4.2.1.2. Proportion of ICES ecoregion area that was swept, computed per ICES ecoregion and per year for all mobile bottom contacting gears

ICES ecoregions	2009	2010	2011	2012	2013
Arctic Ocean	0.1	0.1	0.1	0.1	0.0
Baltic Sea	19.9	20.7	20.9	19.9	15.4
Barents Sea	0.6	0.7	1.6	1.7	1.6
Bay of Biscay and the Iberian Coast	15.3	14.8	14.6	14.5	13.2
Celtic Seas	28.1	27.9	27.7	26.7	25.8
Faroes	0.7	0.6	0.0	0.0	0.1
Greater North Sea	50.0	50.1	50.2	47.7	42.5
Greenland Sea	1.2	1.0	1.0	1.0	0.7
Iceland Sea	0.0	0.0	0.0	0.0	0.0
Norwegian Sea	0.9	0.9	1.2	1.1	1.0
Oceanic Northeast Atlantic	0.3	0.3	0.3	0.2	0.2

4.2.2 Aggregation of fishing activity (DCF indicator 6)

Two approaches were discussed by the group to best illustrate the aggregation of fishing activity.

The first approach is inspired from the work of Jennings *et al.* (2012). It consisted of reporting the proportion of the trawled area containing the top x% of the fishing intensity.

The second approach is inspired by the work of Woillez *et al.* (2007). It is a measure of the proportion of area occupied by fishing activity relative to overall variation in fishing intensity. Practically, let A be the cumulative area occupied by all fishing intensity values, ranked in decreasing order; I(A) is the corresponding cumulative fishing intensity; and I is the overall fishing intensity. The indicator of the second approach, called the spreading area (expressed here in squared kilometres), is then simply defined as twice the area below the curve expressing (I–I(A))/I as a function of A.

The first approach is rather simple with few arbitrary thresholds, here corresponding to 70%, 80% and 90%, required for the computation. By contrast the spreading area has the advantage of taking into account the overall variation across the entire distribution of fishing intensity values. In addition, zero values make no contribution to the spreading area, contrary to various indices that characterize aggregation (area coverage: Swain and Sinclair, 1994; Gini index: Myers and Cadigan, 1995; spatial selectivity index: Petitgas, 1998) which all relate to the area of coverage of highest values.

After discussion, the group decided to report both indicators, as they were judged to be complementary. The spreading area of fishing intensity was reported in absolute and relative terms, i.e. in proportion of the total area of an ICES ecoregion. Both indicators were computed per year and per ICES ecoregion for mobile bottom contacting gears only.

Table 4.2.2.1. Spreading area of fishing intensity computed per ICES ecoregion and per year for mobile bottom contacting gears.

ICES ecoregions	2009	2010	2011	2012	2013
Arctic Ocean	612	648	655	724	611
Baltic Sea	39501	42303	46176	44353	45138
Barents Sea	28142	36403	36383	36069	36439
Bay of Biscay and the Iberian Coast	41044	37962	38139	42683	37454
Celtic Seas	85579	85832	89731	81719	81169
Faroes	5005	6024	173	224	229
Greater North Sea	146650	136556	135984	125760	114711
Greenland Sea	13755	13259	11446	11189	9377
Iceland Sea	1698	1823	867	4183	1163
Norwegian Sea	8750	8935	10486	8680	8138
Oceanic Northeast Atlantic	12783	10214	10839	8197	6599

Table 4.2.2.2. Spreading area of fishing intensity relative to the ICES ecoregion area computed per ICES ecoregion and per year for the mobile bottom contacting gears.

ICES ecoregions	2009	2010	2011	2012	2013
Arctic Ocean	0.1	0.1	0.1	0.1	0.1
Baltic Sea	9.3	10.0	10.9	10.5	10.7
Barents Sea	1.3	1.7	1.7	1.6	1.7
Bay of Biscay and the Iberian Coast	5.4	5.0	5.1	5.7	5.0
Celtic Seas	9.3	9.3	9.8	8.9	8.8
Faroes	1.9	2.3	0.1	0.1	0.1
Greater North Sea	21.5	20.0	20.0	18.5	16.8
Greenland Sea	1.3	1.3	1.1	1.1	0.9
Iceland Sea	0.2	0.2	0.1	0.5	0.1
Norwegian Sea	0.7	0.7	0.9	0.7	0.7
Oceanic Northeast Atlantic	0.3	0.2	0.2	0.2	0.1

It is noteworthy that the spreading area of fishing intensity can be larger than the total swept geographical area (DCF indicator 5), as fishing intensity can often be above 1 in some c-squares. However the spreading area will always be below the area of presence i.e. the sum of areas where effort of mobile bottom contacting gears has been reported.

Table 4.2.2.3. Proportion of the trawled area containing the top 70%, 80% and 90% of the fishing intensity computed per ICES ecoregion and per year for the mobile bottom contacting gears

ICES ecoregions	2009			2010			2011			2012			2013		
	70%	80%	90%	70%	80%	90%	70%	80%	90%	70%	80%	90%	70%	80%	90%
Arctic Ocean	34	39	45	35	41	46	35	41	46	38	44	50	68	79	89
Baltic Sea	13	18	29	15	22	31	17	23	33	15	21	28	19	25	35
Barents Sea	8	15	28	11	19	34	9	16	30	9	16	30	9	17	33
Bay of Biscay and the Iberian Coast	8	15	27	7	13	24	8	13	24	10	16	26	10	16	26
Celtic Seas	7	13	26	7	13	26	8	15	28	7	13	26	7	13	27
Faroes	18	25	38	19	27	43	20	29	43	18	25	35	27	36	50
Greater North Sea	14	23	38	13	21	36	13	21	36	11	19	33	10	18	32
Greenland Sea	9	14	25	8	13	28	6	8	17	5	6	15	7	13	26
Iceland Sea	8	13	37	52	64	77	14	22	36	24	34	53	15	19	25
Norwegian Sea	11	13	17	13	16	21	9	13	21	6	9	15	8	13	21
Oceanic Northeast Atlantic	11	15	23	6	10	15	11	15	23	10	16	22	8	11	18

4.2.3 Areas not impacted by mobile bottom contacting gears (DCF indicator 7)

DCF Indicator 7 is closely connected to DCF indicator 5. It is the complement to the total area swept by all mobile bottom contacting gears. It is obtained simply by subtracting the total area swept of DCF indicator 5 from the total area for each respective ICES ecoregion for a given year.

WGSFD stated that such an indicator is only relevant when all mobile bottom contacting gears are aggregated together. This indicator was reported in absolute and in relative terms, i.e. in proportion of the total area of an ICES ecoregion. DCF indicator 7 was computed per year and per ICES ecoregion.

Table 4.2.3.1. Total area not impacted by mobile bottom contacting gears computed per ICES ecoregion and per year.

ICES ecoregions	2009	2010	2011	2012	2013
Arctic Ocean	635348	635320	635319	635161	635828
Baltic Sea	338567	335232	334168	338311	357274
Barents Sea	2189795	2188137	2168087	2166710	2168143
Bay of Biscay and the Iberian Coast	637674	641867	643286	644260	653959
Celtic Seas	661215	663067	665163	673753	682177
Faroes	264847	264921	266541	266488	266460
Greater North Sea	340573	340248	339489	356750	391674
Greenland Sea	1045608	1047309	1047165	1047743	1050787
Iceland Sea	851793	851837	851987	851995	851951
Norwegian Sea	1190308	1190531	1187394	1188003	1189060
Oceanic Northeast Atlantic	4779688	4782741	4783137	4786598	4788601

Table 4.2.3.2. Total area not impacted by mobile bottom contacting gears relative to the ICES ecoregion area computed per ICES ecoregion and per year.

ICES ecoregions	2009	2010	2011	2012	2013
Arctic Ocean	99.9	99.9	99.9	99.9	100.0
Baltic Sea	80.1	79.3	79.1	80.1	84.6
Barents Sea	99.4	99.3	98.4	98.3	98.4
Bay of Biscay and the Iberian Coast	84.7	85.2	85.4	85.5	86.8
Celtic Seas	71.9	72.1	72.3	73.3	74.2
Faroes	99.3	99.4	100.0	100.0	99.9
Greater North Sea	50.0	49.9	49.8	52.3	57.5
Greenland Sea	98.8	99.0	99.0	99.0	99.3
Iceland Sea	100.0	100.0	100.0	100.0	100.0
Norwegian Sea	99.1	99.1	98.8	98.9	99.0
Oceanic Northeast Atlantic	99.7	99.7	99.7	99.8	99.8

4.2.4 MSFD descriptor 6

In ToR a for WGSFD it is stated that WGSFD should give "an annual update of an aggregated product based on VMS and logbook data giving DCF environmental indicators 5, 6, and 7 as well as MSFD descriptor 6". Descriptor 6 relates to seafloor integrity, and the outputs WGSFD deliver for OSPAR and HELCOM will be used as input for work on this descriptor. Therefore, the group decided not to spend time on this during the meeting.

4.3 ToR b: Work on standardized data products

4.3.1 Method to calculate fishing intensity from available data and information

'Swept area' is generally considered to be an estimate of the area of seabed in contact with the fishing gear and is a function of gear width, vessel speed and fishing effort. Data on instantaneous vessel speed is routinely collected as part of standard VMS transmissions and data on fishing effort can be derived from the elapsed time between pings for each fishing event. By contrast, data on gear width/spread is not routinely collected and there can be significant variation between vessels in the gears employed, and the way the information is recorded. Different gear types interact with the seabed in different ways and thus exert different levels of abrasive pressure, both in terms of the area of substrate affected and the penetration depth. As such, the means of estimating gear width can be a pivotal factor to any swept area methodology.

Due to differences in the characteristics of the gears and the way they are used for the capture of a wide range of target species, otter trawls, demersal seines, beam trawls and scallop dredges vary in their physical interaction with the sea bed. Generally speaking, demersal otter trawls and demersal seines are designed to target fish and invertebrates close to the seabed, while beam trawls and scallop dredges target species that live on the seabed or are partially buried in the sediment (Løkkeborg, 2004). For instance, with otter trawls, the towed otter doors have a relatively small spatial footprint due to their limited size, but because of the shape and weight they can often penetrate deeply into the seabed. By contrast, components such as the ground ropes (foot-rope) between the doors of the trawls have a much larger spatial footprint, but do not typically penetrate the seabed, predominantly remaining in contact with the seabed surface. The sweeps/bridles have the largest contact area with the seabed however the degree of impact from these components is still poorly understood (Valdemarsen *et al.* 2007). Subsequently, otter doors have the potential to disturb both infaunal (subsurface) and epifaunal (surface) communities, whereas ground ropes are likely to only disturb surface dwelling epifaunal communities. In linking the abrasion pressure to benthic response and habitat disturbance, splitting the pressure into surface and subsurface components allows better discrimination of the potential ecological effects (Church *et al. In Prep*). Instead of employing hydrodynamic forces to spread the net, beam trawling involves the use of a rigid, typically metal, beam to keep the trawl net open. Several components on the trawl (shoes, tickler chains, chain mat) are potentially capable of penetrating the sea bed across the width of the gear (Bergman and van Santbrink, 2000). The penetration depth of a beam trawl depends on the weight of the gear and the towing speed, but also on the type of substrate (Paschen *et al.*, 2000). Similarly scallop dredges are specifically designed to disturb the seabed surface and penetrate the upper few centimetres of the sediment with dredge teeth mounted along the whole width of the gear (Løkkeborg, 2004). As such, in estimating the swept area of these gears, surface and subsurface footprint were assumed to be the same. Due to limited use of tickler chains/mats, lighter shrimp beam trawls were a notable exception.

Here we describe a standard methodology for estimating swept area (km^2) from VMS fishing activity information.

4.3.1.1 Available data

To create a swept area abrasion data layer at both OSPAR and HELCOM regional scales, the method was applied to all gridded VMS data submitted by participating countries following the 2014 ICES data call (see section 4.1). The study specifically focused on fishing activity information (VMS) for vessels greater than 12m in length for the 2009–2013 period.

Small vessel activity (<12m) information was available at ICES rectangle resolution through the logbook. Despite variation in resolution between VMS and logbook data, WGSFD tested whether logbook data could be incorporated in estimates of fishing intensity However, the conclusion was that fishing intensity as estimated through logbook data was overrepresented in the outputs (see section 4.5.2). This is partly due to differences in the temporal scale used for reporting fishing events (i.e. VMS effort in hours – ICES logbook effort in days).

For VMS data, a simple speed rule filter was used to distinguish between fishing and non-fishing events. Decisions on the most appropriate filter to be applied were taken by the submitting body. As a result, all data received by ICES was assumed to represent fishing activity only (see associated caveats 4.1.6). To anonymize the movements of individual fishing vessels, VMS point data (vessel pings) were assigned to c-square raster grids at a 0.05° x 0.05° resolution. As such, the base unit for calculating swept area in the methodology is the c-square grid cell (c-squares provide a simplified system that allows for spatial indexing of geographic data e.g. fishing effort). Within each grid cell the number of pings was summed based on the time interval between pings, which produced an estimate of total fishing time for each cell. This information was available per fishing activity (metier level 5/6) for the years 2009–2013.

4.3.1.2 Method used

Due to the fact that VMS and logbook data currently do not allow a good representation of the intensity of fishing effort of static gears, only mobile bottom contact fishing gears were considered within the current method. The predominant activities associated with physical abrasion, in terms of extent and intensity, are: demersal trawling, beam trawling, boat dredge and demersal seine netting, although the extent of area swept for each activity also depends on the characteristics of the specific fishery (vessel size/power/target species).

Most official logbook and fisheries statistics focus on catch rather than effort. Consequently, gear coding in logbooks is not typically suited for quantitative estimation of seafloor pressure (swept area and impact severity). The EU FP7 "BENTHIS" project developed a method to overcome this information deficiency. They proposed using relationships between gear dimensions and vessel size (e.g. trawl door spread and vessel engine power (kW)) for different métiers to assign quantitative information of bottom contact (e.g. width of gear). As part of the project they created a list of 14 different functional gear categories they then collected information on vessel size (m), power (kW) and gear specifications for each métier in a pan-European industry-based questionnaire survey (Eigaard *et al*., 2015). This study enabled statistical modelling of the vessel size/ engine power ~ gear size relationships for different métiers. During the WGSFD meeting in 2015, it was agreed that information on fishing gear should be aggregated to BENTHIS métier levels where possible.

- Step 1 - Full QA of all data submitted (outlined in section 4.1.3)
- Step 2 - Assign all data for mobile bottom contacting gears to BENTHIS métiers where possible (outlined in section 4.1.5). For the current analysis 84% of gears could be assigned to Benthis métiers, with the majority of the remaining

gears (13%) being assigned to more general JNCC gear groups.[4] (see annex 9 for full assignment look-up table).

- Step 3 – Calculate fishing effort (hours). Based on the outputs of step 1, estimates of fishing effort were aggregated per c-square for each métier for each year.
- Step 4 - Fishing speeds were based on average speed values for each métier submitted as part of the data call. Where average speed values were not included as part of the submission, a generalised estimate of speed was derived based on the distribution of speed values available for each gear. Here are the detailed steps of the data analysis that was performed to produce such generalised estimates of speed.
    a. The average speed per gear groups was first explored in the VMS data. The data quality was checked. The gear codes were cleaned up. For example, "PS." was converted to "PS", and "Unk", "NULL", "NIL", and NA code converted to "NK" (not known). The missing speed data were identified by country and by gear (see tables in annex 11).
    b. The average fishing speed histograms were plotted (see figures in annex 11). Most of the histograms were unimodal with average speed comprises in expected range of values for fishing speed. For example, most of the 95% quantile were below 5 nm/h, except for the gears "TBS", "TBB", "PS", "OTM" and "NK". For these gears, histograms were bimodal and the high average fishing speed were reported by Netherland for "TBB" and NEAFC for the other ones. Such average fishing speed were expect for Netherland "TBB" fishery, while there were some doubts about how the VMS data were processed for the NEAFC area. These modes of high values could correspond to steaming behaviour.
    c. The missing average fishing speed data were populated with the mean for each given gear, while excluding data from Netherlands for "TBB", and NEAFC for any kind of gear. When it was not possible (e.g. a gear without any average fishing speed values available to compute a mean), the mean of a similar gear was used. For instance, average fishing speed of "LHX" was populated with the mean of "LH", "LHM" and "LHP".
    d. For the logbook data, no average fishing speed were provided. So, a lookup table linking gear to the mean average fishing speed was produced from the VMS dataset. For the gears only present in the logbook data, the mean of the average fishing speed considering all gears together was used. The lookup table and the logbook data were finally merged providing a file with average fishing speed for each gear.

[4] There is no BENTHIS metier or JNCC gear group category for hydraulic dredge gear. JNCC gear groups do not include estimates of bottom contact for demersal seines.

e. Speed information was converted from knots to metres per minute to aid further calculations.

- Step 5 – Allocate values of bottom contact (m). Due to the fact that there were no available data on vessel length or power submitted through the data call, average vessel length/power values recorded for each métier class in the BENTHIS survey were assumed. As a result, estimates of gear spread could be extrapolated based on the relationship between vessel size/power and gear spread as published by Eigaard *et al.* (2015). Where it was not possible to assign to BENTHIS métier codes, a more generalised set of gear bottom contact and speed values were derived based on the review done by JNCC into bottom contact of mobile demersal gears as described in the WGSFD 2014 report (see table 4.3.2.1 for estimated values for surface and subsurface contact).
    - Surface and subsurface abrasion were assumed to be the same for dredges;
    - Surface and subsurface abrasion were assumed to be the same for most beam trawl métiers except shrimp fishery where ground gear is lighter.
    - Surface and subsurface abrasion were assumed to be different for otter trawling and demersal seine netting with subsurface abrasion generally only associated with a proportion of the gear.
- Step 6 - Swept area calculation. The area of seabed swept by a vessel was calculated per Benthis métier group (gear type in absence of métier) per annum and based on the abrasion methodology proposed by JNCC (Church *et al. In prep*). The fishing area swept (Swept Area) was calculated per grid cell ($m^2.cell^{-1}$). It was calculated by multiplying the values of bottom contact, w, (m) by the 'average vessel speed' v, ($m.hr^{-1}$) for the relevant métier, and the 'time fished', e, (hour) to get an estimate of area covered per gear (Equation 1).The final output was calculated as area swept per cell, per annum ($m^2.cell^{-1}.yr^{-1}$). This was aggregated across métiers for each gear class (Otter trawl, Beam trawl, Dredge and Demersal seine) from 2009–2013. Two data layers were created for each gear class; one for 'surface' abrasion and one for 'subsurface' abrasion

Equation 1 – Swept Area calculation

$$SA = \sum evw$$

Where SA is the swept area, e is the number of minutes between pings, w is total width of fishing gear (m) causing abrasion; v is average vessel speed (m/min),

A swept-area ratio, *SAr*, was then calculated to account for the varying cell size of the GCS WGS84 grid. To produce the swept-area ratio *SA* was divided by the grid cell area, *CA* (Equation 2).

Equation 2 – Swept-Area 3.4.1 ratio calculation

$$SAr = \frac{SA}{CA}$$

Where SA is the swept area, CA is cell area and SAr is swept area ratio (number of times the cell was swept).

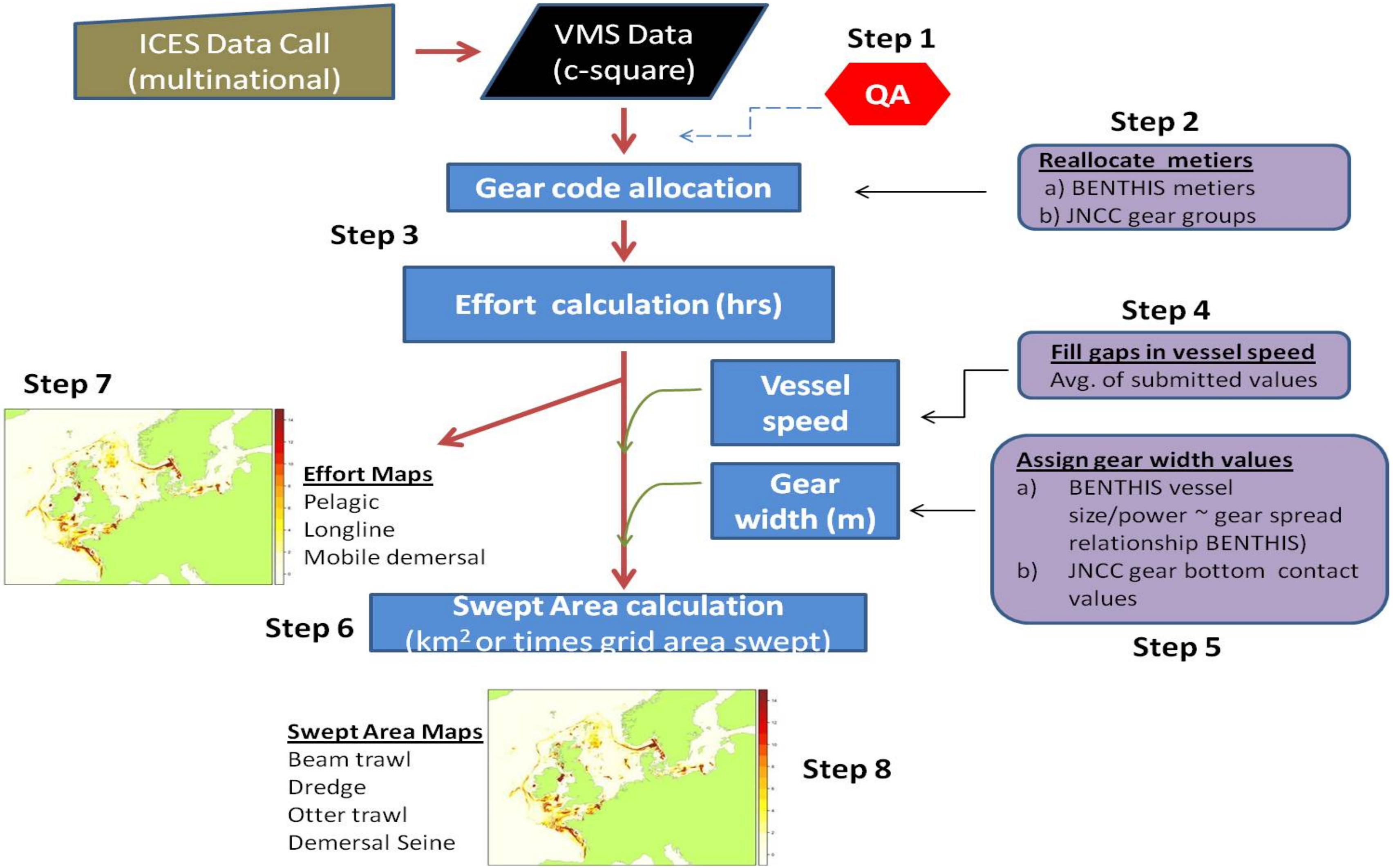
- Steps 7and 8 – Generation of effort and swept area maps at appropriate scale (e.g. OSPAR/HELCOM).

All analysis was conducted using R (R Core Team, 2012). A workflow and an R-script were developed to calculate fishing intensity.

Table 4.3.1.2.1. Estimates of width of fishing gear causing abrasion (surface and subsurface) and speed for each BENTHIS Métier and JNCC gear group.

Gear class	BENTHIS Métier/JNCC code	Avg Power (kW)	Avg Length (m)	Suface contact (m)	Subsurface contact (m)	Speed(m.min^{-1})
Otter trawl	OT_SPF	883	34.39	101.58	2.84	2.9
	OT_DMF	442	19.8	105.47	8.23	3.1
	OT_MIX_DMF_BEN	691	24.37	156.31	13.44	2.9
	OT_MIX	401	20.14	61.37	9.02	2.8
	OT_MIX_DMF_PEL	690	23.74	76.21	16.77	3.4
	OT_MIX_CRU_DMF	473	19.90	113.96	26.10	2.6
	OT_MIX_CRU	681	21.68	105.12	30.69	3.0
	OT_CRU	345	18.68	78.92	25.33	2.5
	Nephrops Trawl	-	-	60	2	3.0
	Otter Trawl (Bottom)	-	-	60	2	3.0
	Otter Trawl (Twin)	-	-	100	3	3.0
	Otter Trawl (other)	-	-	60	2	3.0
Beam trawl	TBB_CRU	211	20.75	17.15	8.95	3.0
	TBB_DMF	822	33.89	20.28	20.28	5.2
	TBB_MOL	107	10.15	4.93	4.93	2.4
	Beam Trawl	-	-	18	18	4.5
Dredge	DRB_MOL	382	24.60	16.97	16.97	2.5
	Boat dredge			12	12	4.0
Demersal Seine	SDN_DMF	168	18.92	6536.64	326.83	NA
	SSC_DMF	482	23.12	6454.21	903.59	NA
Pair trawl/Seine	Pair trawl/Seine			250	0	3.0

Figure 4.3.1.2.1. Workflow for production of fishing effort and swept area maps from aggregated (c-square) VMS data.



4.3.2 Recommendation from WGDEC

The ICES Working Group of Deep Sea Ecology (WGDEC, 2015) recommend that WGSFD produce maps of 'swept area' showing where the seabed has been impacted by bottom fishing activity each year (from 2006–2014) within the NEAFC Regulatory Area. These maps (provided as ESRI raster grids) shall allow WGDEC 2016 to investigate how bottom fishing closures affect fishing activity and behaviour.

Based on data available, WGSFD could only partially answer this request. The ICES Data Centre received data files with the data for the years 2000 to 2014 (NEAFC recommended to use only the years 2004 onwards) delivered by the secretariat of the North East Atlantic Fisheries Organisation (NEAFC). The data files include:

1) VMS ping data with an anonymised vessel identifier, date, time, speed and geographic position. The vessel anonymised identifier allows to link the vessel with the information on fishing gear. The data are given for a six month period, after which, the vessel identifier changes.
2) Vessel information with length category, power category and fishing gear (one gear type given per vessel identifier for a six month period).
3) Catch data can be linked with a vessel for the whole period (six months), this file has the catch per (target) species.

Unfortunately, these data sets did not contain all information needed to conduct a thorough analysis of VMS and logbook data for all years. For too many of the VMS pings listed, information relating to the fishing gear used was missing for the years 2006 to 2012 (Table 4.3.2.1). Sufficient gear information was available for 2013 and 2014, only.

Table 4.3.2.1. Gear information available for VMS pings per year.

	All Pings	Gear information provided		No gear information provided			
				but Catches reported		and no Catches reported	
Year	Pings	Pings	%	Pings	%	Pings	%
2006	138,084	77,036	56	58,276	42	2,772	2
2007	126,787	84,762	67	40,997	32	1,028	1
2008	131,772	103,654	79	27,303	21	815	1
2009	170,844	133,911	78	35,448	21	1,485	1
2010	178,453	140,539	79	36,406	20	1,508	1
2011	208,351	170,112	82	37,606	18	633	0
2012	178,936	156,922	88	21,258	12	756	0
2013	187,615	184,101	98	2,716	1	798	0
2014	281,796	276,784	98	4,862	2	150	0
	1,602,638	**1,327,821**		**264,872**		**9,945**	

The speed histogram for mobile bottom contact gears (OTB, OTT, PTB and TBS) in 2013 and 2014 is shown in figure 4.3.2.1. The histogram indicates that a speed filter between 2 and 6 could be used for identifying fishing activity.

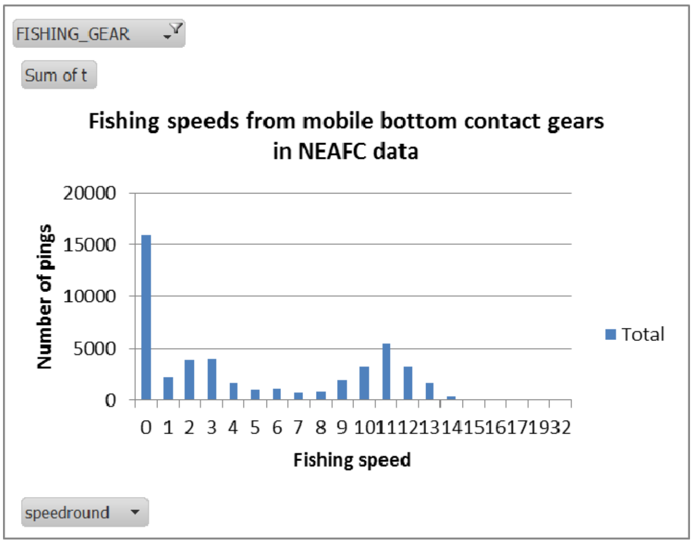


Figure 4.3.2.1. Histogram of fishing speeds for mobile bottom contact gears in NEAFC data 2013/2014.

Fishing hours (calculated as number of hours between VMS pings) ranged from 0 to 75659. In the histogram in figure 4.3.2.2 below all positions with fishing hours >100 have been reclassified to 100. The information on fishing hours seem to be unreliable.

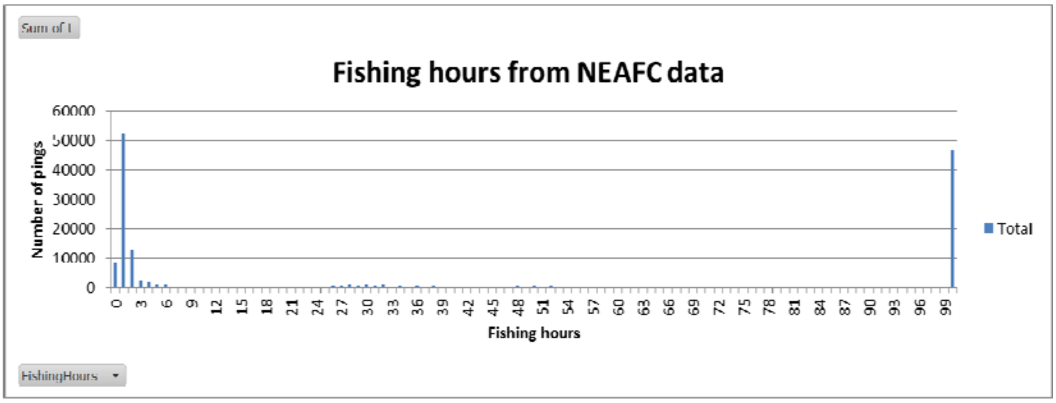


Figure 4.3.2.2. Histogram of fishing hours reported in the NEAFC data in 2013 and 2014. Fishing hours greater than 100 have been reclassified to 100.

Information on métier level 6 was not available from the NEAFC data, only the main gear was provided, so to produce swept area maps only information on value from the main gear in table 4.3.1.2.1 could be used. For WGSFD to make swept area maps, the assumptions required for both effort (fishing hours) and gear width would be too general to make them of any practical use. To answer this request in the future, WGSFD would need better quality data for the NEAFC area.

4.3.3 Recommendation from WGBYC

The ICES Working Group on Bycatch of Protected Species (WGBYC 2014) requested all commercial effort data (i.e. all fleets and areas) from vessel logbooks for the years 2009–

2014, in addition to meta-data to support proper interpretation (e.g. data gaps in reporting, field definitions and collection procedures). WGBYC intends to summarize logbook effort over broad temporal and spatial scales (i.e. calendar year and assessment units) to support bycatch mortality analyses of protected, endangered or threatened species.

Based on data available, WGSFD could only partially answer this request. First, not all countries responded to the data call, thus, the data set is not complete, see sections 4.1.2 and 4.1.3. Second, the data call only requested logbook information for vessels, for which there are no VMS data available. Therefore, the logbook data received are only available for vessels less than 15 m in length prior to 2012 and less than 12 m from 2012 onwards. However, it should also be noted, that only vessels larger than 10 m (8 m in the Baltic) are obliged to fill out logbooks. In addition, fishing effort is given as "hours" in the VMS dataset and as "days at sea" in the logbook dataset, respectively. Therefore, these two datasets could not be combined to provide a complete assessment of effort as requested. WGSFD recommended an amendment to the data call for 2016 to cover the full range of vessel length classes in the logbook request.

It should also be kept in mind that spatial resolution in the logbook is only mandatory at the ICES statistical rectangle scale (0.5° x 1.0°).

The distribution of fishing effort as fishing days per gear group and aggregated per ICES statistical rectangle for the years 2012 and 2013 is presented as an example of how the request may be answered once all data is made available through future data calls (see Figures 4.1.4.1 and 4.1.4.2). Data sets with the information requested will be made available after WGSFD 2016 if the reviewed data exchange format is used for the next ICES VMS/Logbook data call.

4.4 ToR c: Review on-going work for analysing VMS data and developing standardized data products

During the WGSFD meeting in 2015 several presentations were given on on-going work to analyse mostly VMS data, but also AIS data. These presentations served as input for the work done by WGSFD in developing methodologies.

4.4.1 Update on OSPAR BH3 indicator – Extent of Physical damage, by Cristina Vina-Herbon, JNCC, UK

The BH3 indicator is an OSPAR common indicator for the Greater North Sea, Celtic Seas, and Bay of Biscay/Iberian peninsula regions. It has been proposed as candidate indicator, subject to further testing, for the Arctic region and Wider Atlantic region. The indicator aims to address those pressures which cause physical damage to seafloor habitats in the OSPAR area. It is being designed to assess predominant as well as special habitat types. It is built upon two types of underlining information, i) the distribution and sensitivity of habitat components and ii) the distribution and intensity of human activities and pressures that cause physical damage, such as mobile bottom gear fisheries, sediment extraction and offshore constructions.

The overall concept is to design an indicator that will help us to evaluate the extent to which the integrity of the seafloor and associated ecology is being damaged by anthropogenic activity using a combination of sensitivity assessments and exposure to pressures.

The parameter/metric of this indicator is the surface and sub-surface area of damaged habitat. The components of the analysis are:

- Habitat maps showing the extent and distribution of Eunis level 3 habitats, and the mapped extent of relevant features (e.g. particular species, biotopes e.g. Eunis Level 5 or other biological characteristics)
- Sensitivity matrices showing the resistance and resilience of benthic habitats
- Pressure maps showing the extent and distribution of pressures
- Exposure matrices combining pressure intensity and habitat sensitivity per pressure type
- Physical damage index

The indicator method is based on a series of analytical steps to combine the distribution and intensity of physical damage pressures with the distribution and range of habitat sensitivities using a GIS spatial analysis model. The final output of this model is a 'Physical Damage Index' for each benthic habitat or geographical area.

The methodology for the calculation of pressures caused by fishing activities is split into surface abrasion (damage to seabed surface features) and subsurface abrasion (penetration and/or disturbance of the substrate below the surface of the seabed) using pre-processed VMS fishing data to calculate the 'swept area', which is the width of fishing gear multiplied by the average vessel speed and the time fished. This is done per gear per year on a cell-by-cell basis with data from the reporting period of six years. The swept area ratio (proportion of cell area swept per year) is then calculated by dividing the swept area by the grid cell area. The trawling effort is classified with an intensity scale ranging from 'none' to 'very high'. Advice from the ICES WGSFD is being sought to review and improve the method, and to produce the fishing pressure layers.

An important component of this indicator is the provision of habitat maps showing the extent and distribution of predominant and special habitats and their associated sensitivities. These maps are being produced using a combination of observational samples, benthic survey data and modelled habitat maps (e.g. EUSeaMap).

The sensitivity of selected characterising species, biotopes and model habitats is determined based on resistance (tolerance) and resilience (recoverability) in relation to a defined intensity of each pressure. A sensitivity matrix combines both aspects and determines the sensitivity rank of the species, biotope and habitat maps.

In order to determine physical disturbance levels of a particular habitat, the pressure and sensitivity values are combined using an algorithm assessing the degree of disturbance and the proportion of habitat area under each of the disturbance categories. An additive approach is proposed as the physical pressures considered are assumed to affect habitat structure and suitability in a similar manner.

Please note that, at present the technical specifications only address abrasion caused by fishing activities for vessels larger than 12 m. Impacts from small vessels and information from other activities causing physical damage will be added at a later stage.

The development and testing of this indicator is being done alongside benthic condition indicators, in particular the Condition of Habitat Community indicator (Multimetric index) (BH2) and the Condition of Typical Species (BH1) indicator. It is envisaged that these two indicators will be used to calibrate and ground-truth BH3 outputs and methods, and in particular to calibrate the pressure/impacts matrices being used within the models underpinning BH3.

4.4.2 BH3 – Fishing Abrasion Layers Methodology & Challenges, by Declan Tobin, JNCC, UK

The UK and Germany are leading on the creation of an abrasion layer at OSPAR regional/sub-regional scales as an indicator of the physical damage component of Descriptor 6 (seafloor integrity i.e. extent of the seabed significantly disturbed by human activities).

A habitat is considered to be disturbed, and therefore potentially damaged, when it is exposed to a pressure (from human activity) to which it is sensitive. The degree to which the feature is disturbed is dependent on the degree of sensitivity and the level of exposure to the pressure. Physical damage refers both to abrasion at the seabed surface but also includes abrasion, penetration and/or disturbance of the substrate below the surface.

In creating abrasion layers associated with fishing activities, the data must be easily obtainable and in a standard format from all OSPAR contracting parties. Routine fisheries effort data exists in the form of VMS and vessel logbook records and, through ICES, this data can be made available for all relevant states in the OSPAR region. The method used must be standardised and repeatable and must take account of the commercial sensitivity of fishing effort data (e.g. anonymisation by aggregating point data to grids). Also, data processing prior to submission needs to be auditable (e.g. logbook linking and speed filtering).

Swept area is calculated based on time between fishing pings (aggregated per grid), vessel speed and extent of gear contact. As such, the outputs from the method are dependent on the estimates of each of these parameter values. Refining, these assumptions will serve to increase our confidence in the outputs. Swept area is expressed as percentage of grid-cell-equivalent area swept per unit time. In deriving a measure of habitat disturbance, swept area outputs are coupled with habitat sensitivity values. To do this, OSPAR request that thresholds of exposure be set to reflect a range of fishing intensities from *very low* to *very high e.g.* < 17% per year swept to > 300%. It is unknown whether these thresholds are appropriate or should be revised using a more data driven approach. Although currently not considered, it is recognised that patterns of activity (seasonality etc.) rather than simple measures of absolute intensity are also important components of disturbance. It would be desirable to incorporate some measure of activity pattern into the method.

The first step in revising the current method involves improving our estimates of bottom gear contact and vessel speed. To do this, we propose using “new” métier 6 level data, requested under the 2014 ICES data call, along with vessel size/power ~ gear dimension relationships as published by the BENTHIS project. We also propose providing more stringent guidelines for pre-processing of data prior to submission to ICES. As an example we present a case where > 30% of potential fishing pings having being filtered out. This is due to the dataset being restricted only to those pings from ICES statistical rectangles for which there are associated landings values (for reporting purposes, vessels are only obliged to allocate landings in any 24hr period to a single ICES rectangle). It is recommended for future data calls that a mechanism be put in place to help prevent such discrepancies and to request an audit of the processing steps taken prior to submission.

4.4.3 Benthic impact from a fisheries perspective (WP2 EU-FP7 BENTHIS), by Francois Bastardie, DTU Aqua, Denmark

Recent work (Eigaard *et al.*, 2015) funded by the EU FP7-BENTHIS project has made a step forward in expressing fishing pressure on seabed habitats as the accumulated yearly seabed area (km^2) swept by individual fishing gears, accounting for the relative severity of the pressure (e.g., surface vs. subsurface pressure). Because the dimensions of the gears used (e.g. door spread and scale of gear subcomponents) are usually not reported in the logbook, the study conducted a pan-European industry-based questionnaire to collect gear and vessel specifications from a large number of vessels and to draw workable relationships that could help in deducing gear dimensions based on available logbook information only (Eigaard *et al.*, 2015).

The study defined 14 distinct towed gear groups in European waters (the BENTHIS métiers: eight otter trawl groups, three beam trawl groups, two demersal seine groups, and one dredge group), for which we established gear "footprints". The footprint of a gear is defined as the relative contribution from individual gear components, such as trawl doors, sweeps, and ground gear, to the total area and severity of the gear's impact. An industry-based survey covering 13 countries provided the basis for estimating the relative impact-area contributions from individual gear components, whereas sediment penetration was estimated based on a literature review. For each gear group, a vessel size–gear size relationship was estimated to enable the prediction of gear footprint area and sediment penetration based on information on vessel size. Application of these relationships with average vessel sizes and towing speeds provided hourly swept-area estimates by métier.

The WGSFD workflow has been using the relationships between gear dimensions and vessel size (e.g. trawl door spread and vessel engine power (kW)) for different gear groups (BENTHIS métiers) to deduce the gear dimensions and assign quantitative information of bottom contact (surface vs. subsurface contact) to each record of fishing effort aggregated in the pan-European ICES database available to WGSFD. The accumulated swept area in each grid cell (c-square) was deduced from the aggregated fishing effort per cell, times the average aggregated vessel speed in this cell, times the gear dimension for the towed gears deduced from an average vessel size (LOA) or power (KW), while a specific approach has been used for the seines (Eigaard *et al.*, 2015). Vessel size and power values were not obtained from the ICES database (because not requested in the data call) but instead were derived from the average vessel dimension per gear type given in Eigaard *et al.*, (2015).

4.4.4 Habitat-specific effects of fishing disturbance on benthic species richness in marine soft sediments, by Niels Hintzen, IMARES, The Netherlands

Niels Hintzen from IMARES presented, as co-author, a case study on the habitat specific effects of fishing disturbance. Lead author Daniel van Denderen explored the effect of this widespread anthropogenic disturbance on the species richness of a benthic ecosystem, along a gradient of bottom trawling intensities. Data from 80 annually sampled benthic stations in the Dutch part of the North Sea was used over a period of 6 years. Trawl disturbance intensity at each sampled location was reconstructed from VMS. Using a structural equation model, they studied how trawl disturbance intensity relates to benthic species richness, and how the relationship is mediated by total benthic biomass, primary productivity, water depth, and median sediment grain size. The results show a negative relationship between trawling intensity and species richness. Richness is also negatively related to sediment grain size and primary productivity, and positively related to biomass. Further analysis of our data shows that the negative effects of trawling on richness are limited to relatively species-rich, deep areas with fine sediments. We find no effect of bottom trawling on species richness in shallow areas with coarse bottoms.

4.4.5 Mapping fishing effort from VMS data, by Gilles Guillot, DTU Compute, Denmark

The common rationale behind methods of detecting fishing activity from VMS data lies in the fact that fishing activity results typically in slower and more erratic trajectories than steaming activity. A simple method to estimate the state of a vessel consists in setting a threshold on the speed modulus and estimate any ping or time step as fishing if it is below this threshold. This rule of thumb disregards any information about changes in direction and it is not rooted in a neat statistical framework and therefore lacks objectivity. Also, importantly, it disregards any auto-correlation in times, in particular, the facts that a vessel does not alternate between fishing and steaming states too frequently.

The premise of the current project is that model-based clustering methods and in particular hidden Markov models offer a flexible yet computationally efficient framework for the estimation of vessel activity and deserve further attention. We therefore investigated in detail a class of models and several variants in their practical implementation, we compared these models to those proposed by Bastardie *et al.* (2010) and Gloaguen *et al.* (2014) with the aid of on-board camera validation data. In a second step we implemented the model found to be the most accurate, on an extensive dataset from Sweden and assessed the congruence between its output and information obtained from logbook data.

4.4.6 Validation data: keystone to assess performance of state-space models for movement, by Mathieu, Woillez, IFREMER, France

Mahévas *et al.* (2014) stress the importance of validation data to assess the performance of state-space models for movement in ecology and fisheries. State-space models are widely used to estimate the states of an unobserved process from tracking data. When tracking data are assumed to be known without error (e.g. GPS position or filtered Argos positions) the unobserved process (also called hidden state process) generally concerns the behavioural states of the tracked individuals. This modelling approach assumes that the characteristics of the movement (speed, turning angle) inform us on the likely behavioural states (fishing/eating, foraging, and traveling). In fisheries and in marine ecology, applications concern, up to now, time- and state-discrete versions of these models assuming a Markov or Semi- Markov transition between states and a correlated (or not) random walk to describe movement conditionally upon state. Inferences are usually based on maximum likelihood or Bayesian methods. However, the selection and validation of a state-space model lacks appropriate statistical tools and suffers a computational cost. Reliability in the model's output is therefore questionable and it becomes essential to better control the assumptions introduced in the model (time-correlation, markov/semimarkov) and their consequences. Three different state-space models were fitted to several tracking data sets with varying frequencies of data acquisition associated with the validation data sets informing on the true behavioural states. The robustness of state-space models to model hypotheses was assessed and some recommendations were derived on the formulation of state-space models with respect to the time step of observations and the behavioural states. The main findings showed that the first order correlation was rarely taken into account in fisheries. The Markov assumption for the transition between states were confirmed for the 'traveling' state only. Uncorrelated and autoregressive movement models were robust to state process assumptions, although the fitted distribution parameters were not satisfactory. Finally the model's performance was sensitive to the observation time step, showing a small degradation with the increase of time step interval.

4.4.7 Mapping of fishing effort in Europe using AIS data, by Maurizio Gibin, JRC, Italy

Recent reviewed work on the calculation of effort includes a paper authored by Natale *et al.* (2015) on AIS data as an alternative source for deriving fisheries intensity estimates. The Automatic Identification System (AIS) is used by vessels to exchange positional information with other vessels, with base stations and with satellites and it is primarily transmitted for the purpose of collision avoidance. AIS data contain Global Positioning System derived positions of vessels, together with speed, bearing and additional static (e.g. ship type, size, etc.) and voyage related information (e.g. destination, ETA, etc.).. AIS is regulated by the International Maritime Organisation (IMO) Safety of Life and Sea (SOLAS)[5]. In Europe, since May 2014 all EU fishing vessels of overall length exceeding 15 m are required to be fitted with AIS[6]. The AIS data used in the paper were provided by the Maritime Safety and Security Information System (MSSIS) team at the Department Of Transportation's Volpe Center. AIS data were then linked to the European fishing fleet register to assess coverage of the AIS in the EU fishing fleet. In addition the paper defines a methodology for the detection of fishing behaviour from steaming activity focused on computational performance due to the large amount of AIS data to process. An unsupervised learning technique, a Gaussian Mixture Model (GMM), was applied to the speed profiles of each fishing vessel. Typical fishing speed profiles present the characteristics of being a mixture of other distributions. Such a statistical pattern derives from the fact that fishing behaviour is driven by a desire to maximise the fishing time while at sea. As with VMS data (Gerritsen and Lordan 2010, Bastardie *et al.* 2010, Hintzen *et al.* 2010, Vermand *et al.* 2010), when analysing fishing speed histograms, some speed values will have very high frequency compared to others. These modal speeds will reflect fishing behaviours such as: steaming, searching, fishing and idling. An Expectation Maximization algorithm (EM) applied to data from each vessel produced mean and standard deviation parameters of fishing speed distribution. They were used to calculate the fishing speed and related confidence intervals. The results of the analysis were validated using logbook data

[5] Safety of Life at Sea (SOLAS) convention Chapter V, Regulation 19

[6] Directive 2002/59/EC of the European Parliament and of the Council establishing a Community vessel traffic monitoring and information system, as amended by Directive 2009/17/EC and Commission Directive 2011/15/EU

of the Swedish fishing fleet. Swedish logbook data provided exact geographic location of the catches. The methodology proved to be more effective for mobile gears (the majority of the gear used according to the European Fishing Fleet Register), than for fixed gears. AIS data present the advantage of having a better time resolution compared to VMS data, and can range from 2 seconds to 3 minutes.

AIS data present similar confidentiality issues to VMS data. Recent availability of AIS data through commercial websites has raised concerns over the ability to preserve anonymity for highly detailed vessel data. The European Data protection supervisor (2012) issued a warning about identifiable information in AIS data.

An issue still to be addressed in the use of AIS data at a regional scale is the spatial coverage of AIS signals. This aspect depends on the distance to the closest receiving station, and therefore on the network topology and characteristics. A vessel could transit in areas where AIS messages cannot be received by coastal stations (because they are too far away from the receiver), or by satellites because in highly congested areas there may be message collision problems.

The paper from Natale *et al.* (2015) represents the first attempt to produce a high-resolution map of fishing intensity for the European fishing fleet and present useful insights on the level of coverage of AIS in the EU fishing fleet and on the use of AIS for fishing behaviour modelling. AIS data, despite its limitations due to less systematic coverage, provide an additional source of information in respect of VMS and logbooks. Future research on the detection of areas of high fishing activity should use AIS data to enhance and validate VMS data analysis and to produce fishing tracks with higher time resolution (see Mazzarella *et al.* 2014).

4.5 ToR d: OSPAR request

As in 2014, WGSFD received an additional ToR to answer a request from OSPAR. WGSFD was requested to: "Using mobile bottom contacting gear data, produce fishing abrasion pressure maps (2009–2013) using the BH3 approach as a follow-up of the OSPAR request to ICES (Request5/2014). Fishing abrasion pressure maps should be analysed by gear distribution, and type, in the OSPAR maritime area and be based on the methodology proposed for the physical damage indicator (BH3). Specifically ICES is requested to:

- i) collate relevant national VMS and logbook data;
- ii) estimate the proportions of total fisheries represented by the data;
- iii) using methods developed in Request 5/2014, where possible, collect other non-VMS data to cover other types of fisheries (e.g. fishing boats < 12 m length);
- iv) prepare maps for the OSPAR maritime area (including ABNJ) on the spatial and temporal intensity of fishing using mobile bottom contacting gears (BH3 approach);

Point i. is covered by the data call issued by the ICES secretariat asking for VMS and logbook data for the period 2009–2013. The other points are answered in the sections below, referring to the general work on methodology described in other sections of this report.

4.5.1 Estimating the proportions of total fisheries represented by the data

The proportion of total fisheries represented by VMS data was estimated using landings weight values submitted for both VMS and logbook data returns. Note that the percentage of total landings weight from VMS is calculated as weight from VMS data compared to the total weight (logbook+VMS). The proportions of total fisheries represented by VMS data for the OSPAR region are given in the table 4.5.1.1 below. See section 4.1.4 for a description of the method. The table 4.5.1.2 gives an overview of the percentage of the total weight of landings represented by the VMS data by year and gear for the OSPAR region.

Table 4.5.1.1. Percentage of landed weight represented by the VMS data by gear group in the OSPAR region for the years 2009 to 2013. Note that for 2009–2011 VMS was mandatory for vessels larger than 15 meters; in 2012/2013 VMS was mandatory for vessels larger than 12 meters.

Year	Gear group	Mobile Bottom Contact Gear	Total weight VMS	Total weight logbook	Percentage of total weight from VMS
2009	Other		0	30,335,427	0.0
2009	Static		29,214,519	52,433,562	35.8
2009	Dredge	Y	42,703,450	65,085,702	39.6
2009	Purse seine		62,115,424	7,569,604	89.1
2009	Demersal seine	Y	13,373,184	1,545,478	89.6
2009	NA		18,167,962	1,480,901	92.5
2009	Otter	Y	737,950,956	45,720,446	94.2
2009	Beam	Y	91,594,341	3,616,389	96.2
2009	Midwater		466,106,657	13,090,180	97.3
2010	Other		0	32,138,268	0.0
2010	Static		36,827,842	51,006,332	41.9
2010	Dredge	Y	48,027,046	57,477,489	45.5
2010	Purse seine		50,720,479	7,521,924	87.1
2010	Demersal seine	Y	18,100,890	1,903,562	90.5
2010	NA		20,161,961	1,692,036	92.3
2010	Otter	Y	755,826,278	51,825,188	93.6
2010	Beam	Y	115,752,826	3,625,433	97.0
2010	Midwater		611,131,766	10,644,008	98.3
2011	Other		16,084	33,858,033	0.0
2011	Dredge	Y	61,433,306	76,758,615	44.5
2011	Static		113,236,257	54,246,208	67.6
2011	NA		24,106,429	1,391,094	94.5
2011	Otter	Y	1,018,439,759	47,211,943	95.6
2011	Beam	Y	115,830,510	3,393,897	97.2
2011	Demersal seine	Y	66,889,610	1,410,151	97.9
2011	Midwater		573,102,509	11,541,000	98.0
2011	Purse seine		698,872,449	6,739,538	99.0
2012	Other		1,227,000	43,080,156	2.8

2012	Dredge	Y	73,068,108	47,749,676	60.5
2012	Static		122,442,190	45,097,253	73.1
2012	NA		8,971,351	1,347,275	86.9
2012	Otter	Y	817,430,217	26,024,967	96.9
2012	Midwater		729,825,237	6,433,650	99.1
2012	Beam	Y	117,950,835	958,679	99.2
2012	Purse seine		735,936,887	1,063,896	99.9
2012	Demersal seine	Y	78,436,831	9,910	100.0
2013	Other		787,362	35,254,303	2.2
2013	Dredge	Y	67,282,498	57,265,180	54.0
2013	Static		127,698,081	44,143,868	74.3
2013	NA		12,161,737	1,446,818	89.4
2013	Otter	Y	1,042,305,844	21,715,853	98.0
2013	Beam	Y	127,329,346	1,252,863	99.0
2013	Midwater		826,249,237	7,508,591	99.1
2013	Purse seine		562,973,089	761,010	99.9
2013	Demersal seine	Y	92,057,722	14,097	100.0

Table 4.5.1.2. Overview of percentage of total landed weight represented by the VMS data by year and gear group for the OSPAR region.

Gear group	2009	2010	2011	2012	2013
Beam	96.2	97.0	97.2	99.2	99.0
Demersal seine	89.6	90.5	97.9	100.0	100.0
Dredge	39.6	45.5	44.5	60.5	54.0
Midwater	97.3	98.3	98.0	99.1	99.1
NA	92.5	92.3	94.5	86.9	89.4
Other	0.0	0.0	0.0	2.8	2.2
Otter	94.2	93.6	95.6	96.9	98.0
Purse seine	89.1	87.1	99.0	99.9	99.9
Static	35.8	41.9	67.6	73.1	74.3

4.5.2 Collection of other non-VMS data to cover other types of fisheries (e.g. fishing boats < 12 m length)

Logbook data covering vessels down to 10 m length (8 m in the Baltic Sea) was collected as part of the ICES data call on VMS and logbook data. No other non-VMS data were collected. Although AIS offers a potential alternative data source for fishing activity it is currently only mandatory for fishing vessels larger than 15 m.

During the WGSFD meeting it was tested whether logbook data from smaller vessels could be used in conjunction with VMS data for larger vessels to create more comprehensive maps of fishing intensity. The ICES rectangles were subdivided into c-squares (0.05 x 0.05 degrees), and the fishing days from the logbooks multiplied by 24 and were distributed over the c-squares within each ICES rectangle. Calculation of fishing intensity then followed the same procedure as with VMS data and the datasets were merged. Below are two figures comparing fishing intensity derived only from VMS and fishing intensity derived from both VMS and logbook data. It was concluded that fishing intensity is overestimated when using both VMS and logbook data combined. The decision to allocate logbook effort over 24 hours is one potential source of future discussion. Although it might be more appropriate to allocate effort over 12 or 6 hours based on current data collection requirements, the actual number of hours fished per day remains unknown.

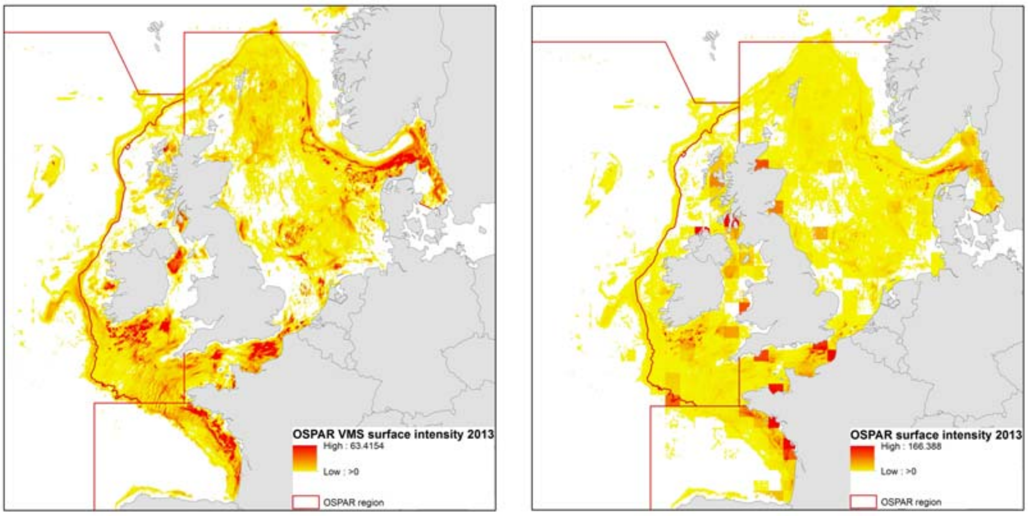


Figure 4.5.2.1. Surface fishing intensity using only VMS data (left) compared to surface fishing intensity using logbook and VMS data (right).

4.5.3 Maps for the OSPAR maritime area (including ABNJ) on the spatial and temporal intensity for fishing using mobile bottom contacting gears (BH3 approach)

Using methods described in section 4.3.1, fishing intensity expressed as fishing abrasion ratio (number of times the c-square has been swept) for mobile bottom contact gears have been mapped. Two sets of maps have been created: one covering the whole OSPAR region and another covering the area around the North Sea, as this is the area with most data. Data within the Portuguese continental shelf has not been included as specified in footnote 1 of the request from OSPAR. Below in figures 4.3.2.1 and 4.3.2.2 are example maps for 2013. Maps of surface and sub-surface fishing intensity for all years 2009–2013, at both the OSPAR regional scale and also at the scale of the area with the most data are listed in Annex 12. Outputs have been generated using both VMS data and VMS+logbook data combined.

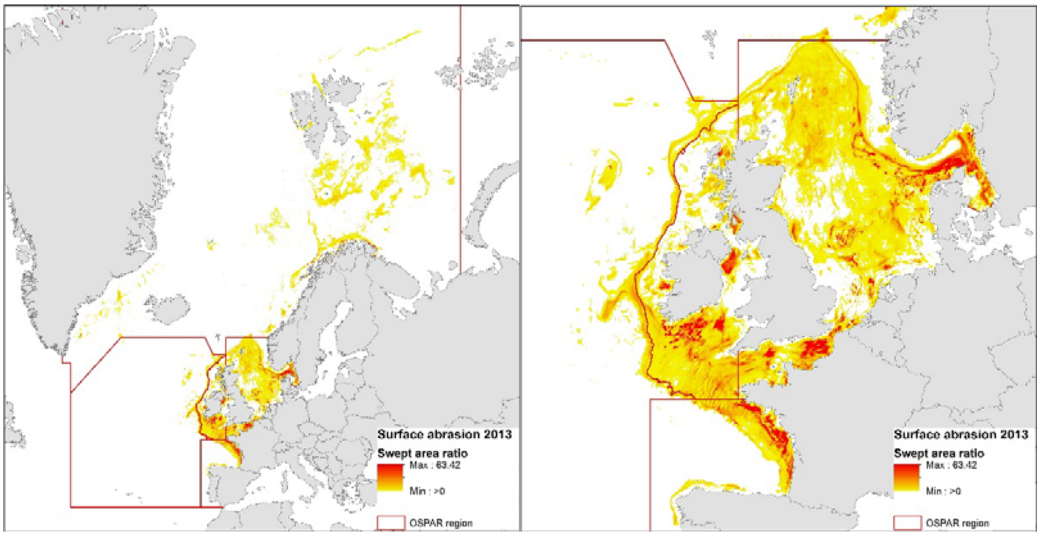


Figure 4.3.2.1. Example map of surface intensity based on VMS data, zoomed to the whole OSPAR region and to the area with most data.

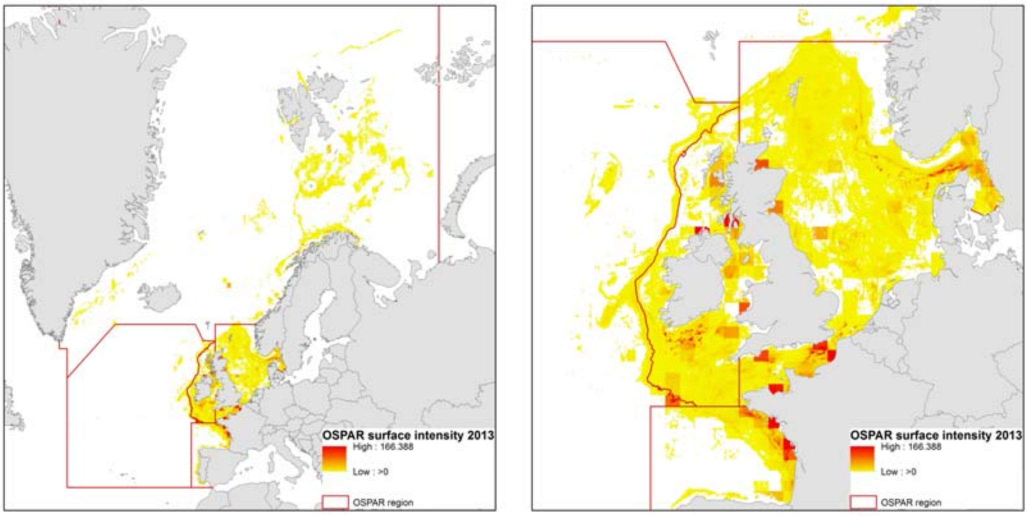


Figure 4.3.2.2. Example map of surface intensity based on both Logbook and VMS data combined, zoomed to the whole OSPAR region and to the area with most data.

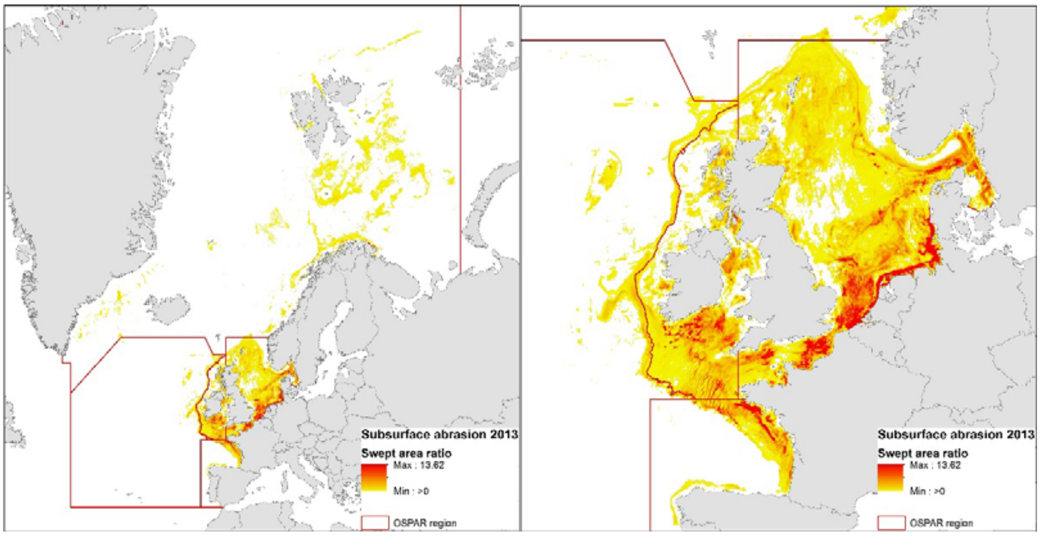


Figure 4.3.2.3. Example map of subsurface intensity based on VMS data, zoomed to the whole OSPAR region and to the area with most data.

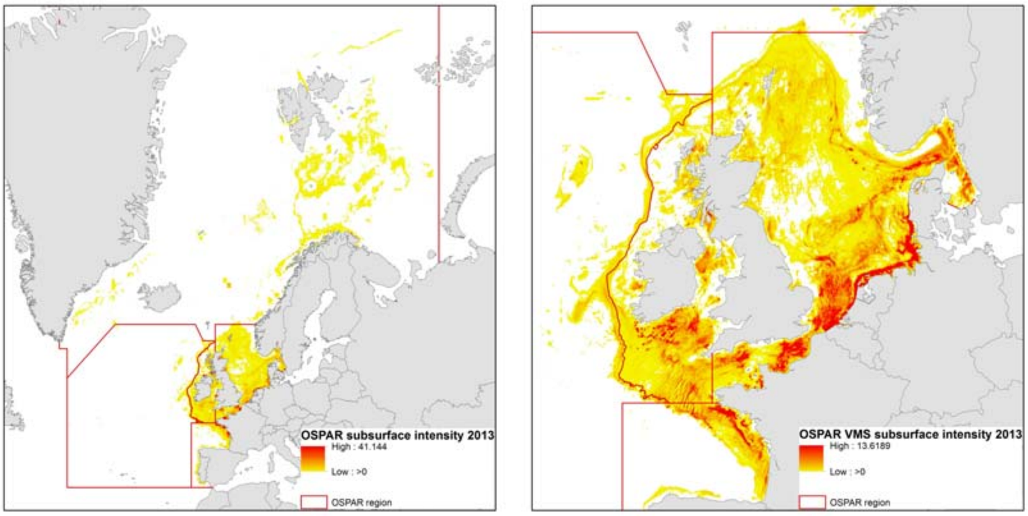


Figure 4.3.2.4. Example map of subsurface intensity based on logbook and VMS data combined, zoomed to the whole OSPAR region and to the area with most data.

4.5.3.1 Assessment of OSPAR fishing exposure thresholds

To derive an index of disturbance from fishing abrasion, swept area, expressed as percentage of grid-cell-equivalent area swept per unit time, was converted to a series of categorical "threshold" values. OSPAR proposed a series of manually selected thresholds for consideration/review by WGSFD.

Typically, setting threshold ranges manually removes objectivity in display of the data, with ranges selected to produce a desired but potentially biased pattern. The group proposed two data driven approaches for consideration

1) Quantiles (equal count)

2) Natural breaks

Using the quantiles approach assures that an equal number of observations (c-squares) are plotted in each range. The quantile classification algorithm is based on a ranking of the observations. The class breaks are set in such a way that an equal number of observations are contained in each class. By contrast, "Natural breaks" finds the optimal way to split up the observation values based on an iterative optimization process that minimizes the variance within classes and maximizes variance between classes. The Natural breaks algorithm was first proposed by Jenks and Caspall in 1971 as an optimal classification method for choropleth maps to minimize error and allow a better discrimination among the different classes (Jenks and Caspall, 1971.

To assess the effectiveness of the chosen classification algorithm, alternative visualisation of the distribution of the observations (c-square) will assist in interpretation of the thresholds compared to the shape of the distribution e.g. box plots/histograms.

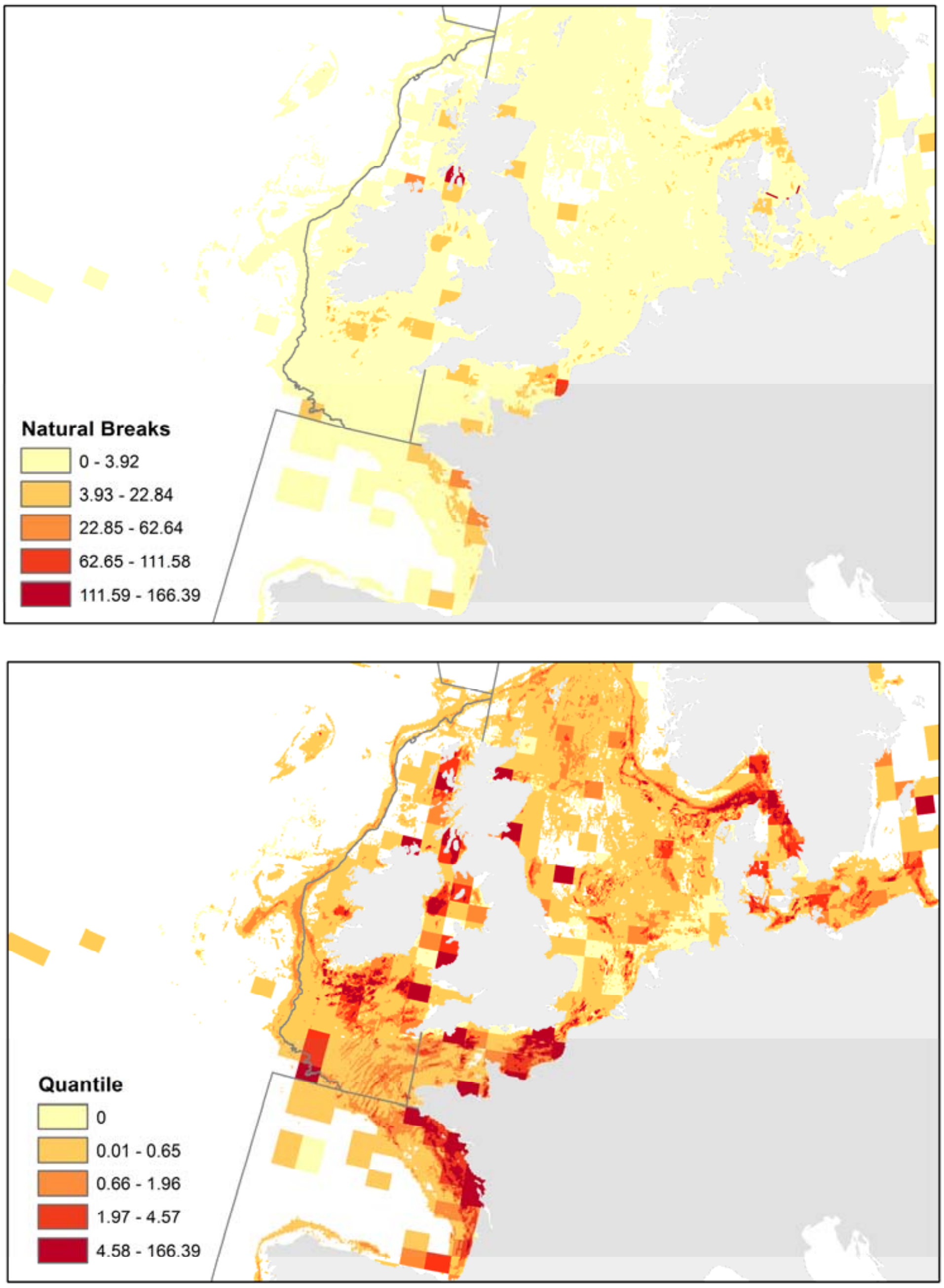


Figure 4.5.3.1.1. Example maps of the Natural Breaks and the Quantiles classifications.

The group suggested using a >12m vessel "benchmark" from which standardised threshold ranges would be set. It was further suggested that this benchmark should be based on the year with the highest average intensity values in the data series 2009–2013. However, due to data gaps in the 12–15m vessel range over this period, it may be that this benchmark may need to be revisited in future assessments.

4.6 ToR e: HELCOM request

WGSFD also received an additional ToR to answer a request from HELCOM on "Pressures from fishing activity (based on VMS/logbook data) in the HELCOM area relating to both seafloor integrity and management of HELCOM MPAs". WGSFD was requested to:

a) Produce maps and shape-files of fishing intensity for the HELCOM area based on a 0.05 x 0.05 c-square degree grid. The maps should consist of a set of the polygonal feature classes and be submitted in the ESRI shape file format. Polygons should indicate the areas with equal fishing intensity measured in hours per year or per season being classified in the same way as similar maps produced for the OSPAR region when applicable.
b) The maps and shape files of fishing intensity should be calculated for bottom contact gear and mid-water trawl and longline for every year in the period from 2009 to 2013 and for each quarter of 2013. In particular the following maps should be produced:
    i. intensity of fishing by each fishing activity for each year in the period from 2009 to 2013;
    ii. total intensity for each year in the period from 2009 to 2013;
    iii. total intensity and by each fishing activity by quarter in 2013.
c) Where available and possible, provide information on fishing intensity for bottom contact gear and mid-water trawl and longline in the 174 official HELCOM MPAs for the whole of 2013 and for the first quarter of 2013 only. The information should be provided in the forms listed in paragraph a) of the current request. Information on overall fishing effort should also be provided.
d) Estimate the proportion of total fisheries represented by the data.

As for the OSPAR request, the points are answered in the sections below, referring to the general work on methodology described in other sections of this report.

Mobile bottom contact gears are defined as otter trawls, demersal seines, beam trawls and dredges. In the Baltic Sea there is also a substantial static gear fishery, which is not covered by this request.

4.6.1 Shapefiles and maps of fishing intensity

Maps have been produced to answer this request, see annex 13. The shapefiles will be a data product. Measures of fishing intensity are only available for mobile bottom contact gears, as there is currently no standard method for calculating fishing intensity for passive gears; therefore fishing intensity is only provided for mobile bottom contact gears. By contrast, fishing hours has been mapped for all gears and for midwater trawls, longlines and mobile bottom contact gears, as total number of hours per year for the years 2009–2013 and for each quarter in 2013. Examples of the maps are inserted below, the rest of the maps are found in Annex 13. For midwater trawls, it is noted that fishing effort is high close to harbours. ICES received raw VMS and logbook data from these countries, and applied a speed filter between 2 and 4.5 to the active gears. In this case it look like it was not appropriate. Ideally the speed filters should be supplied by national experts.

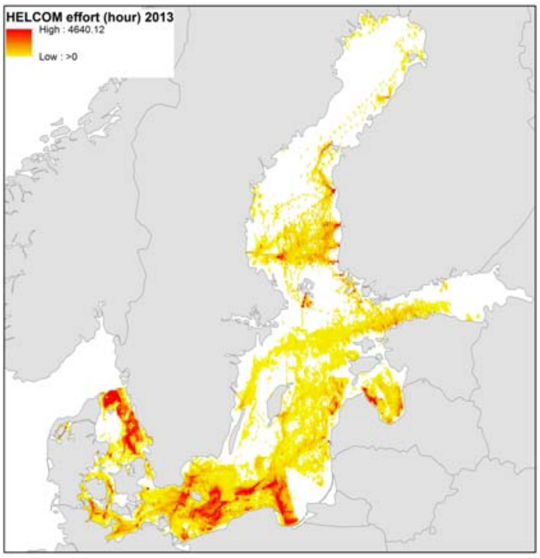


Figure 4.6.1.1. Map of VMS effort (hours) for all gears 2013.

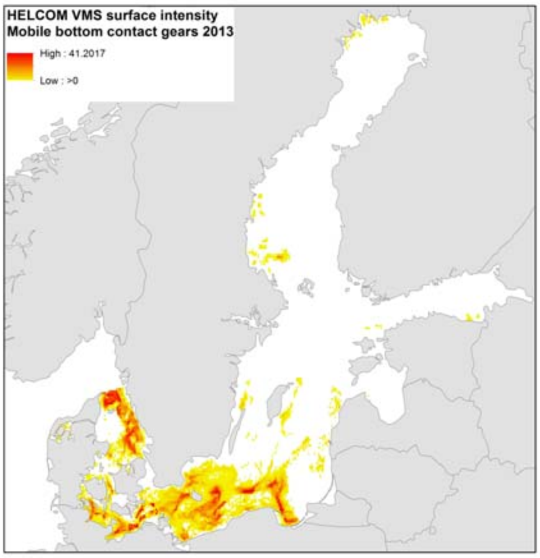


Figure 4.6.1.2. Map of VMS surface intensity for mobile bottom contact gears 2013.

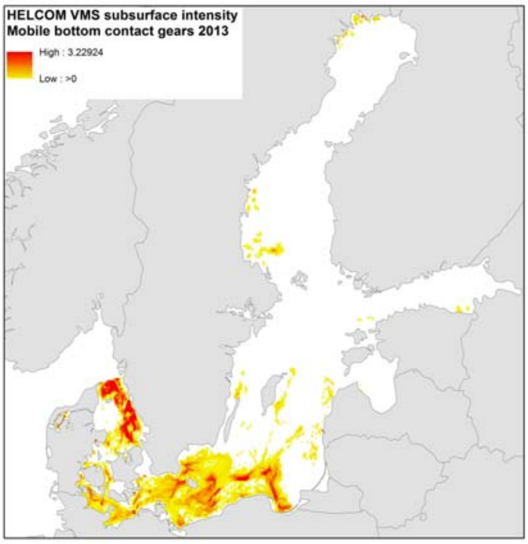


Figure 4.6.1.4. Map of VMS subsurface intensity for mobile bottom contact gears 2013.

4.6.2 Information on fishing activity within HELCOM MPAs

After making a spatial join in GIS, fishing hours have been summarized by HELCOM MPA. The data is available by c-squre which are 0.05*0.05 degrees rectangles, which doesn't follow the MPA boundaries. Therefore the value is counted as being within the MPA if the midpoint of the c-square is within the MPA. This creates an uncertainty, as often part of a c-square is outside an MPA and part of a c-square is inside an MPA. The MPA is only included in the table if there is evidence of fishing activity from the available data.

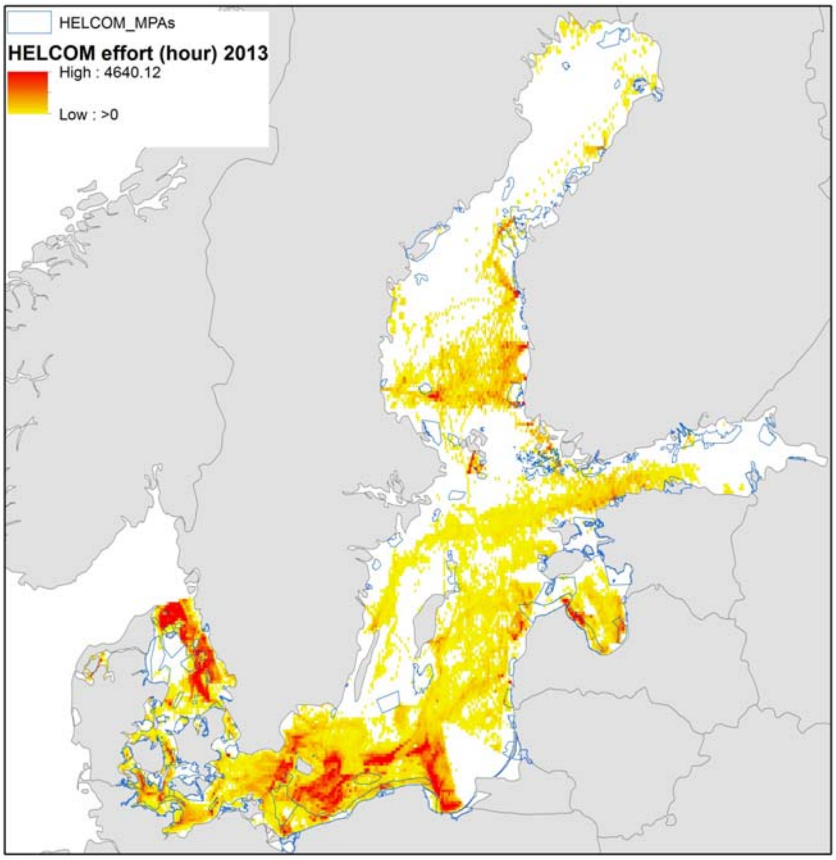


Figure 4.6.2.1. Total fishing effort (hours) in 2013 within HELCOM MPAs.

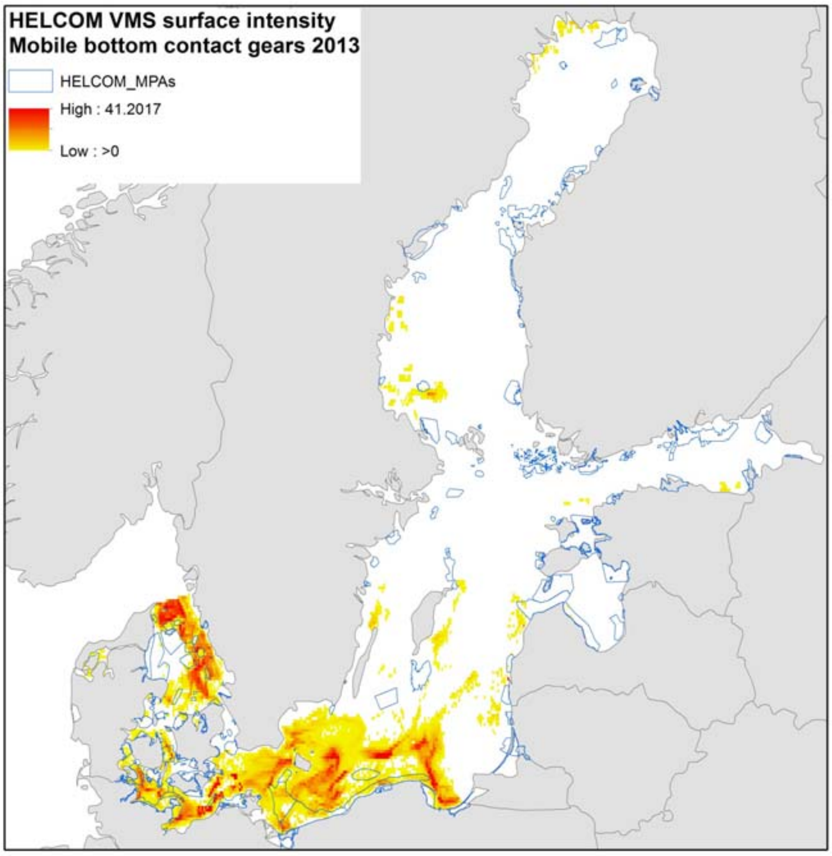


Figure 4.6.2.2. Surface intensity for mobile bottom contact gears in 2013 within HELCOM MPAs.

Table 4.6.2.1. Fishing hours for demersal seine, longlines, midwater trawl, mobile bottom contact gears and static gears in 2013 within HELCOM MPAs based on VMS data.

MPA	Demersal seine	Longlines	Midwater trawl	Mobile bottom contact gear	Static
Adler Grund og Rønne Banke		442	1	48	1,522
Æbelø og havet syd for og Nærå			2	13	
Akmensrags			5	5	
Ålborg Bugt, østlige del			30	4	
Anholt og havet nord for			10	1,005	48
Bakkebrædt og Bakkeground				3	
Bogskar			14		
Bornholm: Davids Banke		114	21	16	33
Bornholm: Ertholmene			1		
Centrale Storebælt og Vresen			23	2,033	517
Eckernförder Bucht mit Flachgründen, Südküste der Eckernförder Bucht und vorgelagerte Flachgründe			26	223	
Falsterbo Peninsula with Måkläppen			261	97	

Fehmarnbelt			25	995	5
Femern Bælt				57	6
Finngrundet-Östra Banken			48	2	
Fladen				69	
Flensborg Fjord, Bredgrund og farvandet omkring Als			67	3,123	
Fyns Hoved, Lillegrund og Lillestrand					12
Gilleleje Flak og Tragten			67	141	6
Hangon itäinen selkä			28		
Havet mellem Romsø og Hindsholm samt Romsø			1		15
Havet og kysten mellem Hundested og Rørvig				4	
Havet omkring Nordre Rønner			7	407	
Herthas Flak				114	
Hesselø med omliggende stenrev			3	2	
High Coast					6
Hirsholmene, havet vest herfor og Ellinge Å's udløb	7		3	130	
Hoburgs Bank			5		30
Horsens Fjord, havet øst for og Endelave			2	2	12
Hvideodde Rev			1	28	
Irbes saurums			3,974	59	
Jasmund National Park			33	1	2
Kadetrinne	3		8	10	
Kims Top og den Kinesiske Mur				2,015	154
Klinteskov Kalkgrund			1	4	
Kokkolan saaristo/Kokkola Archipelago			7		
Kopparstenarna/Gotska Sandön/Salvorev Area			34		
Kristiinankaupungin saaristo /Kristiinankaupunki Archipelago			685		
Kura Kurk			99		
Küstenbereiche Flensburger Förde von Flensburg bis Geltinger Birk, Flengurger Förde			4	170	
Küstenlandschaft Bottsand - Marzkamp u. vorgelagerte Flachgründe, Östlichen Kieler Bucht			3	320	
Læsø Trindel og Tønneberg Banke				6	
Lahemaa			79		
Långör - Östra Sundskär					10
Lawica Slupska		566	18	192	1,529
Lilla Middelgrund			7	543	482
Lillebælt			43	511	
Liminka Bay /Liminganlahti			17		
Maden på Helnæs og havet vest for			4		
Mejl Flak					60

Merenkurkun saaristo /Outer Bothnian Threshold Archipelago (The Quark)			413		
Morups Bank				279	
Nakskov Fjord og Inderfjord				1	
Närpiön saaristo /Närpiö Archipelago			9		
Nida-Perkone					332
Northern Midsjöbanken			8		
Ostoja Slowinska		2		8	104
Pakri			666		
Pernajanlahtien ja Pernajan saariston merensuojelualue /Pernajabay and Pernaja Archipelago marine protection areas			430		
Pommersche Bucht-Rönnebank	5	53	482	3,496	168
Przybrzezne Wody Baltyku		315	269	3,571	1,607
Rahjan saaristo/Rahja Archipelago			405		
Rigas lica rietumu piekraste			8,361	10	
Røsnæs, Røsnæs Rev og Kalundborg Fjord				3	
Saaristomeri /Archipelago Sea			64		
Saltholm og omliggende hav					46
Schlei incl. Schleimünde und vorgelagerter Flachgründe				31	
Schultz og Hastens Grund samt Briseis Flak			1	13	
Sejerø Bugt og Saltbæk Vig				67	
Selga uz rietumiem no Tujas			4,166		
Signilskär - Märket			71		
Skælskør Fjord og havet og kysten mellem Agersø og Glænø				37	
Staberhuk, Großenbrode Meeresbereiche, Wagrien, Sagas-Bank			27	290	
Stavns Fjord, Samsø Østerflak og Nordby Hede			1		
Stenrev sydøst for Langeland				25	79
Stevns Rev			23	16	4
Stora Middelgrund och Röde Bank				705	38
Store Middelgrund				4	136
Strandenge på Læsø og havet syd herfor			1	22	
Sydfynske Øhav			1	128	1
Tammisaaren ja Hangon saariston ja Pohjanpitäjänlahden merensuojelualue /Tammisaari and Hanko Archipelago-and Pojo Bay marine proteciton area			38		
Torhamns Archipelago			1	3	
Tulliniemen linnustonsuojelualue/ Tulliniemi bird protection area			35		
Ujscie Odry i Zalew Szczecinski					2

Uudenkaupungin saaristo/ Uusikaupunki Archipelago			1,097		
Väinameri			141		
Vilsandi			24		
Vorpommersche Boddenlandshaft National Park (West-Pommeranian Lagoon National Park)	1			13	17
Walkyriengrund				28	
Zatoka Pomorska		3	2,757	6,367	813
Zatoka Pucka		1	67	103	17

Table 4.6.2.2. Fishing hours for midwater trawl and mobile bottom contact gears in the 1st quarter of 2013 within HELCOM MPAs based on VMS data.

MPA	Demersal seine	Longlines	Midwater trawl	Mobile bottom contact gear	Static
Adler Grund og Rønne Banke		8		9	114
Æbelø og havet syd for og Nærå				0	
Ålborg Bugt, østlige del			10	1	
Anholt og havet nord for			7	235	
Bakkebrædt og Bakkeground				2	
Bogskar			14		
Bornholm: Davids Banke		49	1	7	
Centrale Storebælt og Vresen			14	1,028	288
Eckernförder Bucht mit Flachgründen, Südküste der Eckernförder Bucht und vorgelagerte Flachgründe			13	128	
Fehmarnbelt			20	755	5
Femern Bælt				5	6
Finngrundet-Östra Banken			36		
Fladen				42	
Flensborg Fjord, Bredgrund og farvandet omkring Als			60	2,587	
Gilleleje Flak og Tragten			61	37	3
Hangon itäinen selkä			28		
Havet mellem Romsø og Hindsholm samt Romsø					1
Havet og kysten mellem Hundested og Rørvig				2	
Havet omkring Nordre Rønner				27	
Herthas Flak				8	
Hesselø med omliggende stenrev			3		
Hirsholmene, havet vest herfor og Ellinge Å's udløb			1	8	
Hvideodde Rev			1	11	
Irbes saurums			22		
Jasmund National Park			23	0	

Kadetrinne	3		8	1	
Kims Top og den Kinesiske Mur				1,083	
Kopparstenarna/Gotska Sandön/Salvorev Area			10		
Kristiinankaupungin saaristo /Kristiinankaupunki Archipelago			202		
Küstenbereiche Flensburger Förde von Flensburg bis Geltinger Birk, Flengurger Förde			4	131	
Küstenlandschaft Bottsand - Marzkamp u. vorgelagerte Flachgründe, Östlichen Kieler Bucht			1	83	
Lahemaa			36		
Lawica Slupska		125	18	8	27
Lilla Middelgrund			6	133	
Lillebælt				78	
Maden på Helnæs og havet vest for			3		
Merenkurkun saaristo /Outer Bothnian Threshold Archipelago (The Quark)			27		
Morups Bank				6	
Nakskov Fjord og Inderfjord				1	
Nida-Perkone					5
Northern Midsjöbanken			3		
Ostoja Slowinska		2			15
Pakri			616		
Pommersche Bucht-Rönnebank	5		261	49	
Przybrzezne Wody Baltyku		270	6	46	81
Rigas lica rietumu piekraste			249		
Røsnæs, Røsnæs Rev og Kalundborg Fjord				3	
Saaristomeri /Archipelago Sea			7		
Schlei incl. Schleimünde und vorgelagerter Flachgründe				22	
Schultz og Hastens Grund samt Briseis Flak			1	10	
Selga uz rietumiem no Tujas			820		
Signilskär - Märket			33		
Skælskør Fjord og havet og kysten mellem Agersø og Glænø				4	
Staberhuk, Großenbrode Meeresbereiche, Wagrien, Sagas-Bank				113	
Stenrev sydøst for Langeland				9	15
Stevns Rev			1	2	
Stora Middelgrund och Röde Bank				4	
Strandenge på Læsø og havet syd herfor				1	
Sydfynske Øhav				38	1
Tammisaaren ja Hangon saariston ja Pohjanpitäjänlahden merensuojelualue /Tammisaari and Hanko Archipelago-and Pojo Bay marine proteciton area			33		

Torhamns Archipelago			1		
Tulliniemen linnustonsuojelualue/ Tulliniemi bird protection area			33		
Uudenkaupungin saaristo/ Uusikaupunki Archipelago			254		
Väinameri			83		
Vilsandi			6		
Vorpommersche Boddenlandshaft National Park (West-Pommeranian Lagoon National Park)	1			1	
Walkyriengrund				12	
Zatoka Pomorska		1	6	1,346	72
Zatoka Pucka		0	20	37	2

In the table below, the swept area ratio has been averaged within MPA's. Again c-square midpoints have been used to identify if a c-square is within an MPA. The values of swept area ratio have been summarized and divided by the number of potential c-square midpoints within the MPA, so c-squares with no value counts as 0.

Table 4.6.2.3. Average swept area fishing abrasion pressure (surface and subsurface) for mobile bottom contact gears in 2013 and 1st quarter of 2013 within HELCOM MPAs based on VMS data.

Name	Surface abrasion 2013	Subsurface abrasion 2013	Surface abrasion Q1 2013	Subsurface abrasion Q1 2013
Adler Grund og Rønne Banke	0.026	0.004	0.005	0.001
Akmensrags	0.003	0.000		
Anholt og havet nord for	0.288	0.060	0.066	0.013
Bakkebrædt og Bakkeground	0.030	0.005	0.024	0.004
Bornholm: Davids Banke	0.148	0.028	0.065	0.014
Centrale Storebælt og Vresen	0.476	0.082	0.243	0.042
Eckernförder Bucht mit Flachgründen, Südküste der Eckernförder Bucht und vorgelagerte Flachgründe	0.471	0.036	0.273	0.021
Falsterbo Peninsula with Måkläppen	0.036	0.017		
Fehmarnbelt	0.636	0.091	0.498	0.069
Femern Bælt	0.091	0.017	0.009	0.002
Finngrundet-Östra Banken	0.001	0.000		
Fladen	0.077	0.029	0.046	0.017
Flensborg Fjord, Bredgrund og farvandet omkring Als	0.979	0.160	0.813	0.133
Gilleleje Flak og Tragten	0.170	0.034	0.050	0.009
Havet og kysten mellem Hundested og Rørvig	0.023	0.006	0.011	0.004
Havet omkring Nordre Rønner	0.296	0.055	0.018	0.003
Herthas Flak	0.923	0.175	0.064	0.011

Hesselø med omliggende stenrev	0.005	0.002		
Hirsholmene, havet vest herfor og Ellinge Å's udløb	0.272	0.040	0.011	0.002
Horsens Fjord, havet øst for og Endelave	0.000	0.000		
Hvideodde Rev	0.288	0.050	0.111	0.019
Irbes saurums	0.005	0.001		
Jasmund National Park	0.006	0.000	0.002	0.000
Kadetrinne	0.091	0.006	0.055	0.003
Kims Top og den Kinesiske Mur	0.885	0.219	0.472	0.111
Klinteskov Kalkgrund	0.021	0.007		
Küstenbereiche Flensburger Förde von Flensburg bis Geltinger Birk, Flengurger Förde	0.197	0.019	0.139	0.016
Küstenlandschaft Bottsand - Marzkamp u. vorgelagerte Flachgründe, Östlichen Kieler Bucht	0.113	0.010	0.027	0.003
Lawica Slupska	0.037	0.006	0.002	0.000
Lilla Middelgrund	0.523	0.167	0.123	0.040
Lillebælt	0.003	0.067	0.003	0.010
Læsø Trindel og Tønneberg Banke	0.017	0.004		
Morups Bank	2.106	0.956	0.044	0.021
Nakskov Fjord og Inderfjord	0.002	0.000	0.002	0.000
Ostoja Slowinska	0.004	0.001		
Pommersche Bucht-Rönnebank	0.334	0.048	0.011	0.002
Przybrzezne Wody Baltyku	0.315	0.054	0.004	0.001
Rigas lica rietumu piekraste	0.001	0.000		
Røsnæs, Røsnæs Rev og Kalundborg Fjord	0.006	0.001	0.006	0.001
Schlei incl. Schleimünde und vorgelagerter Flachgründe	0.075	0.006	0.055	0.004
Schultz og Hastens Grund samt Briseis Flak	0.010	0.002	0.008	0.001
Sejerø Bugt og Saltbæk Vig	0.024	0.004		
Skælskør Fjord og havet og kysten mellem Agersø og Glænø	0.034	0.006	0.005	0.001
Staberhuk, Großenbrode Meeresbereiche, Wagrien, Sagas-Bank	0.282	0.023	0.110	0.009
Stenrev sydøst for Langeland	0.269	0.046	0.090	0.016
Stevns Rev	0.051	0.022	0.006	0.003
Stora Middelgrund och Röde Bank	0.996	0.260	0.005	0.002
Store Middelgrund	0.031	0.005		
Strandenge på Læsø og havet syd herfor	0.003	0.001	0.000	0.000

Sydfynske Øhav	0.053	0.009	0.018	0.003
Torhamns Archipelago	0.004	0.001		
Vorpommersche Boddenlandshaft National Park (West-Pommeranian Lagoon National Park)	0.006	0.000	0.002	0.000
Walkyriengrund	0.469	0.040	0.212	0.018
Zatoka Pomorska	0.316	0.054	0.067	0.011
Zatoka Pucka	0.025	0.004	0.009	0.002
Ålborg Bugt, østlige del	0.000	0.000	0.000	0.000
Æbelø og havet syd for og Nærå	0.017	0.008	0.000	0.000

4.6.3 Estimating the proportion of total fisheries represented by the data

The proportion of total fisheries represented by VMS data was estimated using the weight of landings field in both the VMS and logbook data submissions. Note that the percentage of total landings weight from VMS is calculated as weight derived from VMS data compared to the total weight of landings from logbook+VMS combined. The proportions of total fisheries represented by VMS data for the HELCOM region are given in the table 4.6.3.1 below. See section 4.1.4 for a description of the method. The table 4.5.3.2 gives an overview of the percentage of the total landed weight represented by the VMS data by year and gear for the HELCOM region.

Table 4.6.3.1. Percentage of landings weight represented by the VMS data by gear group in the HELCOM region for the years 2009 to 2013. Note that for 2009–2011 VMS was mandatory for vessels larger than 15 meters; in 2012/2013 VMS was mandatory for vessels larger than 12 meters.

Year	Gear group	Mobile Bottom Contact Gear	Total weight VMS	Total weight logbook	Percentage of total weight from VMS
2009	Beam		0	11,105	0.0
2009	Static		2,833	3,291,468	0.1
2009	Dredge	Y	6,141,228	27,774,672	18.1
2009	Gillnet Gillnet		4,642,671	17,762,281	20.7
2009	Demersal seine	Y	1,341,010	1,504,068	47.1
2009	Longlines		1,080,610	1,205,449	47.3
2009	Purse seine		1,504,825	576,375	72.3
2009	Otter	Y	75,610,144	18,579,088	80.3
2009	NA		2,759,500	433,486	86.4
2009	Midwater		641,552,320	5,903,847	99.1
2010	Beam		0	1,707	0.0
2010	Static		6,148	4,135,966	0.1
2010	Gillnet		4,307,790	15,588,336	21.7
2010	Dredge	Y	7,623,551	17,768,669	30.0
2010	Demersal seine	Y	816,980	1,764,225	31.7
2010	Longlines		724,839	1,451,238	33.3
2010	Purse seine		1,503,578	657,584	69.6
2010	NA		892,627	319,714	73.6
2010	Otter	Y	67,260,523	17,667,096	79.2
2010	Midwater		525,100,955	8,205,465	98.5
2011	Static		37	6,652,944	0.0
2011	Longlines		340,841	2,334,927	12.7
2011	Gillnet		3,013,545	19,263,703	13.5
2011	Dredge	Y	7,057,134	24,205,084	22.6
2011	Demersal seine	Y	921,227	1,345,430	40.6
2011	Purse seine		1,799,106	679,639	72.6

2011	Otter	Y	62,131,665	16,916,514	78.6
2011	NA		5,451,221	204,073	96.4
2011	Midwater		515,354,063	4,357,724	99.2
2011	Other		75,050	0	100.0
2012	Other		0	1,442	0.0
2012	Static		17,422	6,508,251	0.3
2012	Longlines		314,045	1,821,087	14.7
2012	Gillnet		4,021,984	21,390,500	15.8
2012	Dredge	Y	20,228,395	12,654,832	61.5
2012	Purse seine		2,233,203	395,028	85.0
2012	Demersal seine	Y	1,003,043	103,684	90.6
2012	Otter	Y	77,019,487	5,878,299	92.9
2012	NA		4,244,270	236,522	94.7
2012	Midwater		468,295,596	1,245,539	99.7
2013	Static		85,823	6,822,481	1.2
2013	Gillnet		2,768,627	21,402,481	11.5
2013	Longlines		369,150	1,232,804	23.0
2013	Dredge	Y	21,569,328	12,966,846	62.5
2013	Other		268	52	83.8
2013	Demersal seine	Y	589,969	67,950	89.7
2013	NA		5,145,827	536,640	90.6
2013	Otter	Y	62,343,772	6,017,749	91.2
2013	Purse seine		3,355,297	264,224	92.7
2013	Midwater		467,658,526	1,883,500	99.6

Table 4.6.3.2. Overview of percentage of total landings weight represented by the VMS data by year and gear group for the HELCOM region.

Gear group	2009	2010	2011	2012	2013
Beam	0.0	0.0			
Demersal seine	47.1	31.7	40.6	90.6	89.7
Dredge	18.1	30.0	22.6	61.5	62.5
Gillnet	20.7	21.7	13.5	15.8	11.5
Longlines	47.3	33.3	12.7	14.7	23.0
Midwater	99.1	98.5	99.2	99.7	99.6
NA	86.4	73.6	96.4	94.7	90.6
Other			100.0	0.0	83.8
Otter	80.3	79.2	78.6	92.9	91.2
Purse seine	72.3	69.6	72.6	85.0	92.7
Static	0.1	0.1	0.0	0.3	1.2

5 Cooperation

- **Cooperation with other WG**
  - WGDEC recommended that WGSFD produce swept area maps at the 2015 meeting, see section 5.3.2
  - WGBYC requested commercial effort data from vessel logbooks, see section 5.3.3
  - Together with WGHMM and BEWG, WGSFD in 2015 worked on answering a request from OSPAR in 2015.
- **Cooperation with Advisory structures**
  - In 2014 WGSFD produced input for ADGVMS
  - In 2015 WGSFD produced input for ADGBENTH
- **Cooperation with other IGOs**
  - In 2014 and 2015 WGSFD worked on answering requests from OSPAR
  - In 2015 WGSFD worked on answering a request from HELCOM
  - WGSFD worked on VMS data sent from NEAFC to ICES

6 Summary of Working Group evaluation and conclusions

The group made an evaluation of the three years it has existed as a working group. Over the three years, WGSFD has made significant progress from only working on example data in 2013 to working with VMS and logbook data in an aggregated format from ICES data calls in 2014 and 2015. The group worked on establishing and standardizing methods for processing VMS/Logbook data submitted through ICES data calls. This includes proposing data formats, work on evaluating the data quality and in 2015 working on a Data Guidelines document.

The group provided input in responding to an OSPAR request to mapping of bottom fishing intensity using VMS data collected in 2014 and 2015. It has also worked on similar requests from HELCOM. WGSFD also worked on method development and production of outputs for DCF indicators 5, 6 and 7.

Regarding difficulties that the group has encountered it has mainly been related to access to data. VMS data is regarded as confidential and therefore, member states have previously been unwilling to share the data. But providing aggregated data on a 0.05 x 0.05 degree grid scale was generally considered acceptable. There have still been difficulties receiving the data on time and some member states have not submitted any of the data requested.

It is inconvenient that data have had to be deleted after completion of the requests. New data have been requested, so work on data quality has been lost. However, on the other hand, it has made it possible to refine/revise the data format and get additional information for the whole time series.

Regarding data quality, the group has had difficulties in assessing the completeness of the data submitted. Some member states have only submitted part of the fleet or only part of data fields requested. As aggregated data have been requested in the data call, different methods have been applied to process the raw data. In 2015, WGSFD worked on streamlining data processing by working on a best practices document, reviewing the data call format and working on robust methods to process the data.

WGSFD would like to continue its work, as fine scaled spatial fisheries information is potentially of great value to the ICES and wider scientific communities and has been requested by OSPAR and HELCOM. The group would like to continue the work on developing robust methods to process the data to give information on fisheries effort, intensity, DCF indicators 5, 6 and 7 and related products. WGSFD hopes that the methods developed can be implemented by the ICES data centre, so that the group can focus more on future methods development rather than routine data processing.

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Annex 2: Recommendations

Recommendation	Adressed to
1. Standardized and roboust methods on processing VMS/logbook data developed by WGSFD should be implemented by the ICES Data centre.	ICES Data centre

Annex 3: Action items for WGSFD

ACTION	RESPONSIBLE	COMPLETE BEFORE
Questionnaire regarding software and metods curently used to create aggreated VMS and logbook data.	Rui Catarino	End of August 2015
Data guidelines for processing aggregated VMS and logbook data.	Rui Catarino	October 2015
Interessional work on data call	Rui Catarino, Irina Jakovleva, Josefine Egekvist	When data call is issued
Intersessional work on making submitted data ready for the 2016 meeting	Carlos Pinto, Lena Szymanek, Genoveva Gonzalez Mirelis, Mathieu Woillez, Josefine Egekvist	June 2016
Update the R-script for creating data for the next datacall, so that it will answer the revised data exchange format	Rui Catarino, Mathieu Woillez	October 2015

Annex 4: WGSFD draft terms of reference 2016–2018

Working Group on Spatial Fisheries Data (WGSFD), chaired by Josefine Egekvist, Denmark, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2016	6–10 June	Brest, France	Interim report by 1 August to SSGEPI	
Year 2017			Interim report by	
Year 2018			Final report by	

ToR descriptors

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
a	Develop roboust methods to calculate DCF environmental indicators 5, 6 and 7.	WGSFD has in 2013–2015 worked on method to calculate DCF indicators 5, 6 and 7. This output can be used for ICES ecoregion advice. The method could be implemented by the ICES data centre as a standard output for the ICES ecoregion advice, depending on conditions on use of VMS data. This work fit into ICES science plan Ecosystem Pressures and Impacts (EPI)	11	3 years	Method to make output on DCF indicators 5, 6 and 7 for ICES ecoregion advice
b	Work on standardized methods to produce spatial fishery distribution prod-ucts.	Products on spatial fishery distribution have been requested by OSPAR and HELCOM as input for MSFD descriptor 6. These products are also of interest of ICES expert groups as an input to fisheries descriptions and fisheries impacts. WGSFD want to work on standardized methods that can be implemented by the ICES datacentre.	11	3 years	Method to be implemented by the ICES datacentre
c	Review ongoing work for analyzing spatial fisheries data.	As input for ToRs a and b, WGSFD need to keep up to date with ongoing work for		3 years	

		analyzing spatial fisheries data.		
d	Initiate innovative methods to analyze spatial fisheries data.	To make use of the expertice in the WGSFD group to develop methods/analysis on spatial fisheries data of value for the ICES community. To ensure scientific ecxellence investments needs to be made to stay a relevant group for the future.	3 years	E.g. paper, initiate research projects

Summary of the Work Plan

Year 1	Continuing WGSFD work from 2013–2015 on improving methods and ensuring high quality of VMS/logbook data processing from data request formats, quality checks and processing data to be implemented by the ICES data centre. Improving methods to calculate fishing intensity and inititiate development of innovative methods to analyse spatial fisheries data. A request from OSPAR is expected again in 2016. Invite an expert on DCF indicators.
Year 2	Continuing WGSFD work from 2013–2015 on improving methods and ensuring high quality of VMS/logbook data processing from data request formats, quality checks and processing data to be implemented by the ICES data centre. Improving methods to calculate fishing intensity and inititiate development of innovative methods to analyse spatial fisheries data.
Year 3	Continuing WGSFD work from 2013–2015 on improving methods and ensuring high quality of VMS/logbook data processing from data request formats, quality checks and processing data to be implemented by the ICES data centre. Improving methods to calculate fishing intensity and inititiate development of innovative methods to analyse spatial fisheries data.

Supporting information

Priority	WGSFD work in 2013–2015 has proven that there is a demand for fine scaled spatial fisheries information. Outputs on fishing intensity from WGSFD have been requested by OSPAR and HELCOM for work on MSFD descriptor 6. Outputs can also be used for ecoregion advice as well as in descriptions of fisheries activity. WGSFD will in 2016–2018 focus on standardized methods that can be implemented by the ICES data centre but also on initiating development of innovative methods to analyze spatial fisheries data.
Resource requirements	VMS/Logbook data requested in ICES data calls
Participants	The Group is normally attended by around 15 members and some guests.
Secretariat facilities	Assistance from ICES data centre in hosting VMS/logbook data as well as quality checking and impementation of methods developed by WGSFD. Possibly meeting facilities.

Financial	Resources for ICES datacentre to host and process VMS/logbook data.
Linkages to ACOM and groups under ACOM	ACOM
Linkages to other committees or groups	WGDEC, DIG, WGBYC, WGECO, WGMHM, BEWG
Linkages to other organizations	OSPAR, HELCOM, EU FP-7 BENTHIS project

Annex 5: Copy of Working Group evaluation

1) Working Group name: Working Group on Spatial Fisheries Data (WGSFD)

2) Year of appointment: 2013

3) Current Chair: Josefine Egekvist, Denmark

4) Venues, dates and number of participants per meeting.

- ICES HQ, Copenhagen, Denmark, 11–13 September 2013, 8 participants
- ICES HQ, Copenhagen, Denmark, 10–13 June 2014, 13 participants
- ICES HQ, Copenhagen, Denmark, 8–12 June 2015, 15 participants

WG Evaluation

5) If applicable, please indicate the research priorities (and sub priorities) of the Science Plan to which the WG make a significant contribution.

6) In bullet form, list the main outcomes and achievements of the WG since their last evaluation. Outcomes including publications, advisory products, modelling outputs, methodological developments, etc. *

- WGSFD provided input for advice on OSPAR request on mapping of bottom fishing intensity using VMS data in 2014 and in 2015 has received requests for outputs for advice for OSPAR and HELCOM.
- The group worked on establishing and standardizing methods for receiving VMS/Logbook data from ICES data calls. This includes proposing data formats, work on evaluating the data quality and in 2015 working on a Data Guidelines document.
- During the period 2013–2015 WGSFD has evolved from having only example data in 2013 to having data for estimation of fishing effort in 2014 to make estimations of fishing intensity in 2015.
- Work on method and output for DCF indicators 5, 6 and 7.

7) Has the WG contributed to Advisory needs? If so, please list when, to whom, and what was the essence of the advice.

- OSPAR request 2014
- OSPAR request 2015
- HELCOM request 2015

8) Please list any specific outreach activities of the WG outside the ICES network (unless listed in question 6). For example, EC projects directly emanating from the WG discussions, representation of the WG in meetings of outside organizations, contributions to other agencies' activities.

- WGSFD has contributed to OSPAR ICG-COBAM group.

9) Please indicate what difficulties, if any, have been encountered in achieving the workplan.

- Delay in the provision of data from several states.
- Non-response to the data call from some states.
- Access to data, as VMS data are to be treated as confidential.
- Inconvenient that data have had to be deleted after completion of the requests. New data have been requested, so work on data quality has been lost. However on the other hand, it makes it possible to refine/revise the data format and get additional information for the whole time series.
- Difficulties in assessing the completeness of the data submitted.
- Some states submitted incomplete data e.g. only part of their fleet or only part of the fields requested.
- Difficult to fully assess the data quality as aggregated (rather than raw) data have been requested. Different interpretations of the data call and different methods are applied to process the raw data.
- Streamlining the data processing.

Future plans

10) Does the group think that a continuation of the WG beyond its current term is required? (If yes, please list the reasons)

- Yes. WGSFD work in 2013–2015 has proven that there is a demand for fine scaled spatial fisheries information. Outputs on fishing intensity from WGSFD has been requested by OSPAR and HELCOM for work on MSFD descriptor 6. Outputs can also be used for ecoregion advice as well as description of fisheries activities, and it is potentially a data source of great value for other ICES EG's. WGSFD will in 2016–2018 focus on standardized methods that can be implemented by the ICES data centre, as well as initiating further method development.

11) If you are not requesting an extension, does the group consider that a new WG is required to further develop the science previously addressed by the existing WG.

(*If you answered YES to question 10 or 11, it is expected that a new Category 2 draft resolution will be submitted through the relevant SSG Chair or Secretariat*.)

12) What additional expertise would improve the ability of the new (or in case of renewal, existing) WG to fulfil its ToR?

- The group plan to invite experts to bring the historic development, including policy drivers, of the DCF indicators to the attention of WGSFD, as well as other experts with knowledge of relevance to the group to future meetings.

13) Which conclusions/or knowledge acquired of the WG do you think should be used in the Advisory process, if not already used? (please be specific)

- Outputs from WGSFD on fishing intensity are used for OSPAR and HELCOM advice
- Output on DCF indicators can be used for ICES ecoregions advice

- Plots of fishing activty would be useful as a general reference for broadscale fisheries activities in Northern Europe.

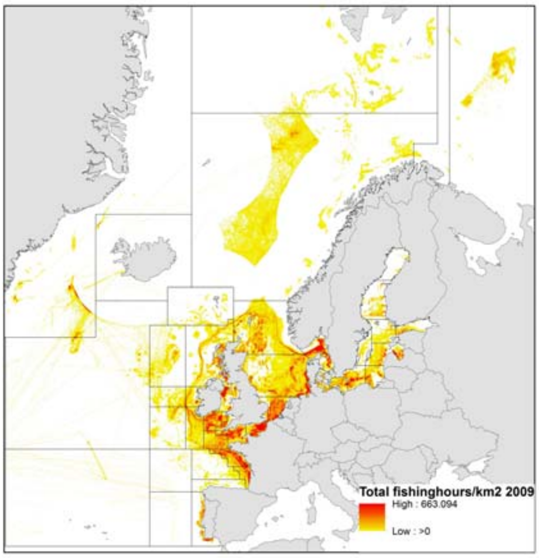
Annex 6: Abbreviation list

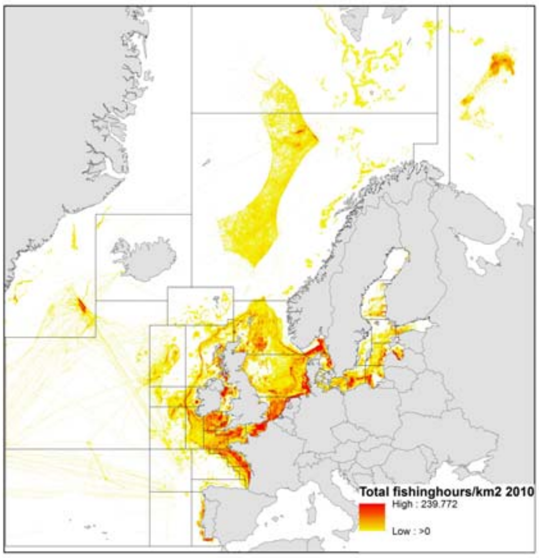
ABNJ	Areas Beyond National Jurisdiction
ACOM	ICES Advisory Committee
ADGBENTH	Benthic Habitats Advice Drafting Group
ADGVME	Vulnerable Marine Ecosystems Advice Drafting Group
AIS	Automatic Identification System
BENTHIS	Studies the impacts of fishing on benthic ecosystems (bottom systems) and will provide the science base to assess the impact of current fishing practices
BH1	OSPAR Indicator - Condition of Typical Species
BH2	OSPAR Indicator - Condition of Habitat Community Indicator
BH3	OSPAR Indicator - Physical Damage Indicator
DCF	Data Collection Framework
HELCOM	Helsinki Commission HELCOM region: Baltic Sea
IGC-COBAM	Intercessional Correspondence Group for the Coordination of Biodiversity Assessment and Monitoring
JMP	OSPAR Joint Monitoring Programme
IMO	International Maritime Organisation
JNCC	Joint Nature Conservation Committee
MPA	*Marine Protected Area*
MSFD	Marine Strategy Framework Directive
MoU	Memorandum of Understanding
NEAFC	North East Atlantic Fisheries Commission
OSPAR	Oslo and Paris Convention on the protection of the NE Atlantic OSPAR region: North-East Atlantic
SCICOM	ICES Science Committee
STECF	Scientific, Technical and Economic Committee for Fisheries
ToR	Terms of Reference
WFD	*Water Framework Directive*
WKIND	Workshop on update and calculation of the DCF indicators
VMS	Vessel Monitoring System

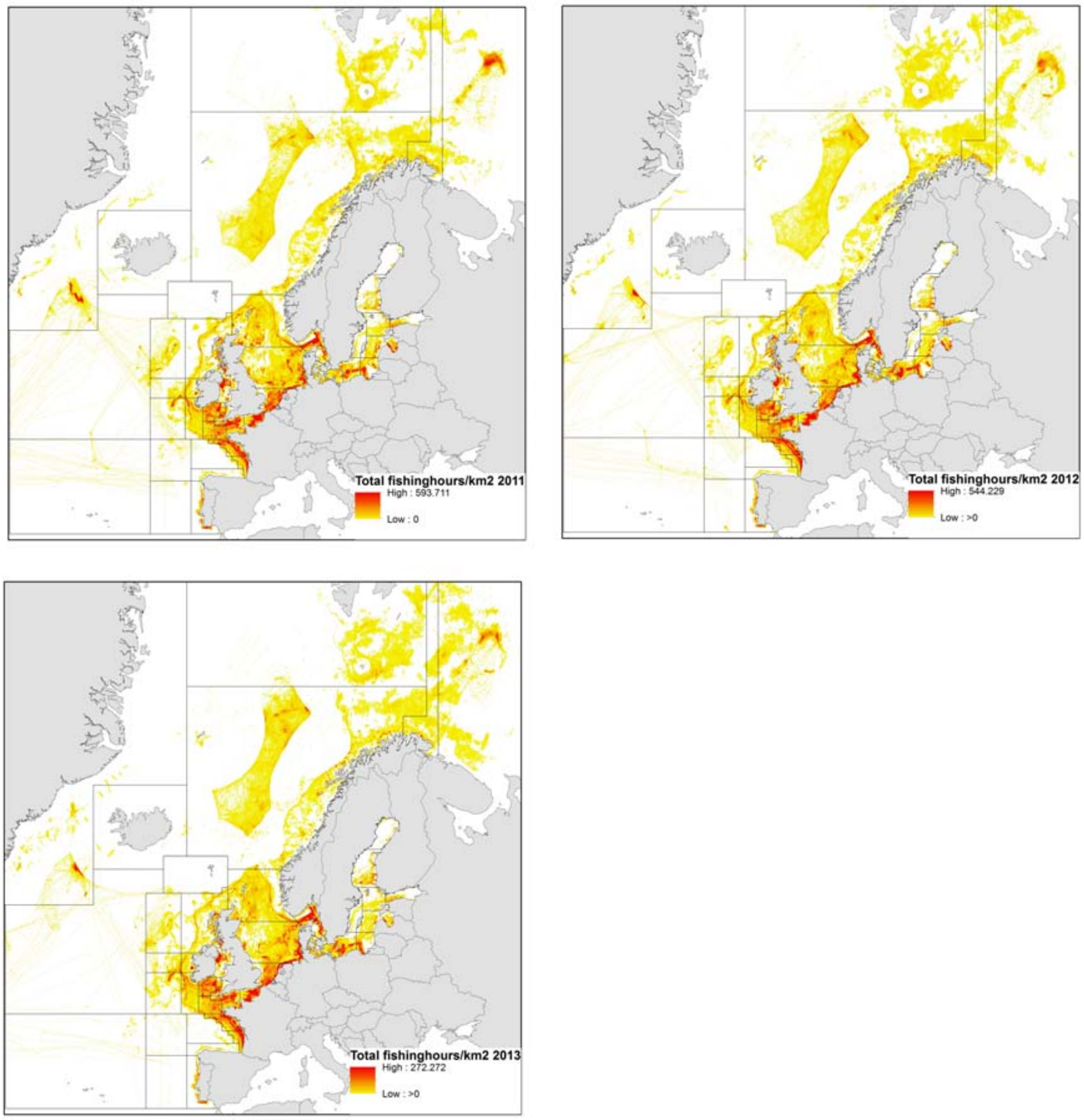
Working Groups

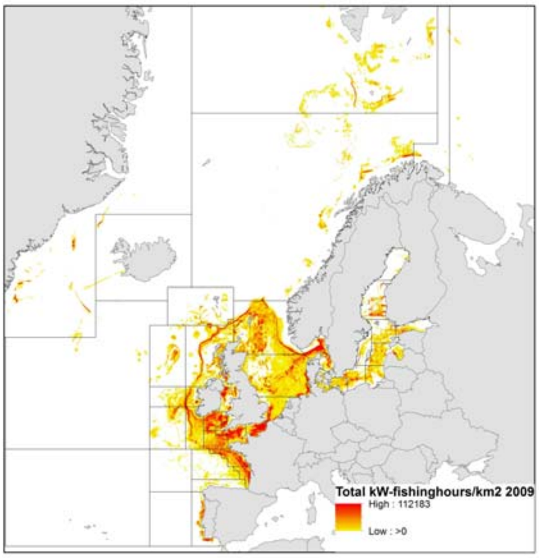
BEWG	Benthos Ecology Working Group
WGBFAS	Baltic Fisheries Assessment Working Group
WGBYC	Working Group on Bycatch of Protected Species
WGDEC	Working Group on Deep-water Ecology
WGDEEP	Working Group on Biology and Assessment of Deep-sea Fisheries Resources
WGECO	Working Group on the Ecosystem Effects of Fishing Activities
WGHMM	Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk and Megrim
WGMHM	Working Group on Marine Habitat Mapping
WGMPCZM	Working Group Marine Planning and Coastal Zone Management
WGNSSK	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak

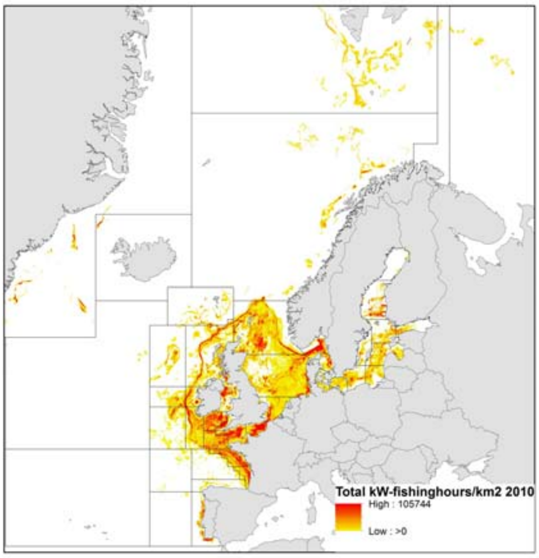
Annex 7: Field totals maps showing extent of data coverage

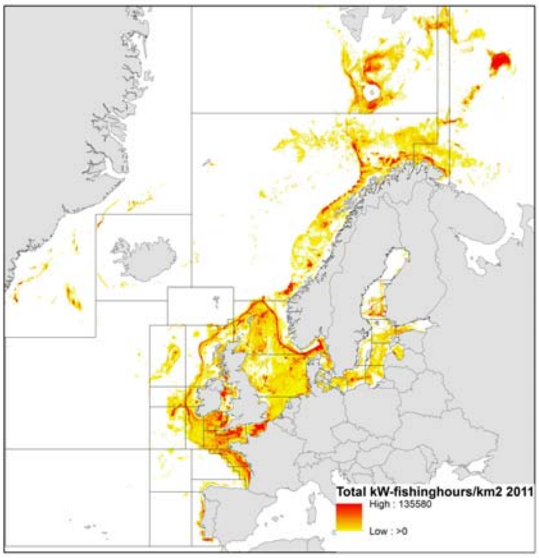


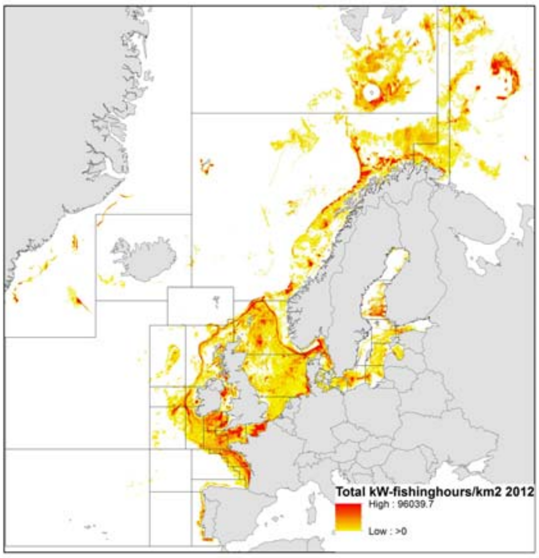


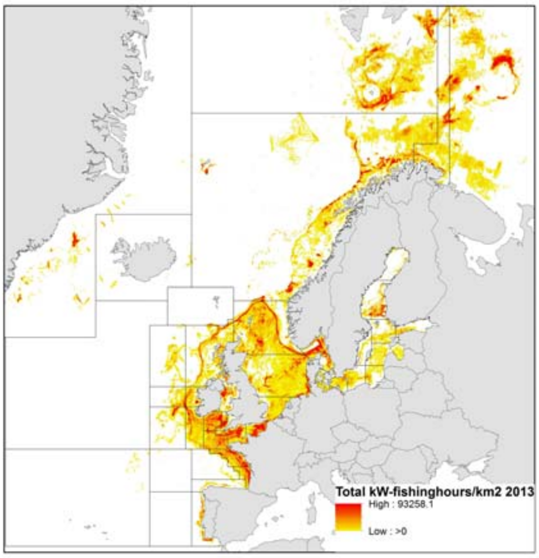

Total fishinghours/km2 2011
High : 593.711
Low : 0
Total fishinghours/km2 2012
High : 544.229
Low : >0
Total fishinghours/km2 2013
High : 272.272
Low : >0

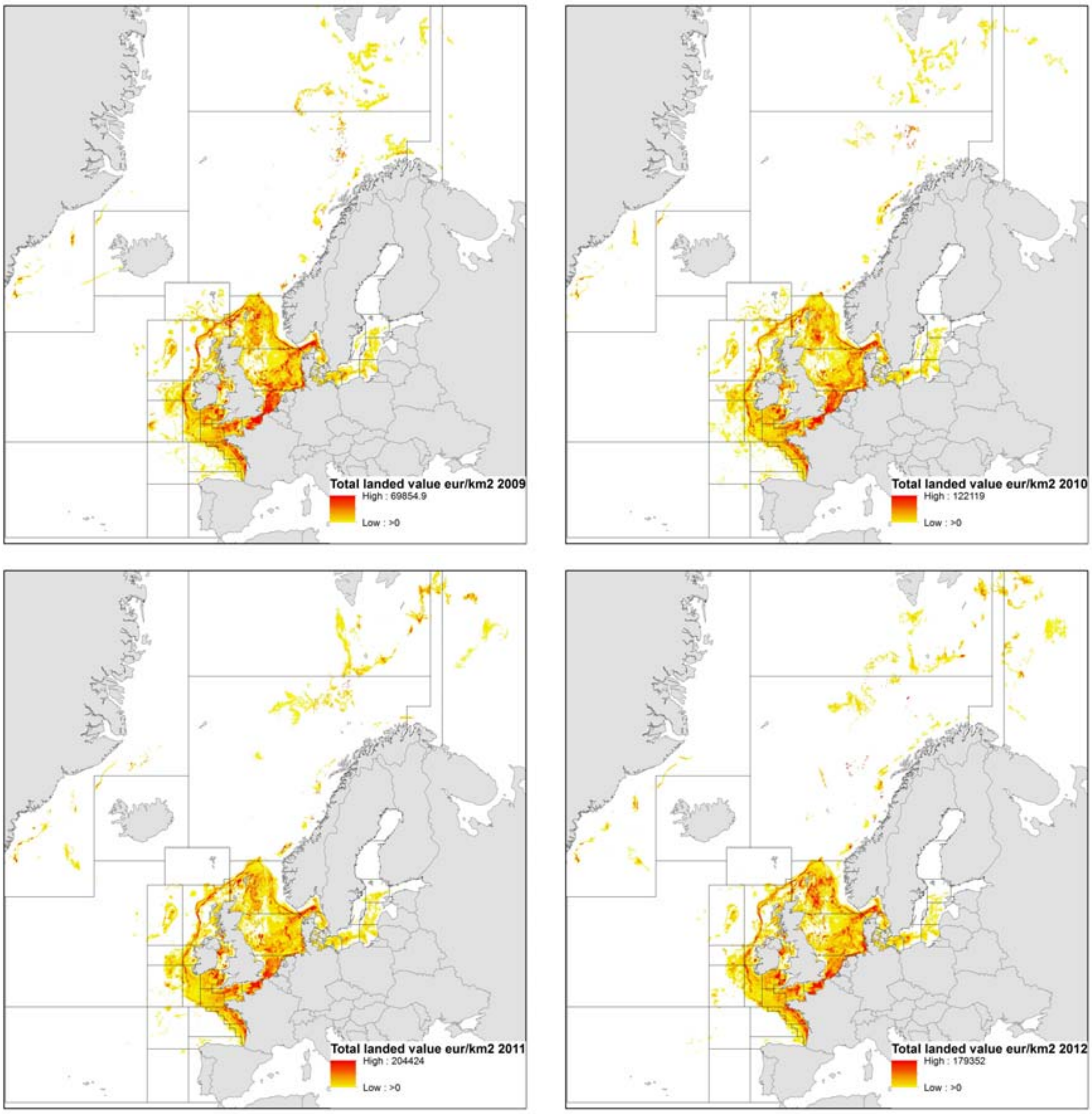

Total kW-fishinghours/km2 2009
High : 112183
Low : >0


Total kW-fishinghours/km2 2010
High : 105744
Low : >0

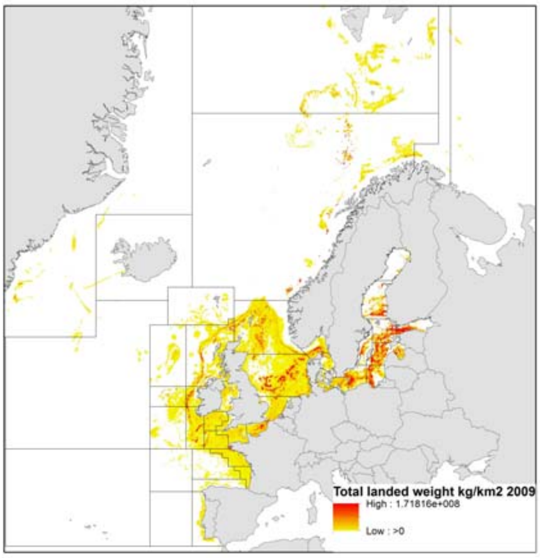

Total kW-fishinghours/km2 2011
High : 135580
Low : >0

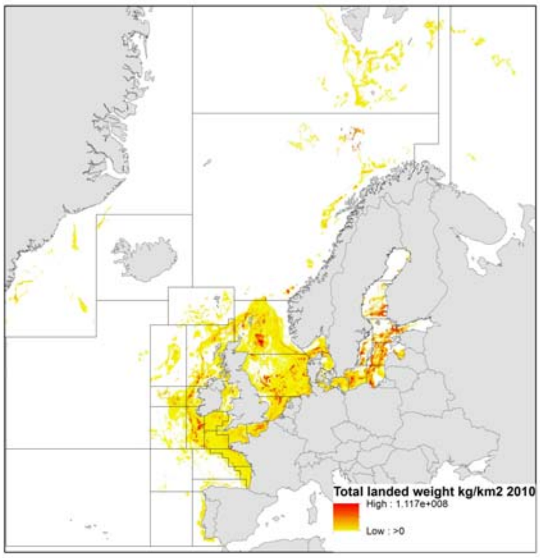

Total kW-fishinghours/km2 2012
High : 96039.7
Low : >0

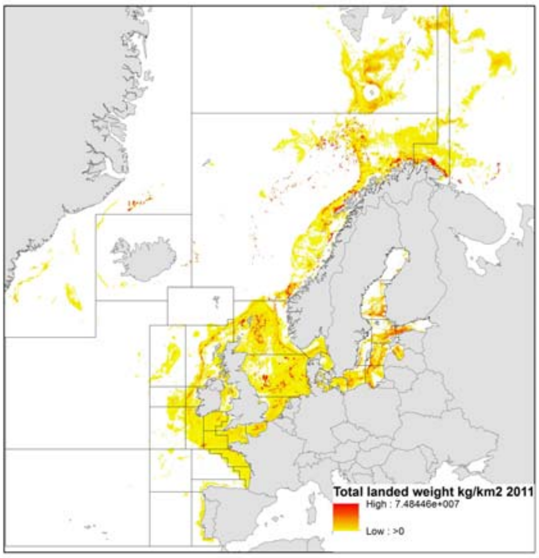

Total kW-fishinghours/km2 2013
High : 93258.1
Low : >0

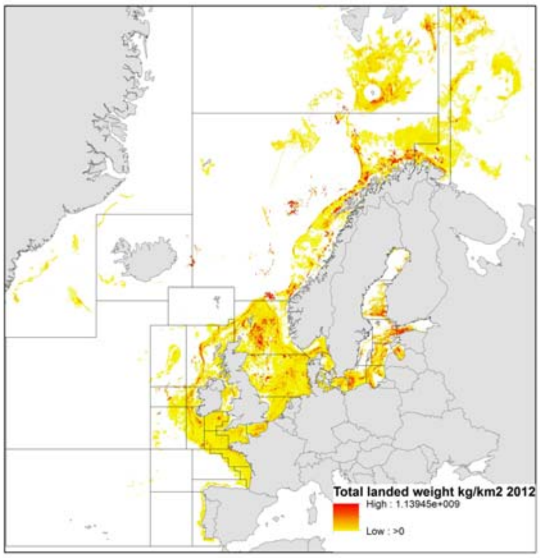


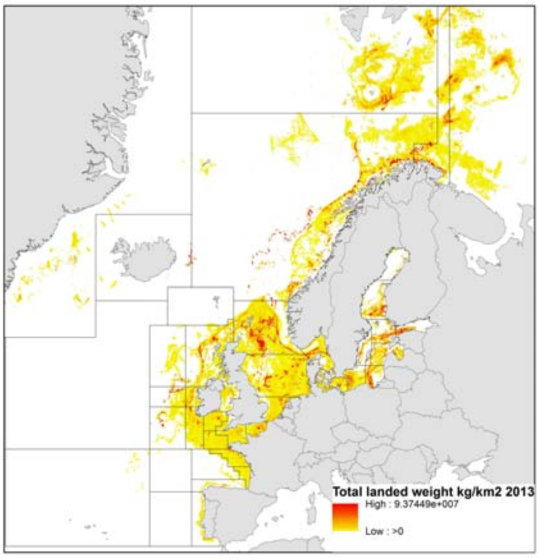
Total landed value eur/km2 2009
High : 69854.9
Low : >0
Total landed value eur/km2 2010
High : 122119
Low : >0
Total landed value eur/km2 2011
High : 204424
Low : >0
Total landed value eur/km2 2012
High : 179352
Low : >0


Total landed weight kg/km2 2009
High : 1.71816e+008
Low : >0


Total landed weight kg/km2 2010
High : 1.117e+008
Low : >0


Total landed weight kg/km2 2011
High : 7.48446e+007
Low : >0


Total landed weight kg/km2 2012
High : 1.13945e+009
Low : >0


Total landed weight kg/km2 2013
High : 9.37449e+007
Low : >0

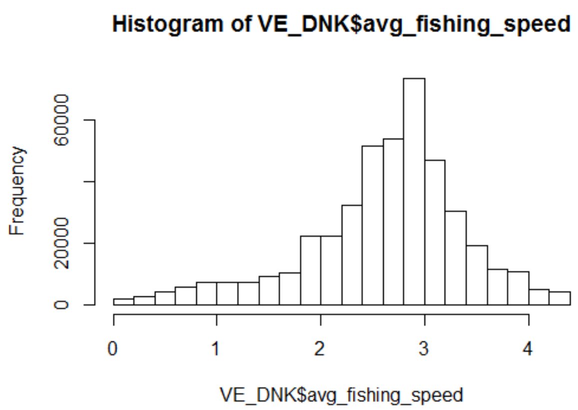
Annex 8: Example of quality report sent to the countries

VMS/Logbook data submitted January 2015 to ICES for Data Call

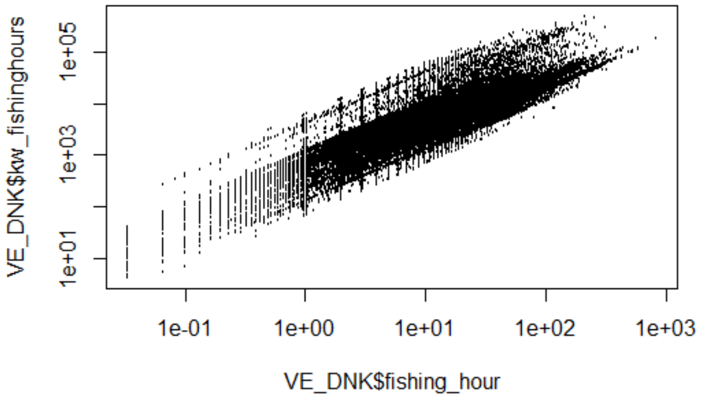
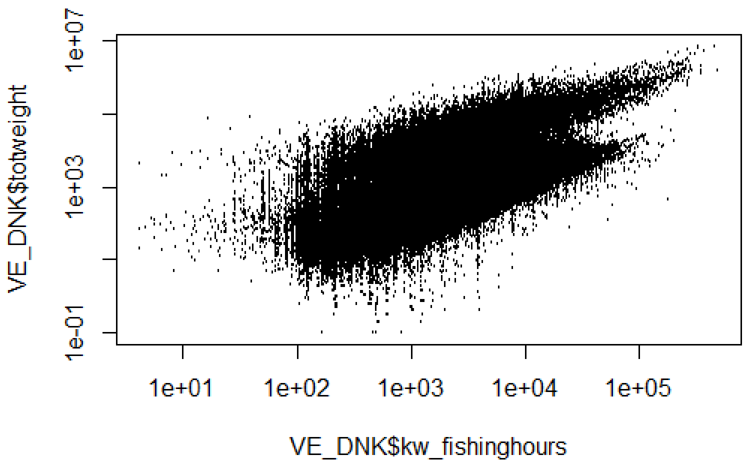
Exchange format for combined VMS and logbook data

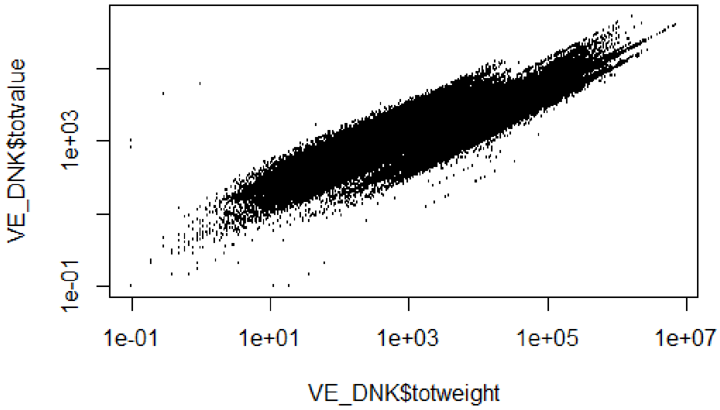
Number of rows in data: 438544

Record type	VE
Vessel flag country	DNK
Year	2009, 2010, 2011, 2012, 2013
Month	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
C-square	31626 unique codes Example of 5 codes: 1501:458:209:2 1501:458:215:3 1501:458:217:2 1501:458:218:2 1501:458:218:4
Vessel length category	>=15 12-15 <12
Gear code	27 unique codes FPO LLD PTM BMS LHP LLS SDN DRB GN OTB SSC DRC GNS OTM TB DRO GTR OTT TBB FIX LH PS TBN FPN LL PTB TBS
All fishing activity category European lvl 6	97 unique codes Example of 5 codes: PTM_SPF_16-31_0_0 PTB_SPF_16-31_0_0 OTB_MCD_70-99_0_0 TBB_DEF_100-119_0_0 TBB_CRU_16-31_0_0
Average fishing speed	Range: 0-4.4



Fishing hour	Range: 0-883.7
kW*fishing hour	Range: 0- 493284.7

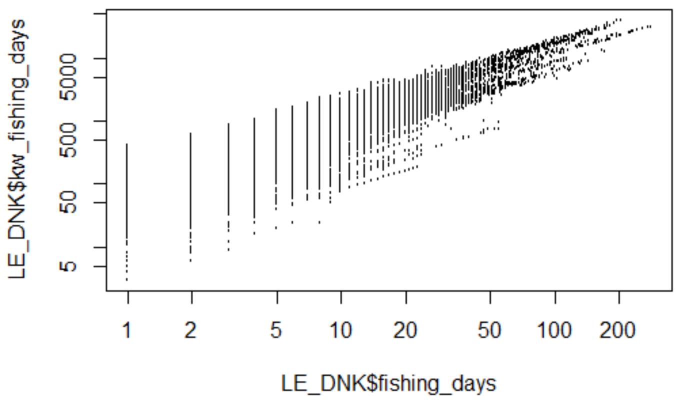
<table>
<tr><td></td><td>
</td></tr>
<tr><td>Tot weight</td><td>Range: 0- 7045157
Mean landings per fishing hour: 1096 kg

</td></tr>
<tr><td>Tot value</td><td>Range: 0- 2767038
43 rows with missing values
Mean price: 0.51</td></tr>
</table>

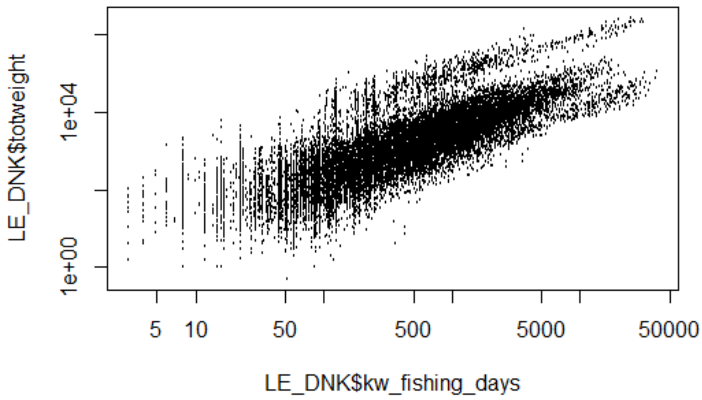
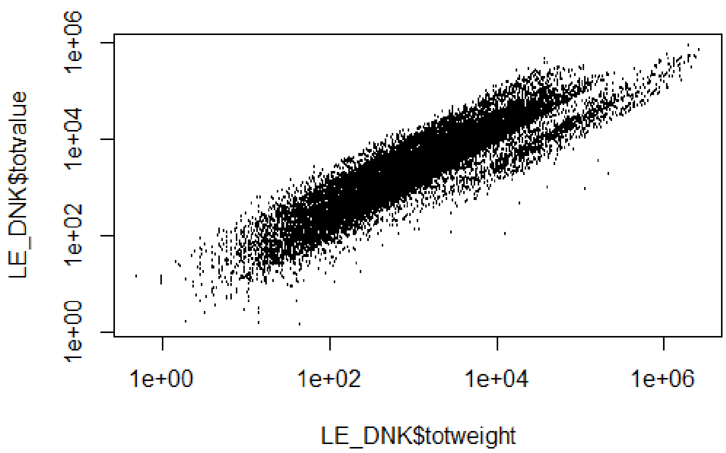
	

VE_DNK$totvalue
1e-01
1e+03
1e-01
1e+01
1e+03
1e+05
1e+07
VE_DNK$totweight

Exchange format for reporting on vessels smaller than 12m/15m

Number of rows in data: 19482

Record type	LE
Vessel flag country	DNK
Year	2009 2010 2011 2012 2013
Month	1 2 3 4 5 6 7 8 9 10 11 12
ICES statistical rectangle	118 unique codes Example of 5 codes: 37G1 37G2 37G4 38F9 38G0
Gear code	31 unique codes BMS DRB DRC DRO FIX FPN FPO FYK GN GND GNS GTN GTR LH LHP LL LLD LLS LTL LX OTB OTM PS PTB PTM SDN SSC TB TBB TBN ZZZ
All fishing activity category European lvl 6	86 unique codes Example of 5 codes: OTB_DEF_>=105_1_110 PTM_SPF_16-31_0_0 GNS_DEF_110-156_0_0 GNS_DEF_>=157_0_0 No_Matrix6
Vessel length category	<8 <10 8-10 10-12 12-15
FishingDays	Range: 0.3-283
kW*fishing days	Range: 3-40150 5 rows with missing values 

Tot weight	Range: 0-2650434 Mean landings per fishing day: 1365 
Tot value	Range: 0-862861 3 rows with missing values Mean price: 0.80 

Annex 9: Look-up table to assign gears at métier level 6 to bespoke gear groupings

Information in this table can be used to e.g. derive proxies for gear width and fishing speed from other sources in order to calculate spatially explicit fishing intensities of bottom contacting gears. Note that passive gears are not included in the Benthis and JNCC groupings.

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
DRB_CRU_0-0_0_0	DRB_CRU	DRB	NA	Boat_dredge	Dredge	Dredge
DRB_DEF_0-0_0_0	DRB_DEF	DRB	NA	Boat_dredge	Dredge	Dredge
DRB_DES_0_0_0	DRB_DES	DRB	NA	Boat_dredge	Dredge	Dredge
DRB_MOL_0	DRB_MOL	DRB	DRB_MOL	Boat_dredge	Dredge	Dredge
DRB_MOL_0-0_0_0	DRB_MOL	DRB	DRB_MOL	Boat_dredge	Dredge	Dredge
DRB_MOL_0_0_0	DRB_MOL	DRB	DRB_MOL	Boat_dredge	Dredge	Dredge
DRB_MOL_>0_0_0	DRB_MOL	DRB	DRB_MOL	Boat_dredge	Dredge	Dredge
FAR_SPF_624	FAR_SPF	FAR	NA	NA	Other	Aerial_net
FG_DEF_624	FG_DEF	FG	NA	NA	Static	Falling_gear
FNC_DEF_624	FNC_DEF	FNC	NA	NA	Static	Falling_gear
FPN_DEF_>0_0_0	FPN_DEF	FPN	NA	NA	Static	poundnet
FPO_CAT_>0_0_0	FPO_CAT	FPO	NA	NA	Static	Pot
FPO_CEP_0_0_0	FPO_CEP	FPO	NA	NA	Static	Pot
FPO_CRU_0-0_0_0	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_0_0_0	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_1249	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_1749	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_349	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_3999	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_5000	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_624	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_>0_0_0	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_CRU_UND_0_0	FPO_CRU	FPO	NA	NA	Static	Pot
FPO_DEF_0-0_0_0	FPO_DEF	FPO	NA	NA	Static	Pot
FPO_DEF_349	FPO_DEF	FPO	NA	NA	Static	Pot
FPO_DEF_624	FPO_DEF	FPO	NA	NA	Static	Pot
FPO_DEF_>0_0_0	FPO_DEF	FPO	NA	NA	Static	Pot
FPO_FIF_0_0_0	FPO_FIF	FPO	NA	NA	Static	Pot
FPO_MOL_0-0_0_0	FPO_MOL	FPO	NA	NA	Static	Pot
FPO_MOL_0_0_0	FPO_MOL	FPO	NA	NA	Static	Pot
GEN_DEF_1249	GEN_DEF	GEN	NA	NA	Static	Gillnet
GEN_DEF_1749	GEN_DEF	GEN	NA	NA	Static	Gillnet
GEN_DEF_2499	GEN_DEF	GEN	NA	NA	Static	Gillnet
GEN_DEF_349	GEN_DEF	GEN	NA	NA	Static	Gillnet
GEN_DEF_624	GEN_DEF	GEN	NA	NA	Static	Gillnet
GEN_DEF_874	GEN_DEF	GEN	NA	NA	Static	Gillnet
GEN_SPF_349	GEN_SPF	GEN	NA	NA	Static	Gillnet
GEN_UNK_349	GEN_UNK	GEN	NA	NA	Static	Gillnet
GNC_DEF_349	GNC_DEF	GNC	NA	NA	Static	Gillnet
GND_DEF_0_0_0	GND_DEF	GND	NA	NA	Static	Drift_gillnets
GND_DEF_0_40_0	GND_DEF	GND	NA	NA	Static	Drift_gillnets
GND_DEF_120_219_0	GND_DEF	GND	NA	NA	Static	Drift_gillnets

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
GND_DEF_>=100_0	GND_DEF	GND	NA	NA	Static	Drift_gillnets
GND_LPF_>=100_0	GND_LPF	GND	NA	NA	Static	Drift_gillnets
GNF_DEF_624	GNF_DEF	GNF	NA	NA	Static	Gillnet
GNS_ANA_110-156_0_0	GNS_ANA	GNS	NA	NA	Static	Gillnet
GNS_ANA_>=157_0_0	GNS_ANA	GNS	NA	NA	Static	Gillnet
GNS_CAT_100_119_0	GNS_CAT	GNS	NA	NA	Static	Gillnet
GNS_CAT_50_59_0	GNS_CAT	GNS	NA	NA	Static	Gillnet
GNS_CAT_>0_0_0	GNS_CAT	GNS	NA	NA	Static	Gillnet
GNS_CAT_>=100_0	GNS_CAT	GNS	NA	NA	Static	Gillnet
GNS_CEP_0_0_0	GNS_CEP	GNS	NA	NA	Static	Gillnet
GNS_CRU_0_0_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_10-30_0_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_100-119_0_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_100_119_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_10_30_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_120-219_0_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_120_219_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_50_59_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_50_70_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_60_79_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_624	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_90_99_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_>0_0_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_>=100_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_>=220_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_CRU_>=220_0_0	GNS_CRU	GNS	NA	NA	Static	Gillnet
GNS_DEF_0-0_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_0_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_0_40_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_10-30_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_100-119_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_100_119_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_10_30_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_110-156	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_110-156_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_110-156_0_0_	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_110_156_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_120-219	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_120-219_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_120_219_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_1249	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_149	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_349	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_40_49_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_50-70_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_50_59_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_50_70_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_60_79_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_624	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_80_99_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_874	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_90-109_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
GNS_DEF_90-99	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_90-99_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_90_99_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_>=100_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_>=157_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_>=220	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_>=220_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_>=220_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_UNK	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DEF_misc_0_0	GNS_DEF	GNS	NA	NA	Static	Gillnet
GNS_DWS_0_0_0	GNS_DWS	GNS	NA	NA	Static	Gillnet
GNS_FWS_>0_0_0	GNS_FWS	GNS	NA	NA	Static	Gillnet
GNS_FWS_NA_0_0	GNS_FWS	GNS	NA	NA	Static	Gillnet
GNS_LPF_120-219_0_0	GNS_LPF	GNS	NA	NA	Static	Gillnet
GNS_LPF_>=100_0	GNS_LPF	GNS	NA	NA	Static	Gillnet
GNS_MCD_100-119_0_0	GNS_MCD	GNS	NA	NA	Static	Gillnet
GNS_MCD_120-219_0_0	GNS_MCD	GNS	NA	NA	Static	Gillnet
GNS_SPF_0_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_10-30_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_100-119_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_120-219_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_120_219_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_16-109	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_16-109_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_32-109_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_50-70_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_50_59_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_60_79_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_624	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_>=100_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_>=157_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_SPF_misc_0_0	GNS_SPF	GNS	NA	NA	Static	Gillnet
GNS_UNK_349	GNS_UNK	GNS	NA	NA	Static	Gillnet
GN_DEF_1249	GN_DEF	GN	NA	NA	Static	Gillnet
GN_DEF_349	GN_DEF	GN	NA	NA	Static	Gillnet
GN_DEF_624	GN_DEF	GN	NA	NA	Static	Gillnet
GN_DWS_349	GN_DWS	GN	NA	NA	Static	Gillnet
GTN_DEF_120_219_0	GTN_DEF	GTN	NA	NA	Static	Gillnet
GTN_DEF_60_79_0	GTN_DEF	GTN	NA	NA	Static	Gillnet
GTN_DEF_>=100_0	GTN_DEF	GTN	NA	NA	Static	Gillnet
GTN_DEF_>=220_0	GTN_DEF	GTN	NA	NA	Static	Gillnet
GTN_LPF_0_0_0	GTN_LPF	GTN	NA	NA	Static	Gillnet
GTN_LPF_>=100_0	GTN_LPF	GTN	NA	NA	Static	Gillnet
GTR_CEP_0_0_0	GTR_CEP	GTR	NA	NA	Static	Trammel
GTR_CEP_100_119_0	GTR_CEP	GTR	NA	NA	Static	Trammel
GTR_CEP_120_219_0	GTR_CEP	GTR	NA	NA	Static	Trammel
GTR_CEP_50_59_0	GTR_CEP	GTR	NA	NA	Static	Trammel
GTR_CEP_60_79_0	GTR_CEP	GTR	NA	NA	Static	Trammel
GTR_CEP_90_99_0	GTR_CEP	GTR	NA	NA	Static	Trammel
GTR_CEP_>=100_0	GTR_CEP	GTR	NA	NA	Static	Trammel
GTR_CEP_>=220_0	GTR_CEP	GTR	NA	NA	Static	Trammel
GTR_CRU_0_0_0	GTR_CRU	GTR	NA	NA	Static	Trammel

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
GTR_CRU_100_119_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_CRU_120_219_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_CRU_50_59_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_CRU_50_70_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_CRU_60_79_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_CRU_90_99_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_CRU_>=100_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_CRU_>=220_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_CRU_>=220_0_0	GTR_CRU	GTR	NA	NA	Static	Trammel
GTR_DEF_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_0-0_0_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_0_0_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_0_40_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_100_119_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_110-156_0_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_120-219_0_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_120_219_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_50_59_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_50_70_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_60_79_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_80_99_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_90-99	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_90_99_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_>=100_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_>=157_0_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_>=220_0	GTR_DEF	GTR	NA	NA	Static	Trammel
GTR_DEF_>=220_0_0	GTR_DEF	GTR	NA	NA	Static	Trammel
HAR_UNK_1249	HAR_UNK	HAR	NA	NA	Other	Harpoon
HAR_UNK_349	HAR_UNK	HAR	NA	NA	Other	Harpoon
HAR_UNK_624	HAR_UNK	HAR	NA	NA	Other	Harpoon
HAR_UNK_874	HAR_UNK	HAR	NA	NA	Other	Harpoon
HMD_MOL_0_0_0	HMD_MOL	HMD	NA	NA	Dredge	Dredge
HMD_MOL_70-99_0_0	HMD_MOL	HMD	NA	NA	Dredge	Dredge
HMD_MOL_<16_0_0	HMD_MOL	HMD	NA	NA	Dredge	Dredge
HMD_MOL_>=120_0_0	HMD_MOL	HMD	NA	NA	Dredge	Dredge
HMD_MOL_UND_0_0	HMD_MOL	HMD	NA	NA	Dredge	Dredge
LA_DEF_1249	LA_DEF	LA	NA	NA	Static	Lines
LHM_DEF_349	LHM_DEF	LHM	NA	NA	Static	Lines
LHM_FIF_0_0_0	LHM_FIF	LHM	NA	NA	Static	Lines
LHM_SPF_624	LHM_SPF	LHM	NA	NA	Static	Lines
LHM_UNK_349	LHM_UNK	LHM	NA	NA	Static	Lines
LHP_CEP_0_0_0	LHP_CEP	LHP	NA	NA	Static	Lines
LHP_DEF_0	LHP_DEF	LHP	NA	NA	Static	Lines
LHP_DEF_0-0_0_0	LHP_DEF	LHP	NA	NA	Static	Lines
LHP_FIF_-_0_0	LHP_FIF	LHP	NA	NA	Static	Lines
LHP_FIF_0_0_0	LHP_FIF	LHP	NA	NA	Static	Lines
LHP_LPF_0-0_0_0	LHP_LPF	LHP	NA	NA	Static	Lines
LHP_LPF_0_0_0	LHP_LPF	LHP	NA	NA	Static	Lines
LHP_SPF_0_0_0	LHP_SPF	LHP	NA	NA	Static	Lines
LLD_ANA_0_0_0	LLD_ANA	LLD	NA	NA	Static	Longlines
LLD_ANA_NA_0_0	LLD_ANA	LLD	NA	NA	Static	Longlines
LLD_DEF_0_0_0	LLD_DEF	LLD	NA	NA	Static	Longlines

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
LLD_DEF_349	LLD_DEF	LLD	NA	NA	Static	Longlines
LLD_DEF_624	LLD_DEF	LLD	NA	NA	Static	Longlines
LLD_DEF_874	LLD_DEF	LLD	NA	NA	Static	Longlines
LLD_LPF_0_0_0	LLD_LPF	LLD	NA	NA	Static	Longlines
LLS_ANA_0_0_0	LLS_ANA	LLS	NA	NA	Static	Longlines
LLS_CRU_349	LLS_CRU	LLS	NA	NA	Static	Longlines
LLS_DEF_0_0_0	LLS_DEF	LLS	NA	NA	Static	Longlines
LLS_DEF_1249	LLS_DEF	LLS	NA	NA	Static	Longlines
LLS_DEF_1749	LLS_DEF	LLS	NA	NA	Static	Longlines
LLS_DEF_2499	LLS_DEF	LLS	NA	NA	Static	Longlines
LLS_DEF_349	LLS_DEF	LLS	NA	NA	Static	Longlines
LLS_DEF_3999	LLS_DEF	LLS	NA	NA	Static	Longlines
LLS_DEF_624	LLS_DEF	LLS	NA	NA	Static	Longlines
LLS_DEF_874	LLS_DEF	LLS	NA	NA	Static	Longlines
LLS_DWS_0_0_0	LLS_DWS	LLS	NA	NA	Static	Longlines
LLS_DWS_1249	LLS_DWS	LLS	NA	NA	Static	Longlines
LLS_DWS_2499	LLS_DWS	LLS	NA	NA	Static	Longlines
LLS_DWS_3999	LLS_DWS	LLS	NA	NA	Static	Longlines
LLS_FIF_0_0_0	LLS_FIF	LLS	NA	NA	Static	Longlines
LLS_FWS_0_0_0	LLS_FWS	LLS	NA	NA	Static	Longlines
LLS_SPF_349	LLS_SPF	LLS	NA	NA	Static	Longlines
LLS_SPF_3999	LLS_SPF	LLS	NA	NA	Static	Longlines
LLS_SPF_624	LLS_SPF	LLS	NA	NA	Static	Longlines
LLS_SPF_874	LLS_SPF	LLS	NA	NA	Static	Longlines
LLS_UNK_1249	LLS_UNK	LLS	NA	NA	Static	Longlines
LLS_UNK_349	LLS_UNK	LLS	NA	NA	Static	Longlines
LL_CRU_624	LL_CRU	LL	NA	NA	Static	Longlines
LL_DEF_1249	LL_DEF	LL	NA	NA	Static	Longlines
LL_DEF_149	LL_DEF	LL	NA	NA	Static	Longlines
LL_DEF_1749	LL_DEF	LL	NA	NA	Static	Longlines
LL_DEF_2499	LL_DEF	LL	NA	NA	Static	Longlines
LL_DEF_349	LL_DEF	LL	NA	NA	Static	Longlines
LL_DEF_624	LL_DEF	LL	NA	NA	Static	Longlines
LL_DEF_874	LL_DEF	LL	NA	NA	Static	Longlines
LL_DWS_1749	LL_DWS	LL	NA	NA	Static	Longlines
LL_SPF_1249	LL_SPF	LL	NA	NA	Static	Longlines
LL_SPF_349	LL_SPF	LL	NA	NA	Static	Longlines
LL_SPF_624	LL_SPF	LL	NA	NA	Static	Longlines
LL_UNK_349	LL_UNK	LL	NA	NA	Static	Longlines
LTL_DEF_349	LTL_DEF	LTL	NA	NA	Static	Lines
LTL_LPF_0_0_0	LTL_LPF	LTL	NA	NA	Static	Lines
LTL_SPF_1249	LTL_SPF	LTL	NA	NA	Static	Lines
LTL_SPF_2499	LTL_SPF	LTL	NA	NA	Static	Lines
LTL_SPF_349	LTL_SPF	LTL	NA	NA	Static	Lines
LTL_SPF_624	LTL_SPF	LTL	NA	NA	Static	Lines
LTL_SPF_874	LTL_SPF	LTL	NA	NA	Static	Lines
LX_DEF_349	LX_DEF	LX	NA	NA	Static	Lines
MIS_CRU_0-0_0_0	MIS_CRU	MIS	NA	NA	Other	Other
MIS_DEF_0-0_0_0	MIS_DEF	MIS	NA	NA	Other	Other
MIS_DEF_0_0_0	MIS_DEF	MIS	NA	NA	Other	Other
MIS_DEF_874	MIS_DEF	MIS	NA	NA	Other	Other
MIS_MIS_0_0_0	MIS_MIS	MIS	NA	NA	Other	Other

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
MIS_SPF_0_0_0	MIS_SPF	MIS	NA	NA	Other	Other
NA	NA	NA	NA	NA	NA	NA
NK_DEF_1249	NA	NA	NA	NA	NA	NA
NK_DEF_874	NA	NA	NA	NA	NA	NA
NO_SPF_UNK	NA	NA	NA	NA	NA	NA
NULL	NA	NA	NA	NA	NA	NA
No_Matrix6	NA	NA	NA	NA	NA	NA
OTB/OTM	OTB/OTM	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_ANA_0_0_0	OTB_ANA	OTB	OT_MIX_DMF_PEL	Otter_Trawl	Otter	Otter_Trawl
OTB_CAT_70_99_0	OTB_CAT	OTB	OT_MIX_DMF_PEL	Otter_Trawl	Otter	Otter_Trawl
OTB_CAT_>=70_0	OTB_CAT	OTB	OT_MIX_DMF_PEL	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_0_0_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_0_16_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_100_119_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_16_31_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_32_54_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_32_69_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_55_69_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_70_99_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_>=120_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CEP_>=70_0	OTB_CEP	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CHECK_100-119_0_	OTB_CHE	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CHECK_32-69_0_0	OTB_CHE	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CHECK_70-99_0_0	OTB_CHE	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CHECK_>=120_0_0	OTB_CHE	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_0_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_100-119_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_100_119_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_1249	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_16-31	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_16-31_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_16_31_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_2499	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_32-69_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_32-69_2_22	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_32_54_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_32_69_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_349	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_3999	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_5000	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_55_69_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_624	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_70-89_2_35	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_70-99_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_70_99_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_874	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_90-119_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_90-119_1_120	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_90-119_1_140	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_90-119_1_300	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_<16_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_>0_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
OTB_CRU_>=120_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_>=120_1_120	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_>=55_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_>=70_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_>=70_0_0	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_CRU_UNK	OTB_CRU	OTB	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_0_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_0_16_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_100-119	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_100-119_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_100_119_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_1249	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_130-279_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_16-31_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_16_31_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_1749	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_2499	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_32-69_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_32_54_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_32_69_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_349	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_3999	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_40_54_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_5000	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_55_69_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_624	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_70-89_2_35	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_70-99	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_70-99_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_70_89_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_70_99_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_874	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_90-104_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_90-119_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_90-119_1_110	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_90-119_1_120	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_90-119_1_140	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_90-119_1_300	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_90_119_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_<16_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_<16_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=105_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=105_1_110	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=105_1_120	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=120	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=120_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=120_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=120_1_110	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=120_1_120	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=130_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=55_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=65_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
OTB_DEF_>=70_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_>=70_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_UND_0_0	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_UNK	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DEF_misc_1_110	OTB_DEF	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_100-119_0_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_100_119_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_1249	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_1749	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_2499	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_32-69_0_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_32_69_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_3999	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_5000	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_70-99_0_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_70_99_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_874	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_>=120_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_>=120_0_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_>=70_0	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_DWS_UNK	OTB_DWS	OTB	OT_MIX_DMF_BEN	Otter_Trawl	Otter	Otter_Trawl
OTB_FWS_624	OTB_FWS	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_FWS_>0_0_0	OTB_FWS	OTB	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OTB_LPF_100-119_0_0	OTB_LPF	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_LPF_70-99_0_0	OTB_LPF	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_LPF_>=120_0_0	OTB_LPF	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_100-119_0_0	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_16-31_0_0	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_70-99	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_70-99_0_0	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_90-119_0_0	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_90-119_1_110	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_90-119_1_120	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_90-119_1_140	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_90-119_1_300	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_>0_0_0	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_>=120_0_0	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCD_UND_0_0	OTB_MCD	OTB	OT_MIX_CRU	Otter_Trawl	Otter	Otter_Trawl
OTB_MCF_100-119_0_0	OTB_MCF	OTB	OT_MIX_DMF_PEL	Otter_Trawl	Otter	Otter_Trawl
OTB_MCF_32-69_0_0	OTB_MCF	OTB	OT_MIX_DMF_PEL	Otter_Trawl	Otter	Otter_Trawl
OTB_MCF_70-99_0_0	OTB_MCF	OTB	OT_MIX_DMF_PEL	Otter_Trawl	Otter	Otter_Trawl
OTB_MIS_0_0_0	OTB_MIS	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_0_0_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_100-119_0_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_16_31_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_32-69_0_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_32_69_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_70-99_0_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_70_99_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_<16_0_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_>=120_0_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl
OTB_MOL_>=70_0	OTB_MOL	OTB	OT_MIX	Otter_Trawl	Otter	Otter_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
OTB_MPD_16-31_0_0	OTB_MPD	OTB	OT_MIX_DMF_PEL	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_0_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_0_16_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_100-119_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_100_119_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_1249	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_16-104_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_16-31_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_16_31_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_16_31_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_1749	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_2499	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_32-104_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_32-69_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_32-89_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_32_54_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_32_69_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_3999	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_5000	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_624	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_70-99_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_70_99_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_874	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_<16_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_>=120_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_>=120_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_>=70_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_UNK	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_SPF_misc_0_0	OTB_SPF	OTB	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_1249	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_1749	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_2499	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_349	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_3999	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_5000	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_624	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_874	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_UNK_UNK	OTB_UNK	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTB_unk_0_0	OTB_unk	OTB	NA	Otter_Trawl	Otter	Otter_Trawl
OTM_ANA_UNK	OTM_ANA	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_CEP_0_0_0	OTM_CEP	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_CRU_1249	OTM_CRU	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_CRU_70-99_0_0	OTM_CRU	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_0_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_100-119_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_100-129_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_100_119_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_1249	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_16-31_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_16_31_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_2499	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_32-69_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
OTM_DEF_32_54_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_32_69_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_3999	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_5000	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_70-99_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_70_99_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_90-104_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_90-119_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_<16_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_>=105_1_110	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_>=105_1_120	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_>=120_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_>=120_0_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_>=70_0	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DEF_UNK	OTM_DEF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DWS_2499	OTM_DWS	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DWS_3999	OTM_DWS	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_DWS_5000	OTM_DWS	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_FWS_>0_0_0	OTM_FWS	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_FWS_UNK	OTM_FWS	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_0_0_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_100-119_0_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_100_119_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_32-54_0_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_32-69_0_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_32_54_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_70_99_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_>=120_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_>=120_0_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_LPF_>=70_0	OTM_LPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_0_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_0_16_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_100-119_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_100_119_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_1249	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_16-104_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_16-31_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_16_31_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_16_31_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_1749	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_2499	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_32-104_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_32-54_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_32-69_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_32-89_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_32_54_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_32_69_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_349	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_3999	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_5000	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_70-99_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_70_99_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
OTM_SPF_874	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_<16_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_>=120_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_>=40_0_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_>=70_0	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_SPF_UNK	OTM_SPF	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_UNK_2499	OTM_UNK	OTM	NA	NA	Midwater	Midwater_Trawl
OTM_UNK_UNK	OTM_UNK	OTM	NA	NA	Midwater	Midwater_Trawl
OTS_CRU_349	OTS_CRU	OTS	OT_MIX_CRU	Otter_Trawl	Otter	Twin_Otter_Trawl
OTS_CRU_624	OTS_CRU	OTS	OT_MIX_CRU	Otter_Trawl	Otter	Twin_Otter_Trawl
OTS_DEF_3999	OTS_DEF	OTS	OT_DMF	Otter_Trawl	Otter	Twin_Otter_Trawl
OTT_CEP_0_0_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CEP_100_119_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CEP_16_31_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CEP_32_54_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CEP_32_69_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CEP_55_69_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CEP_70_99_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CEP_>=120_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CEP_>=70_0	OTT_CEP	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CHECK_100-119_0_	OTT_CHE	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CHECK_70-99_0_0	OTT_CHE	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CHECK_>=120_0_0	OTT_CHE	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_0_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_0_16_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_100-119_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_100_119_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_16-31_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_16_31_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_32-69_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_32-69_2_22	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_32_54_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_55_69_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_624	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_70-89_2_35	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_70-99_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_70_99_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_90-119_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_90-119_1_120	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_90-119_1_140	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_90-119_1_300	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_<16_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_>0_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_>=120_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_>=120_0_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_>=120_1_120	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_CRU_>=70_0	OTT_CRU	OTT	OT_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_0_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_0_16_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_100-119_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_100_119_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_16-31_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
OTT_DEF_16_31_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_32-69_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_32_54_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_32_69_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_55_69_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_70-99_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_70_99_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_90-119_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_90-119_1_120	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_90-119_1_140	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_90-119_1_300	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_>0_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_>=105_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_>=105_1_120	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_>=120_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_>=120_0_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_>=120_1_120	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DEF_>=70_0	OTT_DEF	OTT	OT_DMF	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DWS_100_119_0	OTT_DWS	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DWS_>=120_0_0	OTT_DWS	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_DWS_>=70_0	OTT_DWS	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MCD_100-119_0_0	OTT_MCD	OTT	OT_MIX_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MCD_70-99_0_0	OTT_MCD	OTT	OT_MIX_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MCD_90-119_0_0	OTT_MCD	OTT	OT_MIX_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MCD_90-119_1_120	OTT_MCD	OTT	OT_MIX_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MCD_90-119_1_140	OTT_MCD	OTT	OT_MIX_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MCD_90-119_1_300	OTT_MCD	OTT	OT_MIX_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MCD_90-119_1_>14	OTT_MCD	OTT	OT_MIX_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MCD_>=120_0_0	OTT_MCD	OTT	OT_MIX_CRU	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MOL_100-119_0_0	OTT_MOL	OTT	OT_MIX	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MOL_32-69_0_0	OTT_MOL	OTT	OT_MIX	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MOL_70-99_0_0	OTT_MOL	OTT	OT_MIX	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MOL_>=120_0_0	OTT_MOL	OTT	OT_MIX	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_MOL_>=70_0	OTT_MOL	OTT	OT_MIX	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OTT_unk_0_0	OTT_unk	OTT	NA	Otter_Trawl_Twin	Otter	Twin_Otter_Trawl
OT_CRU_349	OT_CRU	OT	OT_CRU	Otter_Trawl	Otter	Otter_Trawl
OT_DEF_1249	OT_DEF	OT	OT_DMF	Otter_Trawl	Otter	Otter_Trawl
OT_DWS_3999	OT_DWS	OT	NA	Otter_Trawl	Otter	Otter_Trawl
OT_SPF_5000	OT_SPF	OT	OT_SPF	Otter_Trawl	Otter	Otter_Trawl
PS1_DEF_1249	PS1_DEF	PS1	NA	NA	Seine	Purse_seine
PS1_DEF_1749	PS1_DEF	PS1	NA	NA	Seine	Purse_seine
PS1_DEF_2499	PS1_DEF	PS1	NA	NA	Seine	Purse_seine
PS1_DEF_349	PS1_DEF	PS1	NA	NA	Seine	Purse_seine
PS1_DEF_3999	PS1_DEF	PS1	NA	NA	Seine	Purse_seine
PS1_DEF_624	PS1_DEF	PS1	NA	NA	Seine	Purse_seine
PS1_DEF_874	PS1_DEF	PS1	NA	NA	Seine	Purse_seine
PS1_SPF_1249	PS1_SPF	PS1	NA	NA	Seine	Purse_seine
PS1_SPF_149	PS1_SPF	PS1	NA	NA	Seine	Purse_seine
PS1_SPF_1749	PS1_SPF	PS1	NA	NA	Seine	Purse_seine
PS1_SPF_2499	PS1_SPF	PS1	NA	NA	Seine	Purse_seine
PS1_SPF_349	PS1_SPF	PS1	NA	NA	Seine	Purse_seine
PS1_SPF_3999	PS1_SPF	PS1	NA	NA	Seine	Purse_seine

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
PS1_SPF_5000	PS1_SPF	PS1	NA	NA	Seine	Purse_seine
PS1_SPF_624	PS1_SPF	PS1	NA	NA	Seine	Purse_seine
PS1_SPF_874	PS1_SPF	PS1	NA	NA	Seine	Purse_seine
PS2_DEF_1249	PS2_DEF	PS2	NA	NA	Seine	Purse_seine
PS2_DEF_1749	PS2_DEF	PS2	NA	NA	Seine	Purse_seine
PS2_DEF_2499	PS2_DEF	PS2	NA	NA	Seine	Purse_seine
PS2_DEF_3999	PS2_DEF	PS2	NA	NA	Seine	Purse_seine
PS2_DEF_5000	PS2_DEF	PS2	NA	NA	Seine	Purse_seine
PS2_DEF_624	PS2_DEF	PS2	NA	NA	Seine	Purse_seine
PS2_DEF_874	PS2_DEF	PS2	NA	NA	Seine	Purse_seine
PS2_DWS_1749	PS2_DWS	PS2	NA	NA	Seine	Purse_seine
PS2_DWS_2499	PS2_DWS	PS2	NA	NA	Seine	Purse_seine
PS2_DWS_3999	PS2_DWS	PS2	NA	NA	Seine	Purse_seine
PS2_DWS_5000	PS2_DWS	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_1249	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_149	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_1749	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_2499	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_349	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_3999	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_5000	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_624	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS2_SPF_874	PS2_SPF	PS2	NA	NA	Seine	Purse_seine
PS_DEF_0_0_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_0_16_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_100_119_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_1249	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_16_31_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_1749	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_2499	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_32_54_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_32_69_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_349	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_55_69_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_624	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_70_99_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_874	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_DEF_>=70_0	PS_DEF	PS	NA	NA	Seine	Purse_seine
PS_LPF_0_0_0	PS_LPF	PS	NA	NA	Seine	Purse_seine
PS_LPF_16_31_0	PS_LPF	PS	NA	NA	Seine	Purse_seine
PS_LPF_>=70_0	PS_LPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_0_0_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_0_16_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_100_119_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_1249	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_16-104_0_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_16-31_0_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_16_31_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_1749	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_2499	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_32-69_0_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_32_54_0	PS_SPF	PS	NA	NA	Seine	Purse_seine

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
PS_SPF_32_69_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_349	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_3999	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_5000	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_55_69_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_624	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_70_99_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_874	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_>0_0_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PS_SPF_>=70_0	PS_SPF	PS	NA	NA	Seine	Purse_seine
PTB_CEP_0_0_0	PTB_CEP	PTB	NA	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_CHECK_>=120_0_0	PTB_CHE	PTB	NA	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_CRU_70-99_0_0	PTB_CRU	PTB	OT_CRU	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_CRU_874	PTB_CRU	PTB	OT_CRU	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_0_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_0_16_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_100-119_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_100_119_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_16-31_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_16_31_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_32-69_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_32_69_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_70-99_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_70_99_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_874	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_90-104_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_<16_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_>=105_1_110	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_>=105_1_120	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_>=120_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_>=70_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_DEF_NA_0_0	PTB_DEF	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_FWS_>0_0_0	PTB_FWS	PTB	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_LPF_100-119_0_0	PTB_LPF	PTB	NA	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_MCD_70-99_0_0	PTB_MCD	PTB	OT_MIX_CRU	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_MCD_90-119_0_0	PTB_MCD	PTB	OT_MIX_CRU	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_MCD_>=120_0_0	PTB_MCD	PTB	OT_MIX_CRU	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_MOL_70-99_0_0	PTB_MOL	PTB	OT_MIX	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_MOL_874	PTB_MOL	PTB	OT_MIX	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_100-119_0_0	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_16-104_0_0	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_16-31_0_0	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_32-104_0_0	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_32-69_0_0	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_32-89_0_0	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_>=105_1_110	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_>=105_1_120	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_SPF_>=120_0_0	PTB_SPF	PTB	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PTB_unk_0_0	PTB_unk	PTB	NA	Pair_Trawl_Seine	Otter	Pair_Trawl
PTM_CEP_100_119_0	PTM_CEP	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_CEP_16_31_0	PTM_CEP	PTM	NA	NA	Midwater	Midwater_Pair_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
PTM_CEP_32_69_0	PTM_CEP	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_CEP_70_99_0	PTM_CEP	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_CEP_>=70_0	PTM_CEP	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_CRU_100-119_0_0	PTM_CRU	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_CRU_32-69_0_0	PTM_CRU	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_CRU_70-99_0_0	PTM_CRU	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_0_0_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_0_16_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_100-119_0_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_100_119_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_1249	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_16-31_0_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_16_31_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_1749	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_2499	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_32-69_0_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_32_54_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_32_69_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_3999	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_5000	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_70-99_0_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_70_99_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_874	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_90-104_0_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_<16_0_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_>=105_1_110	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_>=105_1_120	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_>=120_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_>=120_0_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DEF_>=70_0	PTM_DEF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DWS_1249	PTM_DWS	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DWS_1749	PTM_DWS	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DWS_2499	PTM_DWS	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DWS_3999	PTM_DWS	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_DWS_5000	PTM_DWS	PTM	NA	NA	Midwater	Midwater_Pair_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
PTM_FWS_>0_0_0	PTM_FWS	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_0_0_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_100-119_0_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_100_119_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_16-31_0_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_16_31_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_32-54_0_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_32-69_0_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_32_54_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_70-99_0_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_70_99_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_>=120_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_>=120_0_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_>=70_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_LPF_>=70_0_0	PTM_LPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_0_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_100-119_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_100_119_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_1249	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_16-104_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_16-31_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_16_31_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_1749	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_2499	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_32-104_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_32-54_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_32-69_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_32-89_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_32_54_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_32_69_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_349	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_3999	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_5000	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_70-99_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_70_99_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
PTM_SPF_874	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_>=105_1_120	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_>=120_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_>=120_0_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_>=70_0	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_SPF_UNK	PTM_SPF	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_UNK_1749	PTM_UNK	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_UNK_3999	PTM_UNK	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PTM_UNK_UNK	PTM_UNK	PTM	NA	NA	Midwater	Midwater_Pair_Trawl
PT_DEF_874	PT_DEF	PT	OT_DMF	Pair_Trawl_Seine	Otter	Pair_Trawl
PT_SPF_1249	PT_SPF	PT	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
PT_SPF_2499	PT_SPF	PT	OT_SPF	Pair_Trawl_Seine	Otter	Pair_Trawl
SDN_CEP_0_0_0	SDN_CEP	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_CEP_100_119_0	SDN_CEP	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_CEP_70_99_0	SDN_CEP	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_CEP_>=70_0	SDN_CEP	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_0_0_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_0_16_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_100-119_0_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_100_119_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_1249	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_2499	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_32_69_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_349	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_624	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_70-99_0_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_70_99_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_874	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_90-119_0_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_>0_0_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_>=105_1_110	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_>=105_1_120	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_>=120_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_>=120_0_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SDN_DEF_>=70_0	SDN_DEF	SDN	SDN_DMF	NA	Seine	Danish_seine
SPR_DEF_100-119_0_0	SPR_DEF	SPR	SDN_DMF	Pair_Trawl_Seine	Seine	Pair_seine
SPR_DEF_1249	SPR_DEF	SPR	SDN_DMF	Pair_Trawl_Seine	Seine	Pair_seine
SPR_DEF_70-99_0_0	SPR_DEF	SPR	SDN_DMF	Pair_Trawl_Seine	Seine	Pair_seine
SSC_CRU_349	SSC_CRU	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_CRU_624	SSC_CRU	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_0_0_0	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_100-119	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_100-119_0_0	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_1249	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_1749	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_2499	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_32-69_0_0	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_349	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
SSC_DEF_3999	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_624	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_70-99	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_70-99_0_0	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_874	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_90-119_0_0	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_>=105_1_110	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_>=105_1_120	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_>=120	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_>=120_0_0	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_>=70_0_0	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DEF_UND_0_0	SSC_DEF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_DWS_1249	SSC_DWS	SSC	NA	NA	Seine	Scottish_Seine
SSC_MCF_100-119_0_0	SSC_MCF	SSC	SSC_DMF	NA	Seine	Scottish_Seine
SSC_SPF_1249	SSC_SPF	SSC	NA	NA	Seine	Scottish_Seine
SSC_SPF_1749	SSC_SPF	SSC	NA	NA	Seine	Scottish_Seine
SSC_SPF_2499	SSC_SPF	SSC	NA	NA	Seine	Scottish_Seine
SSC_SPF_624	SSC_SPF	SSC	NA	NA	Seine	Scottish_Seine
SSC_SPF_874	SSC_SPF	SSC	NA	NA	Seine	Scottish_Seine
SSC_UNK_1249	SSC_UNK	SSC	NA	NA	Seine	Scottish_Seine
SSC_UNK_1749	SSC_UNK	SSC	NA	NA	Seine	Scottish_Seine
SSC_UNK_349	SSC_UNK	SSC	NA	NA	Seine	Scottish_Seine
SSC_UNK_624	SSC_UNK	SSC	NA	NA	Seine	Scottish_Seine
SSC_UNK_874	SSC_UNK	SSC	NA	NA	Seine	Scottish_Seine
SV_DEF_1249	SV_DEF	SV	SDN_DMF	Seine	Seine	Seine
SV_DEF_1749	SV_DEF	SV	SDN_DMF	Seine	Seine	Seine
SV_DEF_2499	SV_DEF	SV	SDN_DMF	Seine	Seine	Seine
SV_DEF_349	SV_DEF	SV	SDN_DMF	Seine	Seine	Seine
SV_DEF_624	SV_DEF	SV	SDN_DMF	Seine	Seine	Seine
SV_DEF_874	SV_DEF	SV	SDN_DMF	Seine	Seine	Seine
SV_SPF_624	SV_SPF	SV	NA	Seine	Seine	Seine
SX_DEF_2499	SX_DEF	SX	SDN_DMF	NA	Seine	Seine
SX_DEF_624	SX_DEF	SX	SDN_DMF	NA	Seine	Seine
SX_SPF_624	SX_SPF	SX	NA	NA	Seine	Seine
TBB_CEP_0_0_0	TBB_CEP	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_CRU_100-119_0_0	TBB_CRU	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_CRU_16-31	TBB_CRU	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_CRU_16-31_0_0	TBB_CRU	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_CRU_16_31_0	TBB_CRU	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_CRU_70-99_0_0	TBB_CRU	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_CRU_70_99_0	TBB_CRU	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_CRU_<16_0_0	TBB_CRU	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_CRU_>=120_0_0	TBB_CRU	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_0_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_100-119	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_100-119_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_100_119_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_16-31_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_16_31_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_32-69_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_32_69_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
TBB_DEF_70-89_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_70-99	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_70-99_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_70_99_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_90-119_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_<16_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_>=120	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_>=120_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_>=120_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DEF_UND_0_0	TBB_DEF	TBB	TBB_DMF	Beam_Trawl	Beam	Beam_Trawl
TBB_DWS_70-99_0_0	TBB_DWS	TBB	NA	Beam_Trawl	Beam	Beam_Trawl
TBB_MCD_16-31_0_0	TBB_MCD	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_MCD_70-99_0_0	TBB_MCD	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_MCD_>=120_0_0	TBB_MCD	TBB	TBB_CRU	Beam_Trawl	Beam	Beam_Trawl
TBB_MOL_0_0_0	TBB_MOL	TBB	TBB_MOL	Beam_Trawl	Beam	Beam_Trawl
TBB_MOL_100-119_0_0	TBB_MOL	TBB	TBB_MOL	Beam_Trawl	Beam	Beam_Trawl
TBB_MOL_16_31_0	TBB_MOL	TBB	TBB_MOL	Beam_Trawl	Beam	Beam_Trawl
TBB_MOL_70-99_0_0	TBB_MOL	TBB	TBB_MOL	Beam_Trawl	Beam	Beam_Trawl
TBB_MOL_70_99_0	TBB_MOL	TBB	TBB_MOL	Beam_Trawl	Beam	Beam_Trawl
TBN_CRU_349	TBN_CRU	TBN	OT_CRU	Nephrops_Trawl	Otter	Nephrops_Trawl
TBN_CRU_624	TBN_CRU	TBN	OT_CRU	Nephrops_Trawl	Otter	Nephrops_Trawl
TBN_DEF_349	TBN_DEF	TBN	OT_DMF	Nephrops_Trawl	Otter	Nephrops_Trawl
TBN_DEF_624	TBN_DEF	TBN	OT_DMF	Nephrops_Trawl	Otter	Nephrops_Trawl
TBN_UNK_624	TBN_UNK	TBN	NA	Nephrops_Trawl	Otter	Nephrops_Trawl
TBS_CRU_1249	TBS_CRU	TBS	OT_CRU	Otter_Trawl	Otter	Shrimp_Trawl
TBS_CRU_349	TBS_CRU	TBS	OT_CRU	Otter_Trawl	Otter	Shrimp_Trawl
TBS_CRU_5000	TBS_CRU	TBS	OT_CRU	Otter_Trawl	Otter	Shrimp_Trawl
TBS_CRU_624	TBS_CRU	TBS	OT_CRU	Otter_Trawl	Otter	Shrimp_Trawl
TBS_CRU_874	TBS_CRU	TBS	OT_CRU	Otter_Trawl	Otter	Shrimp_Trawl
TBS_DEF_1249	TBS_DEF	TBS	OT_DMF	Otter_Trawl	Otter	Shrimp_Trawl
TBS_DEF_16-31_0_0	TBS_DEF	TBS	OT_DMF	Otter_Trawl	Otter	Shrimp_Trawl
TBS_DEF_349	TBS_DEF	TBS	OT_DMF	Otter_Trawl	Otter	Shrimp_Trawl
TBS_DEF_624	TBS_DEF	TBS	OT_DMF	Otter_Trawl	Otter	Shrimp_Trawl
TBS_DEF_874	TBS_DEF	TBS	OT_DMF	Otter_Trawl	Otter	Shrimp_Trawl
TBS_SPF_1249	TBS_SPF	TBS	OT_SPF	Otter_Trawl	Otter	Shrimp_Trawl
TBS_SPF_349	TBS_SPF	TBS	OT_SPF	Otter_Trawl	Otter	Shrimp_Trawl
TBS_SPF_5000	TBS_SPF	TBS	OT_SPF	Otter_Trawl	Otter	Shrimp_Trawl
TBS_UNK_349	TBS_UNK	TBS	NA	Otter_Trawl	Otter	Shrimp_Trawl
TBS_UNK_874	TBS_UNK	TBS	NA	Otter_Trawl	Otter	Shrimp_Trawl
TB_CRU_624	TB_CRU	TB	OT_CRU	Otter_Trawl	Otter	Bottom_Trawl
TB_DEF_3999	TB_DEF	TB	OT_DMF	Otter_Trawl	Otter	Bottom_Trawl
TB_DEF_624	TB_DEF	TB	OT_DMF	Otter_Trawl	Otter	Bottom_Trawl
TB_SPF_3999	TB_SPF	TB	OT_SPF	Otter_Trawl	Otter	Bottom_Trawl
TB_SPF_5000	TB_SPF	TB	OT_SPF	Otter_Trawl	Otter	Bottom_Trawl
TMS_CRU_2499	TMS_CRU	TMS	NA	NA	Midwater	Midwater_Beam
TMS_CRU_349	TMS_CRU	TMS	NA	NA	Midwater	Midwater_Beam
TMS_CRU_624	TMS_CRU	TMS	NA	NA	Midwater	Midwater_Beam
TMS_CRU_874	TMS_CRU	TMS	NA	NA	Midwater	Midwater_Beam
TMS_DEF_874	TMS_DEF	TMS	NA	NA	Midwater	Midwater_Beam
TM_DEF_349	TM_DEF	TM	NA	NA	Midwater	Midwater_Beam
TM_SPF_349	TM_SPF	TM	NA	NA	Midwater	Midwater_Beam
TM_SPF_3999	TM_SPF	TM	NA	NA	Midwater	Midwater_Beam

Métier level 6	Métier level 5	Métier level 4	BENTHIS Métier grouping	JNCC Métier grouping	Métier Category	Description
TM_SPF_5000	TM_SPF	TM	NA	NA	Midwater	Midwater_Beam
TX_CRU_349	TX_CRU	TX	NA	NA	Other	Other
Unknown	NA	NA	NA	NA	NA	NA
XXXXXXXXXXXXXXXXXXX	NA	NA	NA	NA	NA	NA
XXX_vvv_vvv_vvv_vvv	NA	NA	NA	NA	NA	NA

Annex 10: Exchange format for combined VMS and logbook data

Table to be used for reporting VMS data.

Order	Name	Type	Req.	Basic checks	Comments
1	Record type	String	M		Fixed value VE
2	Vessel Flag Country	String	M	Code list	ISO 3166-1 alpha-3codes. The flag country of the vessel.
3	Year	Integer	M	Code list	1900 to 3000
4	Month	Integer	M	Code list	1 to 12
5	C-square	String	M	Code list	0.05x0.05 degree, C-square reference XXXX:XXX:XXX:X
6	Vessel length category	String	M	Code list	"<12" "12-15" ">=15"
7	Gear code	String	M	Code list	DCF level 4
8	Fishing activity category European lvl 5	String	M	Code list	Fishing activity category – it is recomentded to submit DCF level 6
9	Average fishing speed	Decimal numeral	M	1 to 50	Average fishing speed within the aggregation: year, month, c-square, vessel length category, gear code and DCF métier .
10	Fishing hour	Decimal numeral	M	1 to 9999999999	Fishing hour calculated from VMS data.
11	Average Vessel Length overall	Decimal numeral	M	1 to 200	Average vessel length within the aggregation: year, month, c-square, gear code and DCF métier .
12	Average kW	Decimal numeral	M	1 to 9999999999	Average vessel power (kW) within the aggregation: year, month, c-square, gear code and DCF métier .
13	kW*fishing hour	Decimal numeral	M	1 to 9999999999	
14	Tot weight	Decimal numeral	M	1 to 9999999999	Total landings of all species caught. In kg
15	Tot value	Decimal numeral	M	1 to 9999999999	Total value of all species caught. In Euro

Table to be used for reporting Logbook data

Order	Name	Type	Req.	Basic checks	Comments
1	Record type	String	M		Fixed value LE
2	Vessel Flag Country	String	M	Code list	ISO 3166-1 alpha-3 codes. The flag country of the vessel.
3	Year	Integer	M	Code list	1900 to 3000
4	Month	Integer	M	Code list	1 to 12
5	ICES statistical rectangle	String	M	Code list	Uppercase, e.g. 45F2
6	Gear code	String	M	Code list	DCF level 4
7	Fishing activity category European lvl 6	String	M	Code list	Fishing activity category – DCF level 6
8	Vessel length category	String	M	Code list	Vessel length grouped into: "<12" "12-15" ">=15"
9	VMS enabled category	String	M	Code list	Yes/No
10	FishingDays	Decimal numeral	M	1 to 9999999999	Number of fishing days by ICES rectangle. If a vessel fished in several ICES squares one day, the day will be divided by the number of ICES rectangles.
11	kW*fishing days	Decimal numeral	M	1 to 9999999999	
12	Tot weight	Decimal numeral	M	1 to 9999999999	Total landings of all species caught. In kg
13	Tot value	Decimal numeral	M	1 to 9999999999	Total value of all species caught. In Euro

Annex 11: Missing average speeds

Table of proportion of 0's and NA's in the average speeds field for each country

Country	BEL	DEU	DNK	EST	FIN	FRA	GBR	IRL	LTU	LVA	NEAFC	NLD
%0's	NA	0	0	0	0	100	0	0	1	100	22	1
%NA's	100	0	0	0	0	0	0	0	0	85	0	0

Country	NO	POL	PRT	SWE
%0's	0	100	0	0
%NA's	0	25	0	0

Table of proportion of 0's and NA's in the average speeds field for each gear code

Gear code	BMS	DRB	DRC	DRO	DTS	FIX	FPN	FPO	GEN	GN	GND	GNF	GNS
%0's	0	0.38	0	0	0	0.01	0	0.5	0.93	0.02	1	1	0.57
%NA's	0	0.03	0	0	0	0	0	0	0.3	0	0	0	0.05

Gear code	GTN	GTR	HMD	LH	LHM	LHP	LHX	LL	LLD	LLS	LTL	MIS	NK
%0's	1	0.85	0	0	0	0	1	0	0.69	0.19	0.23	0	0.02
%NA's	0	0.01	0	0	0	0	0	0	0.05	0	0	0	0

Gear code	OT	OTB	OTH	OTM	OTT	PG	PS	PS1	PS2	PTB	PTM	PTS	SDN
%0's	0	0.3	0.67	0.29	0.6	0	0.29	0.01	0	0.15	0.49	0	0.56
%NA's	0	0.02	0	0.08	0	0	0	0	0	0	0	0	0

Gear code	SPR	SSC	SV	TB	TBB	TBN	TBS	TMS
%0's	0	0.03	0	0	0.01	0	0.11	0
%NA's	0	0.03	0	0	0.17	0	0	0

Histograms of average fishing speed per gear. The vertical red lines represents the mean.

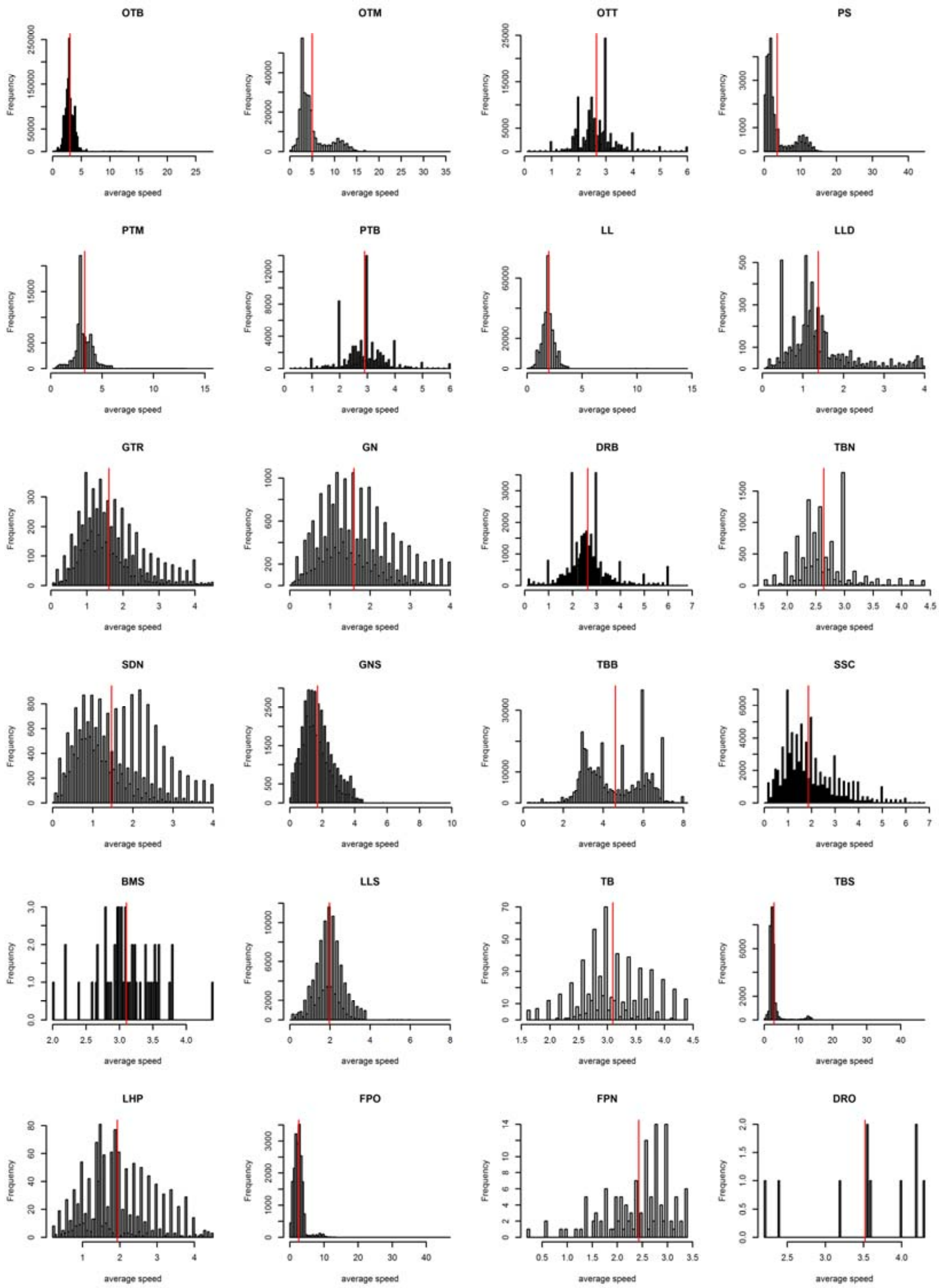
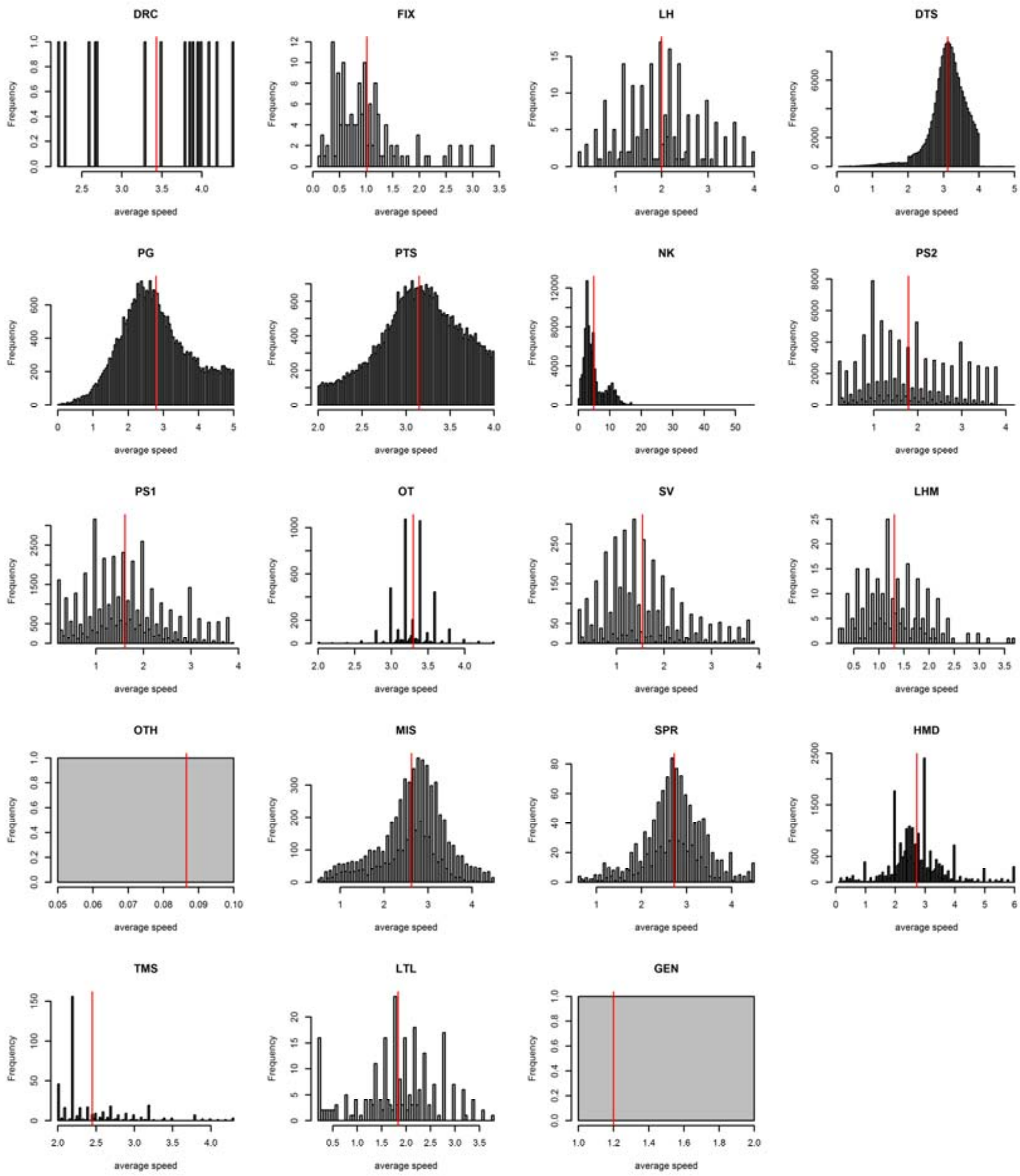
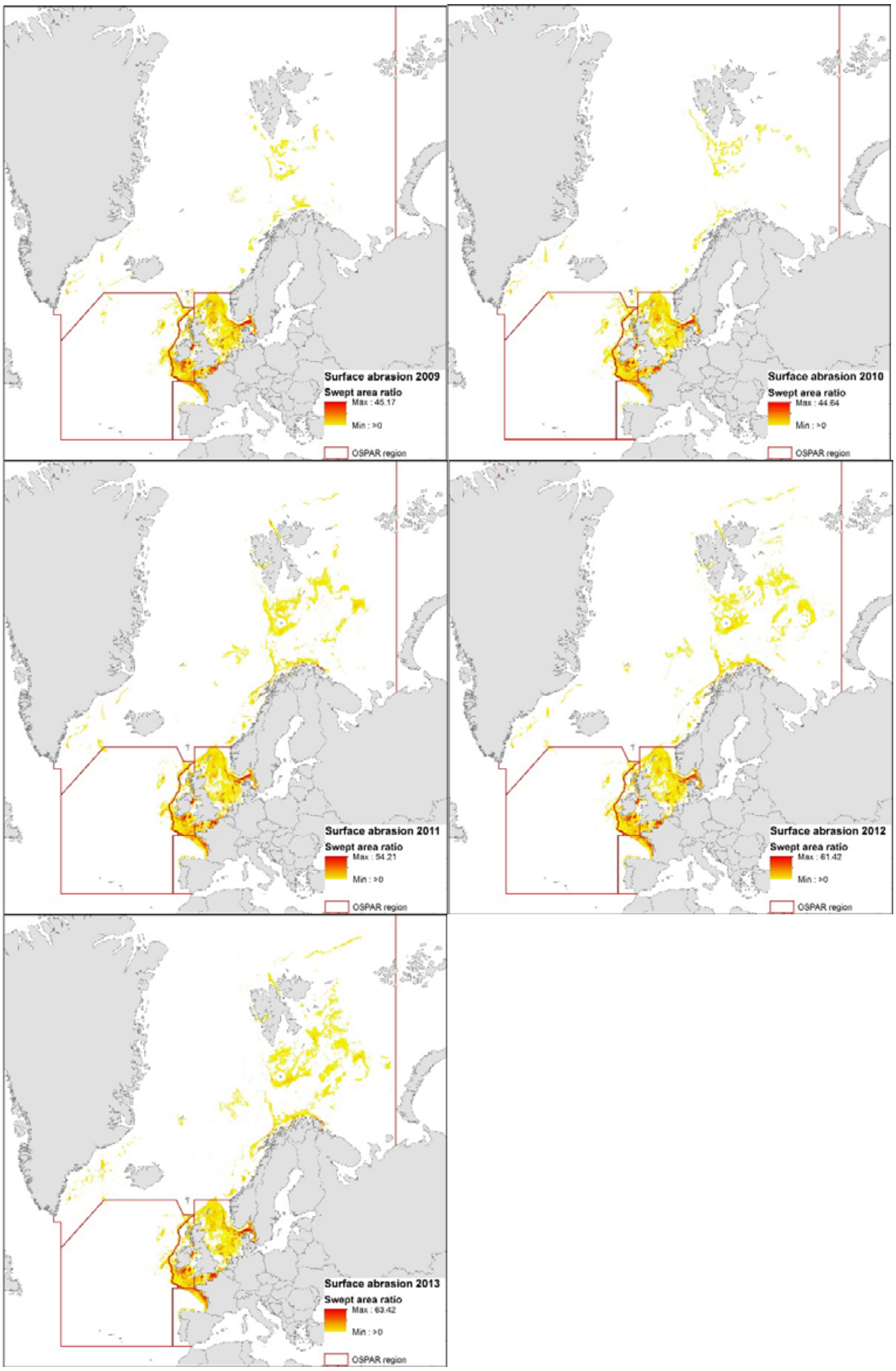


Figure continued.

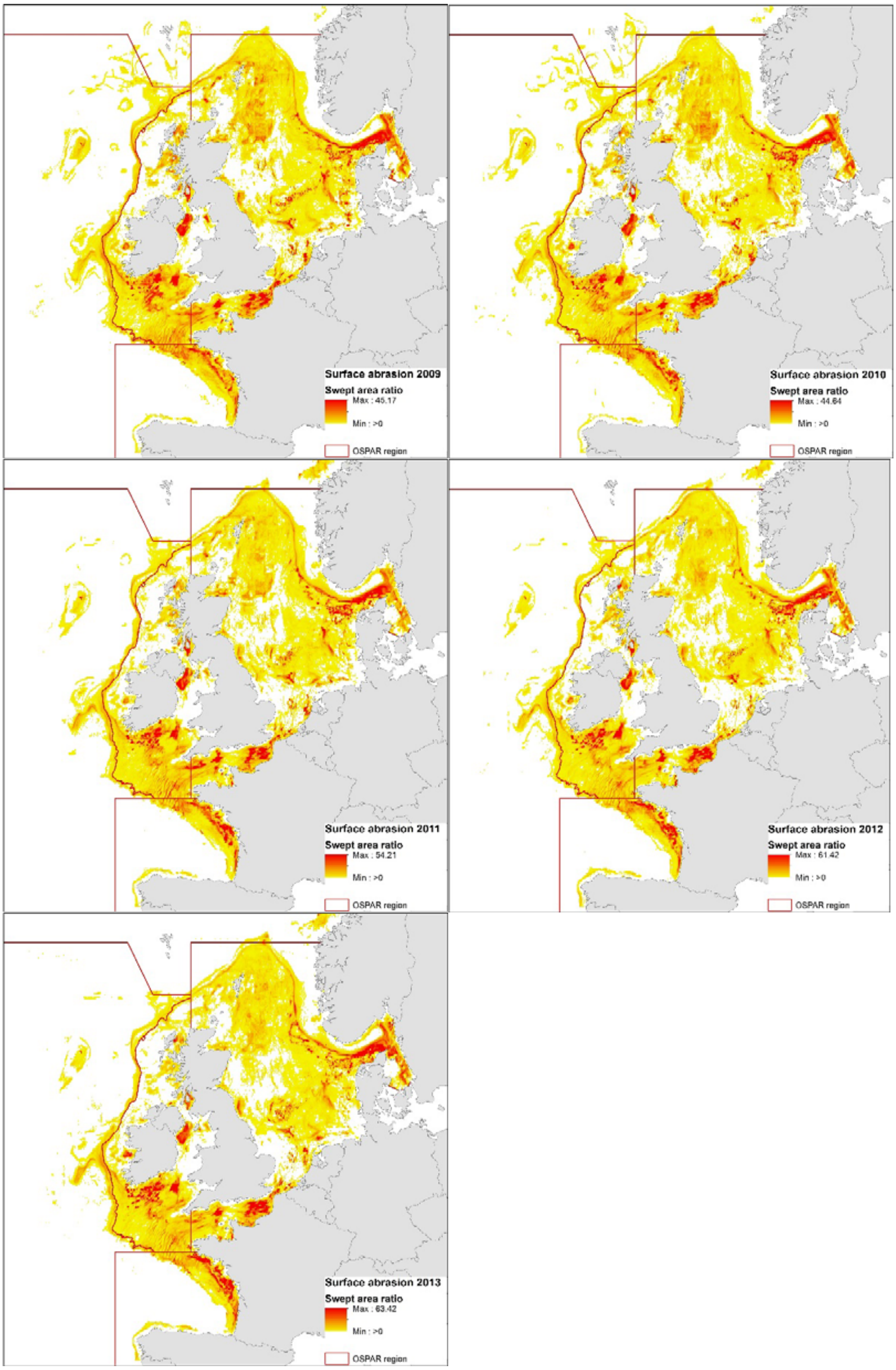


Annex 12: Maps produced in response to the OSPAR request

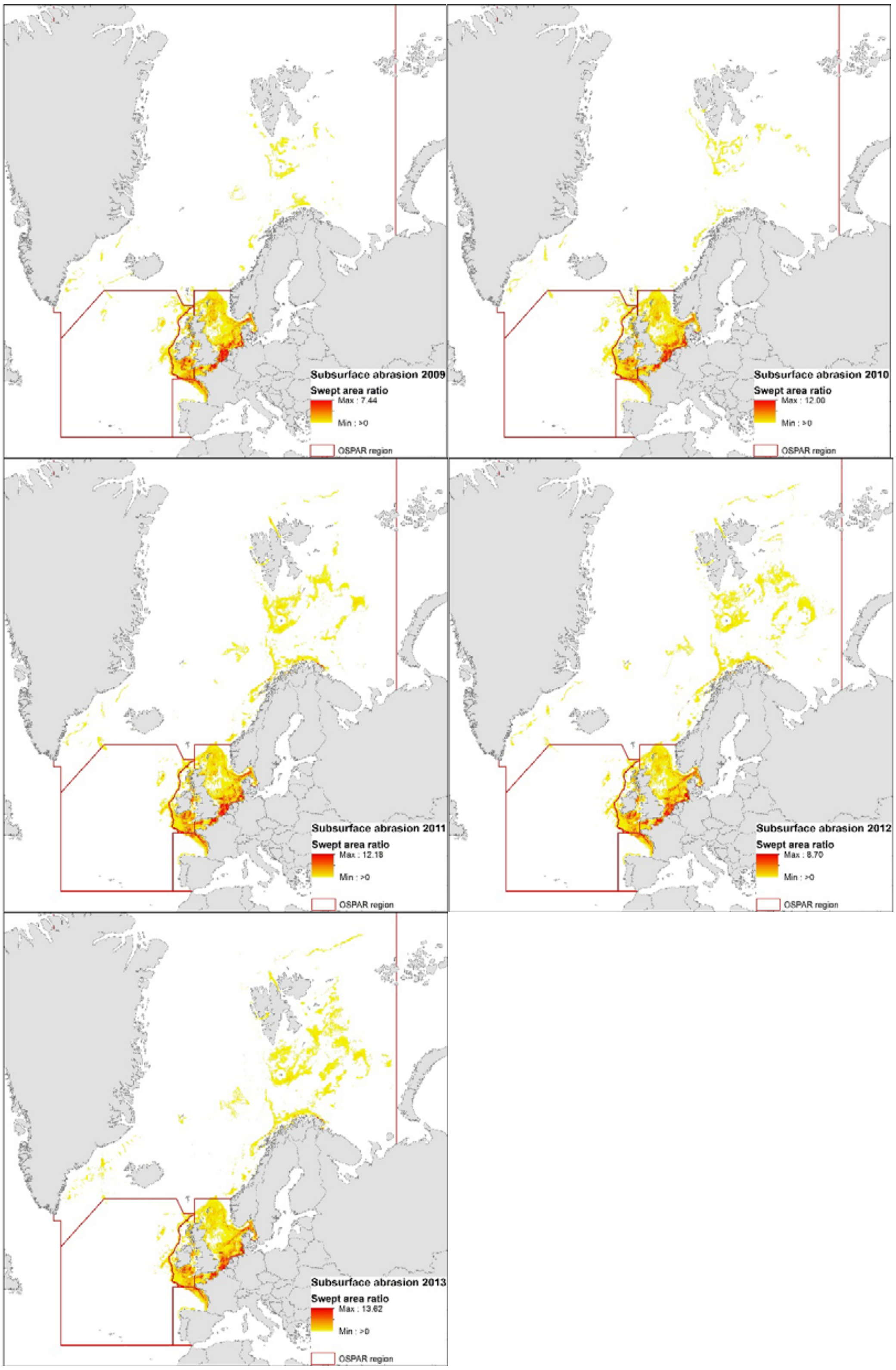
OSPAR VMS - surface intensity, 2009–2013 – OSPAR region



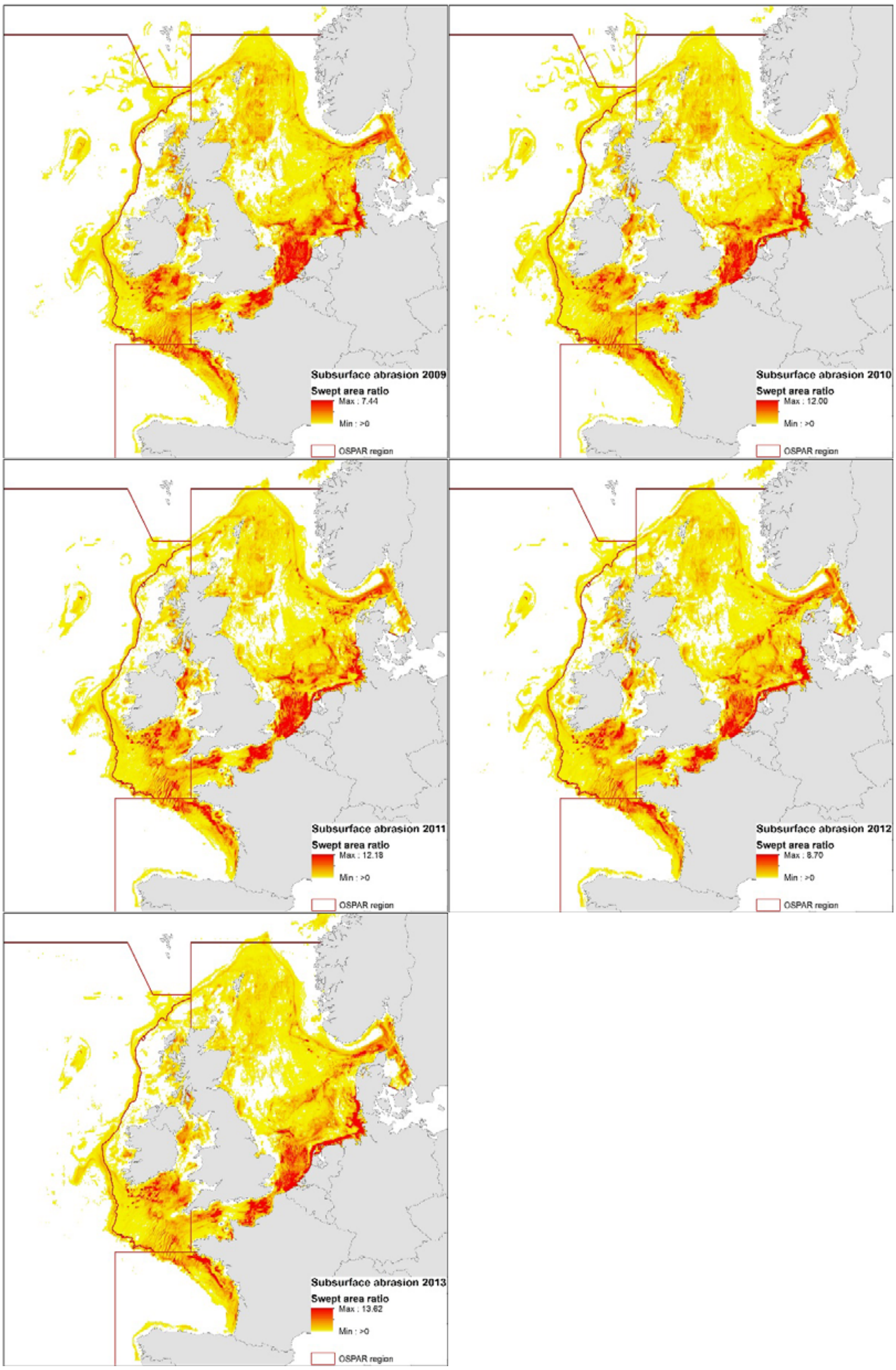
OSPAR VMS - surface intensity, 2009–2013 – zoom to area with most data



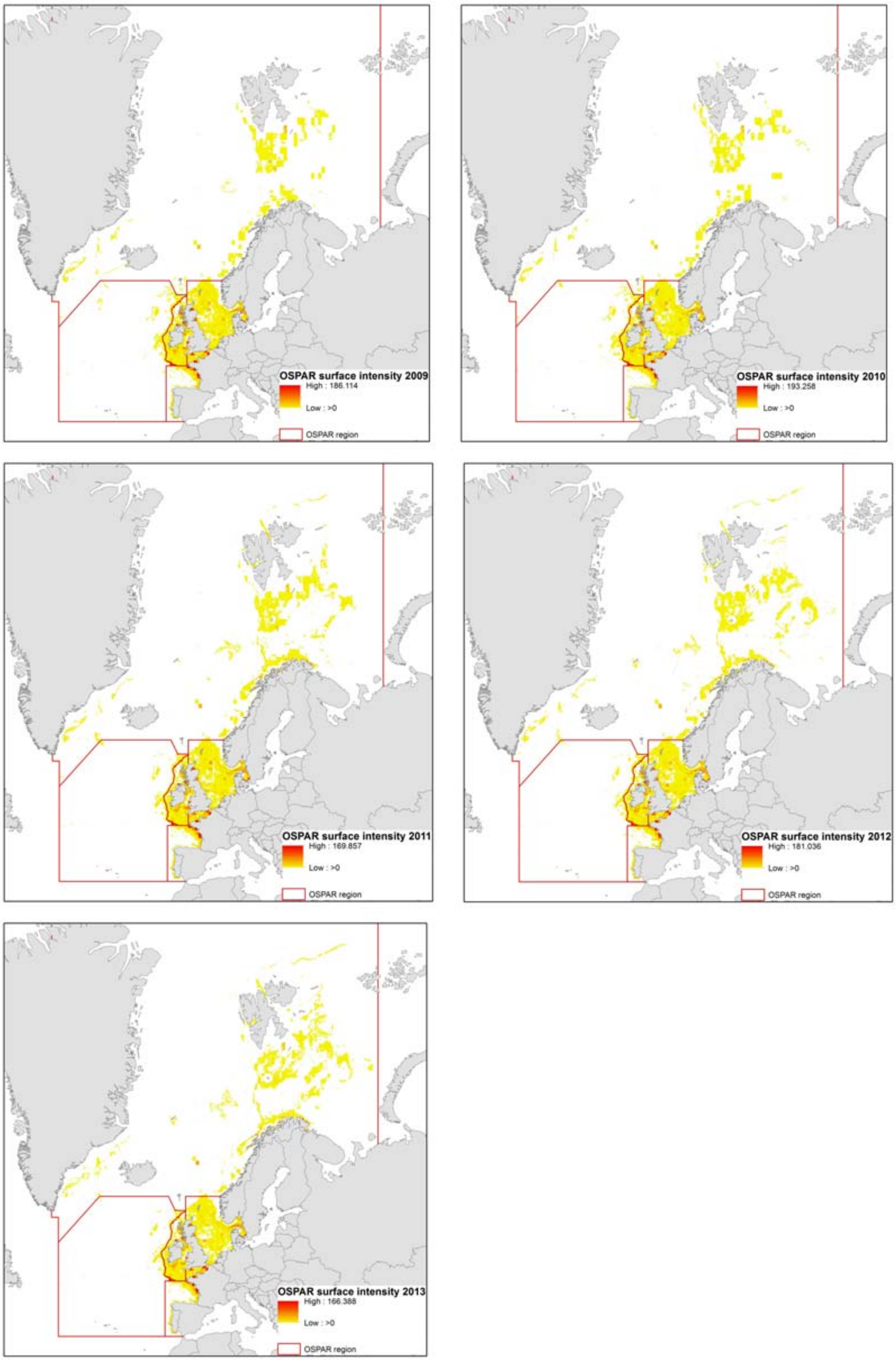
OSPAR VMS - sub-surface intensity, 2009–2013 – OSPAR region



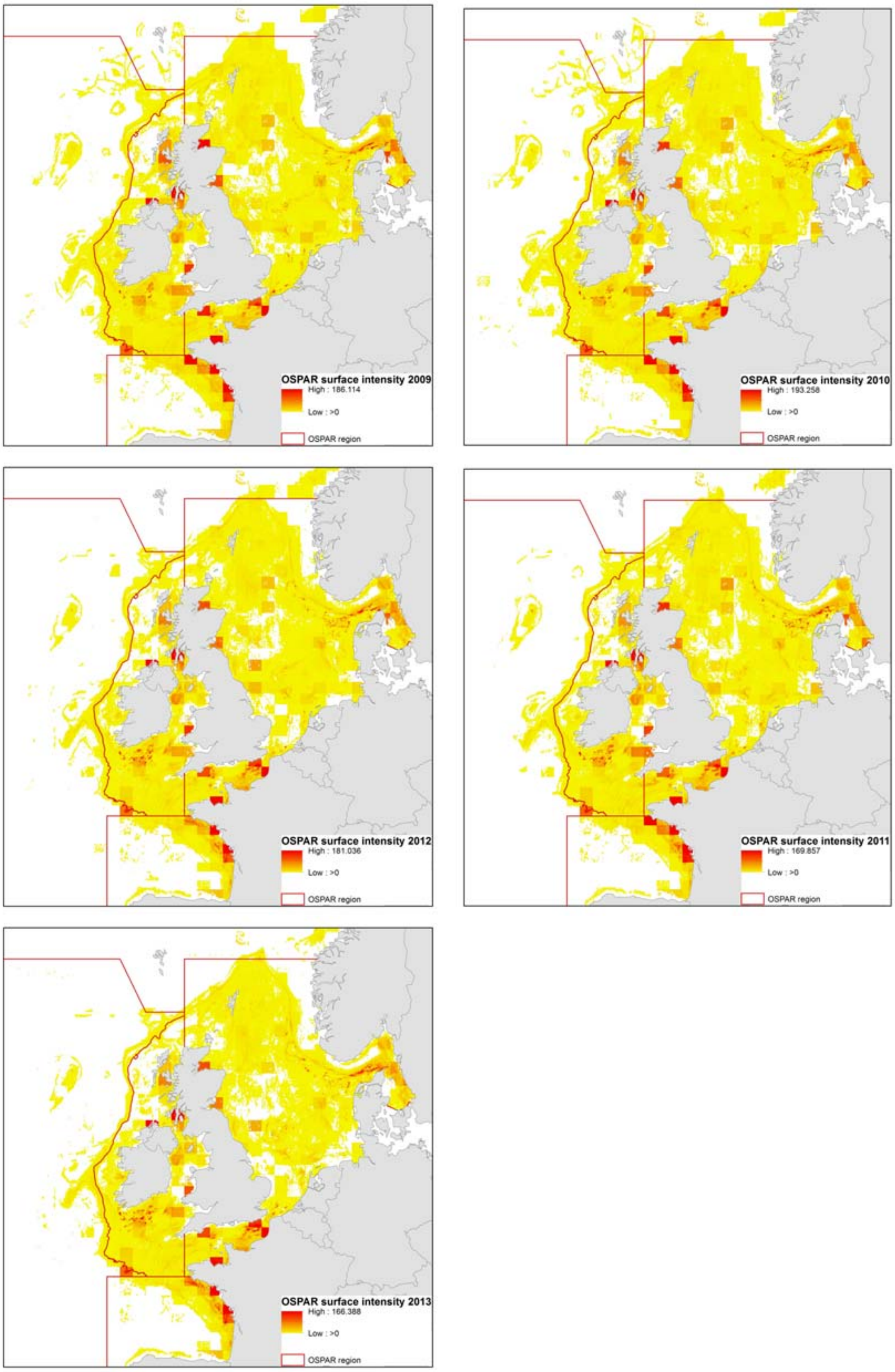
OSPAR VMS - sub-surface intensity, 2009–2013 – zoom to area with most data



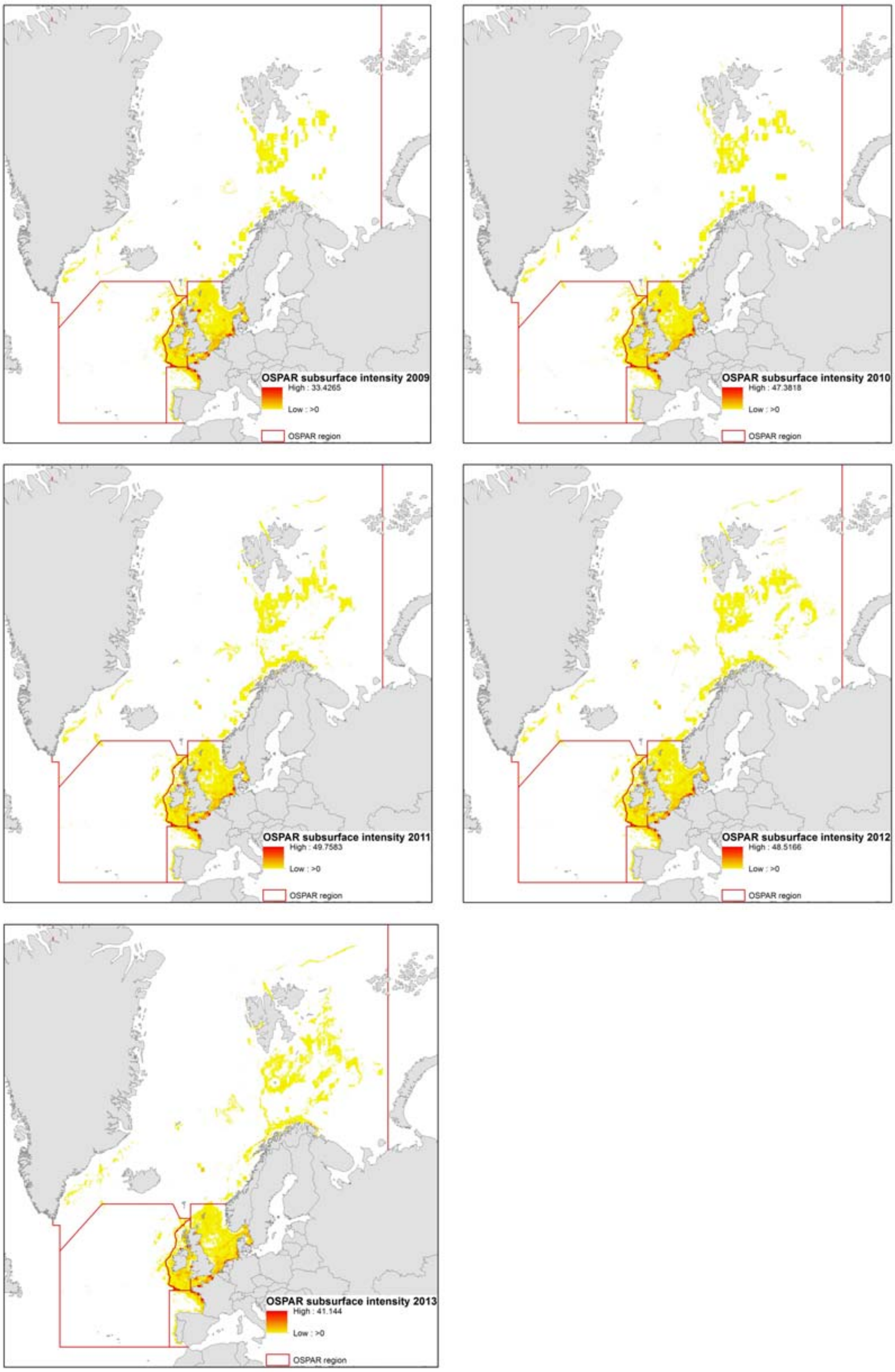
OSPAR Logbook + VMS - surface intensity, 2009–2013 – OSPAR region



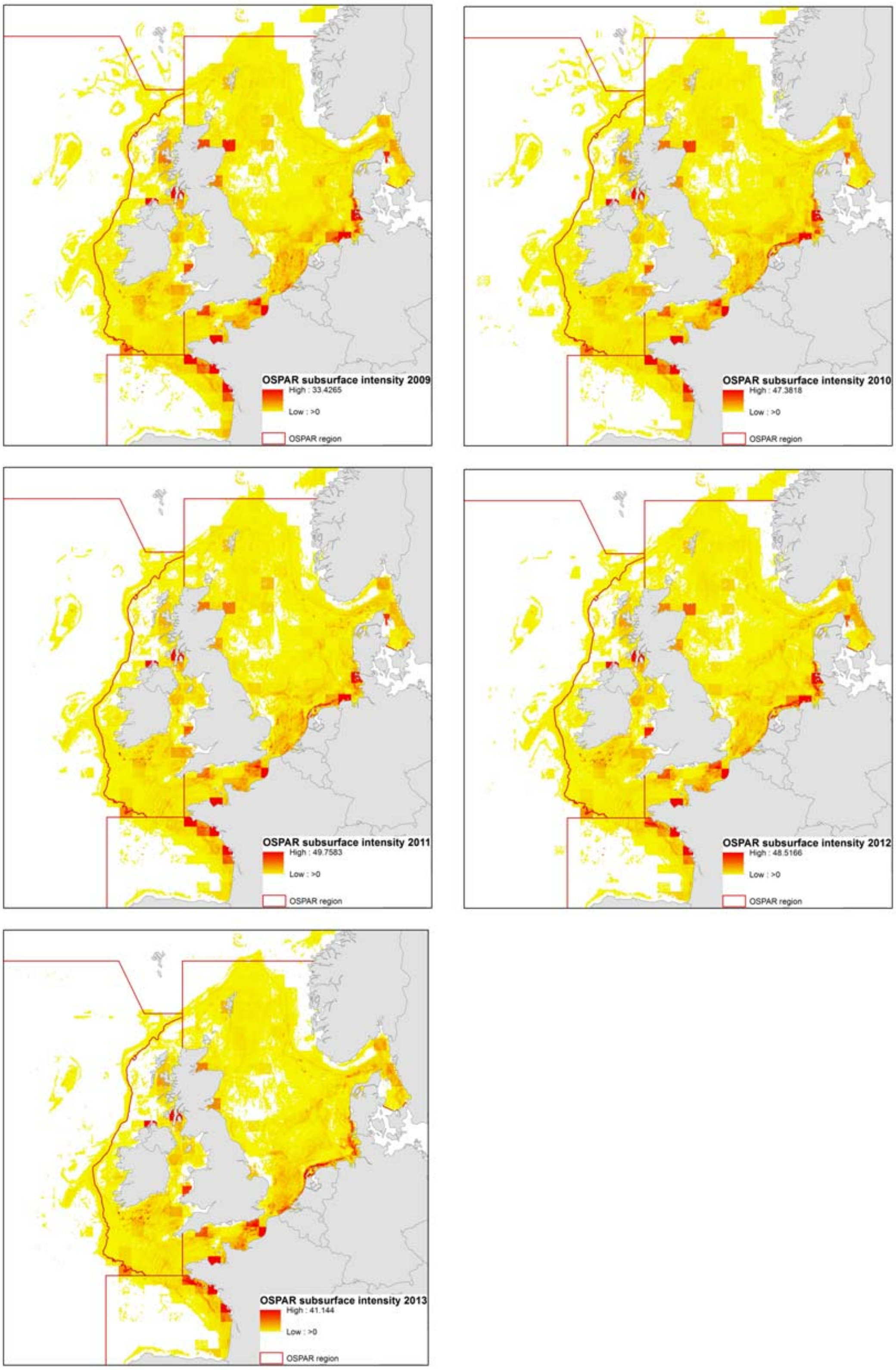
OSPAR Logbook + VMS - surface intensity, 2009–2013 – zoom to area with most data



OSPAR Logbook + VMS - sub-surface intensity, 2009–2013 – OSPAR region

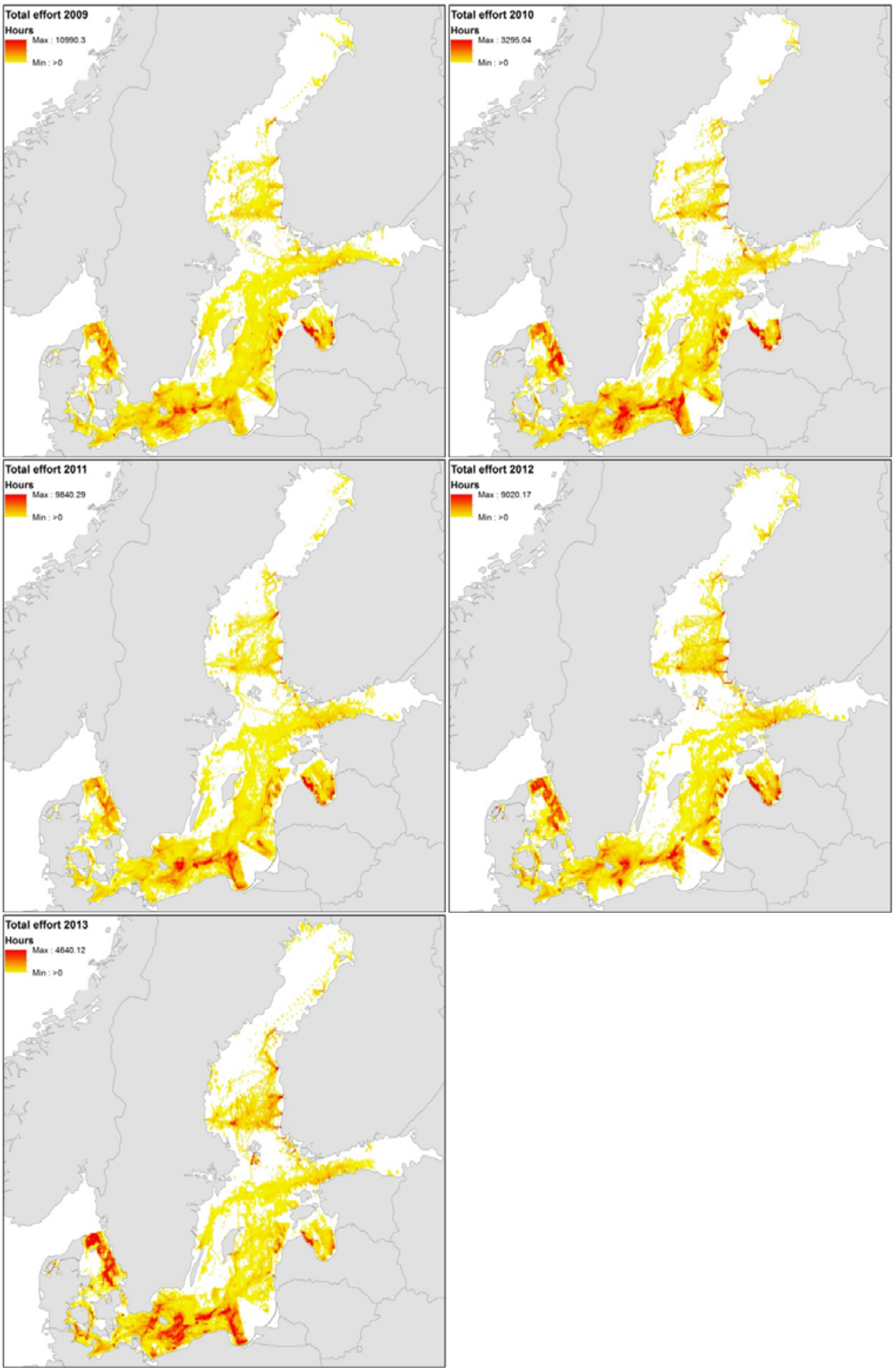


OSPAR Logbook + VMS - sub-surface intensity, 2009–2013 – zoom to area with most data

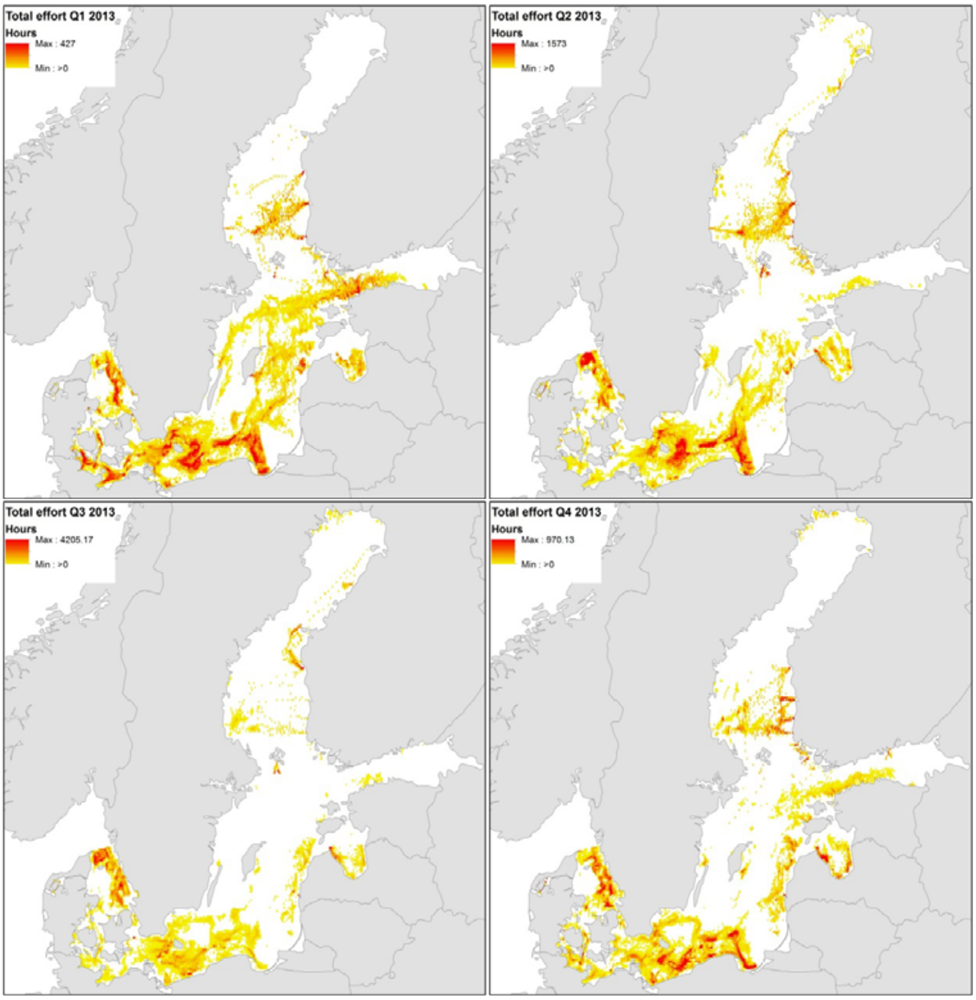


Annex 13: Maps produced in response to the HELCOM request

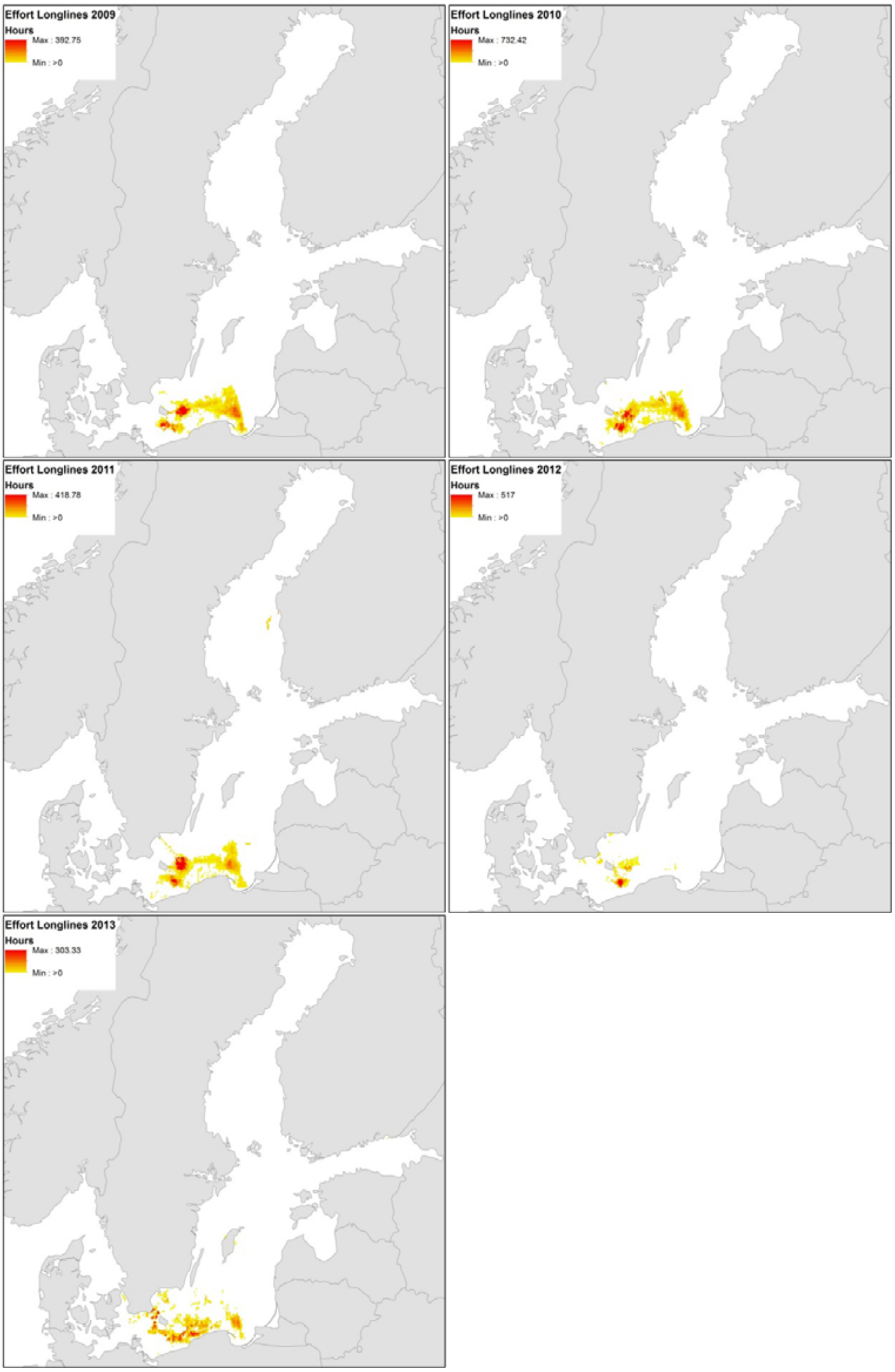
HELCOM total VMS effort (hours) for mobile bottom contact gear, midwater trawl and longlines 2009–2013



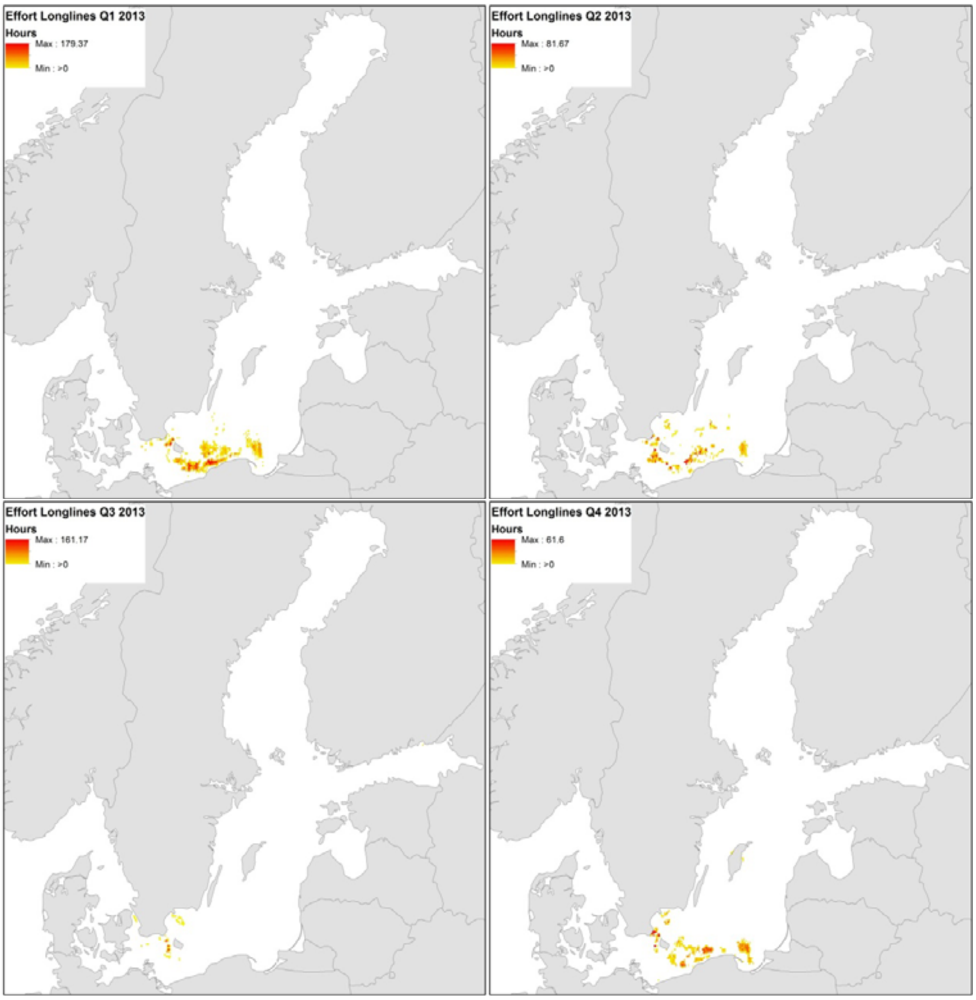
HELCOM total VMS - effort (hours) for mobile bottom contact gear, midwater trawl and longlines by quarter, 2013



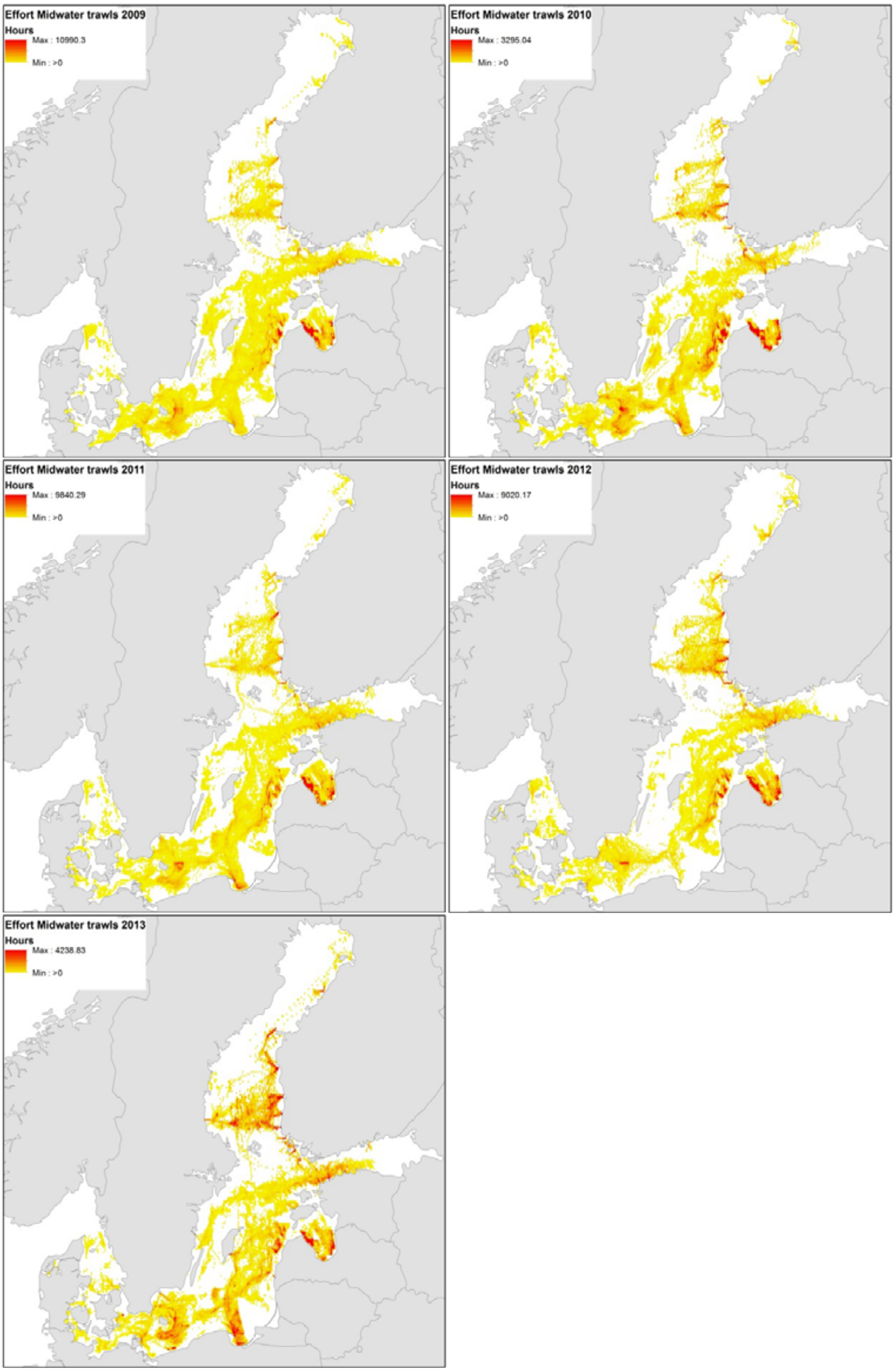
HELCOM VMS - effort (hours) for longlines, 2009–2013



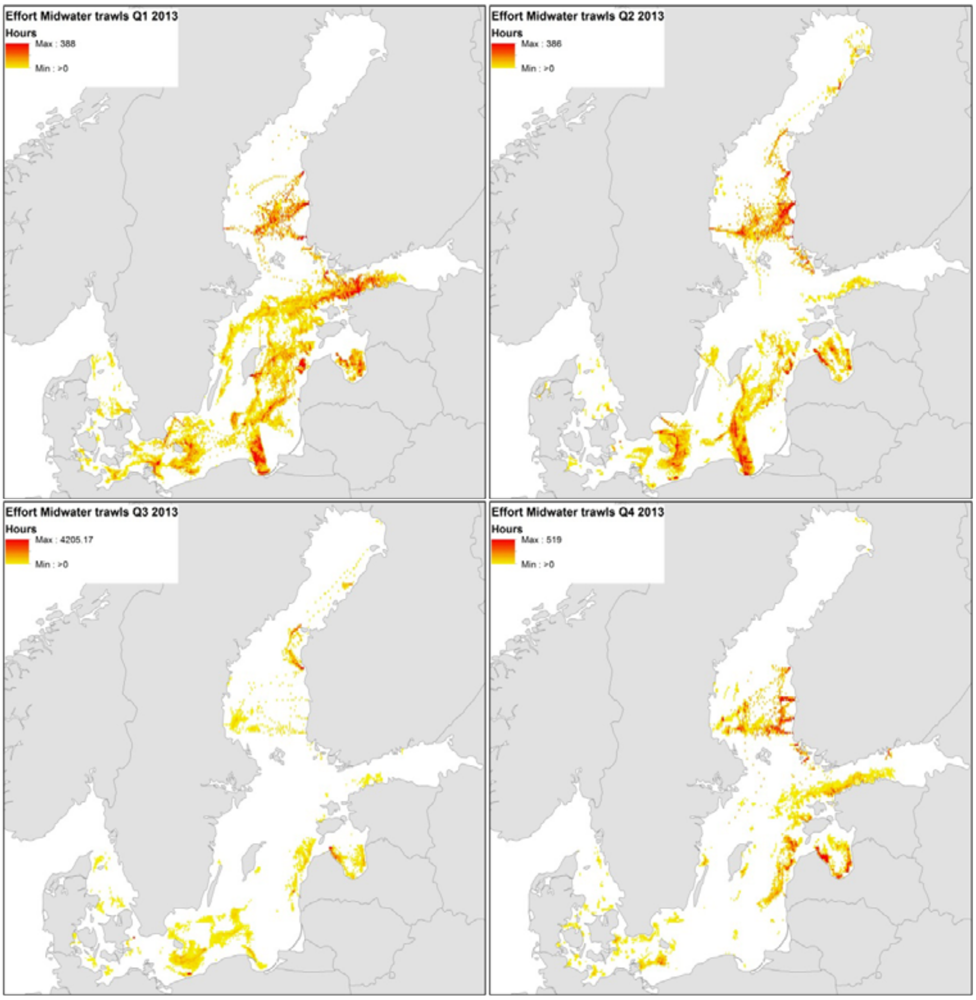
HELCOM VMS - effort (hours) for longlines by quarter, 2013



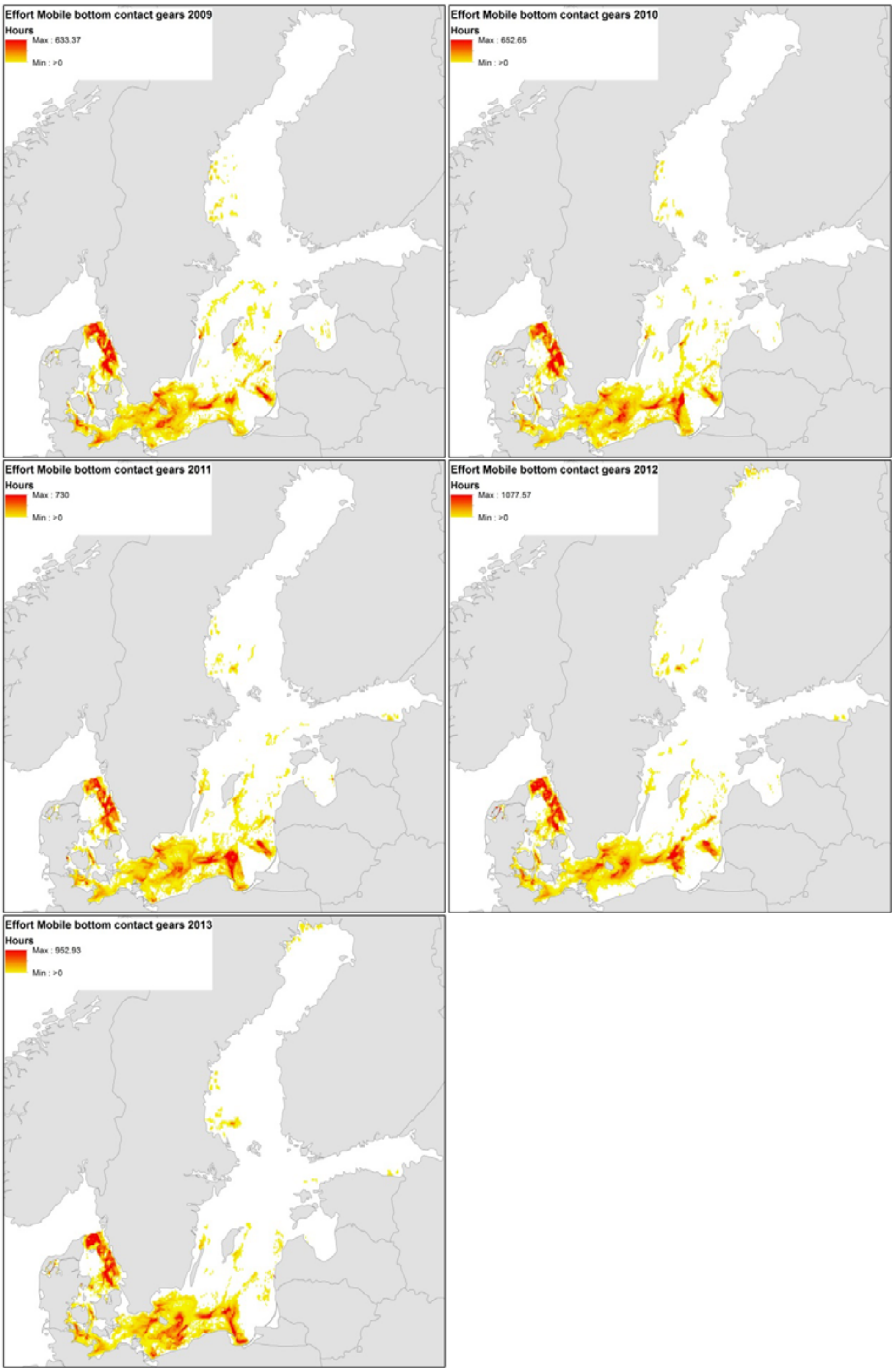
HELCOM VMS - effort (hours) for midwater trawls, 2009–2013



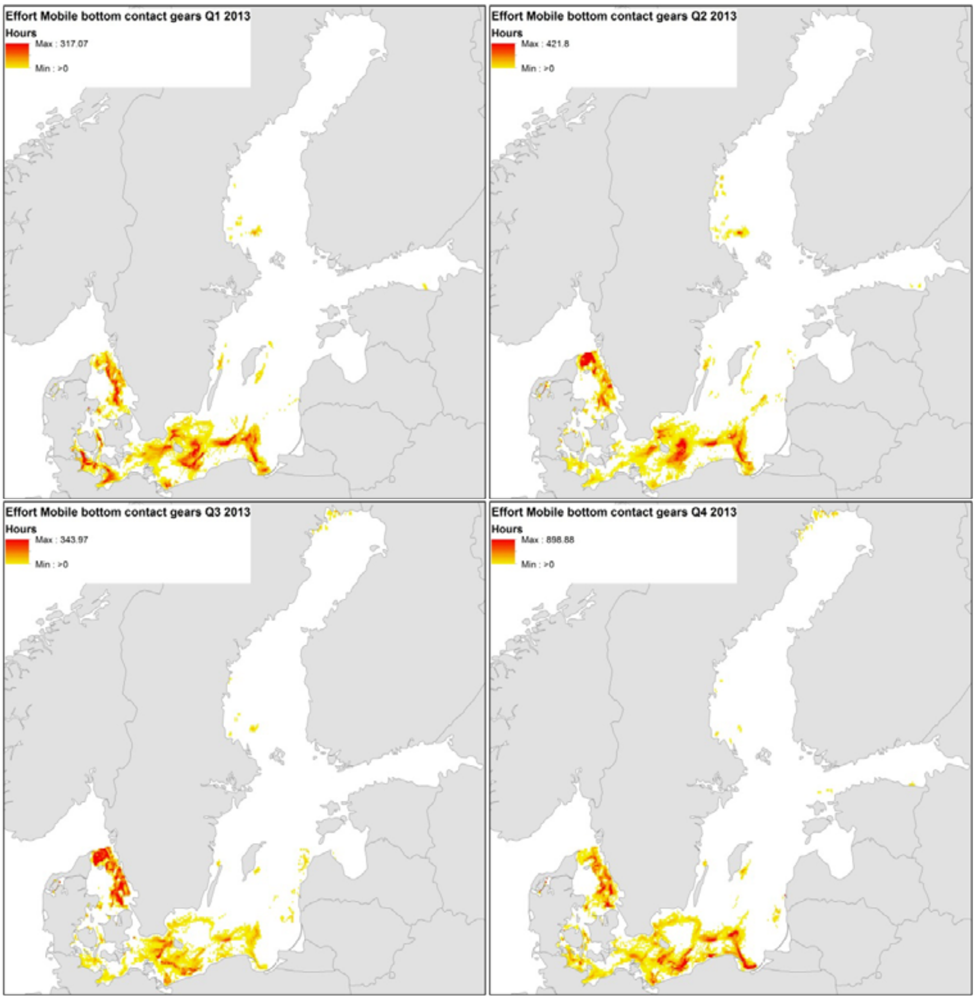
HELCOM VMS - effort (hours) for midwater trawls by quarter, 2013



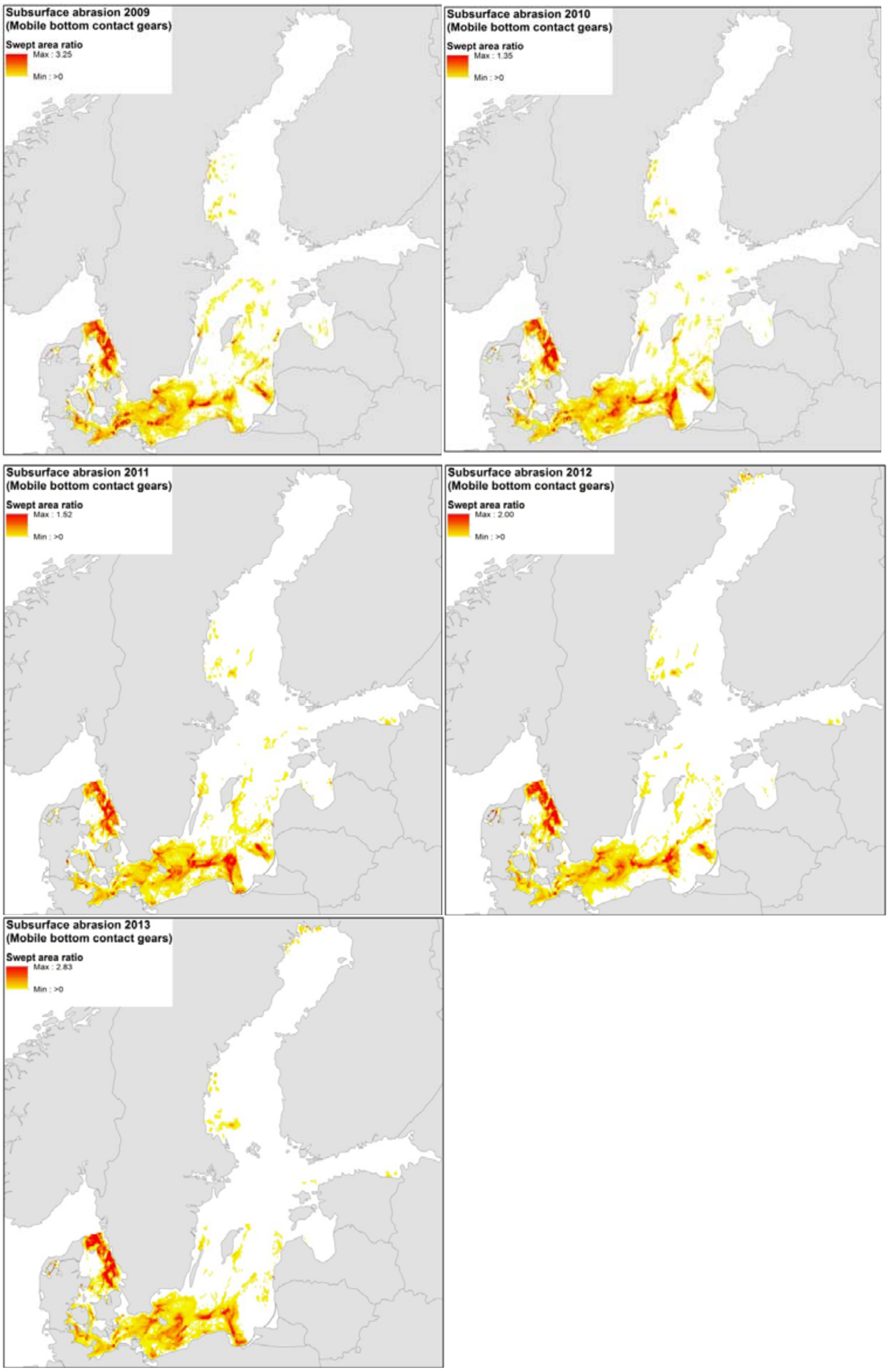
HELCOM VMS - effort (hours) for mobile bottom contact gears, 2009–2013



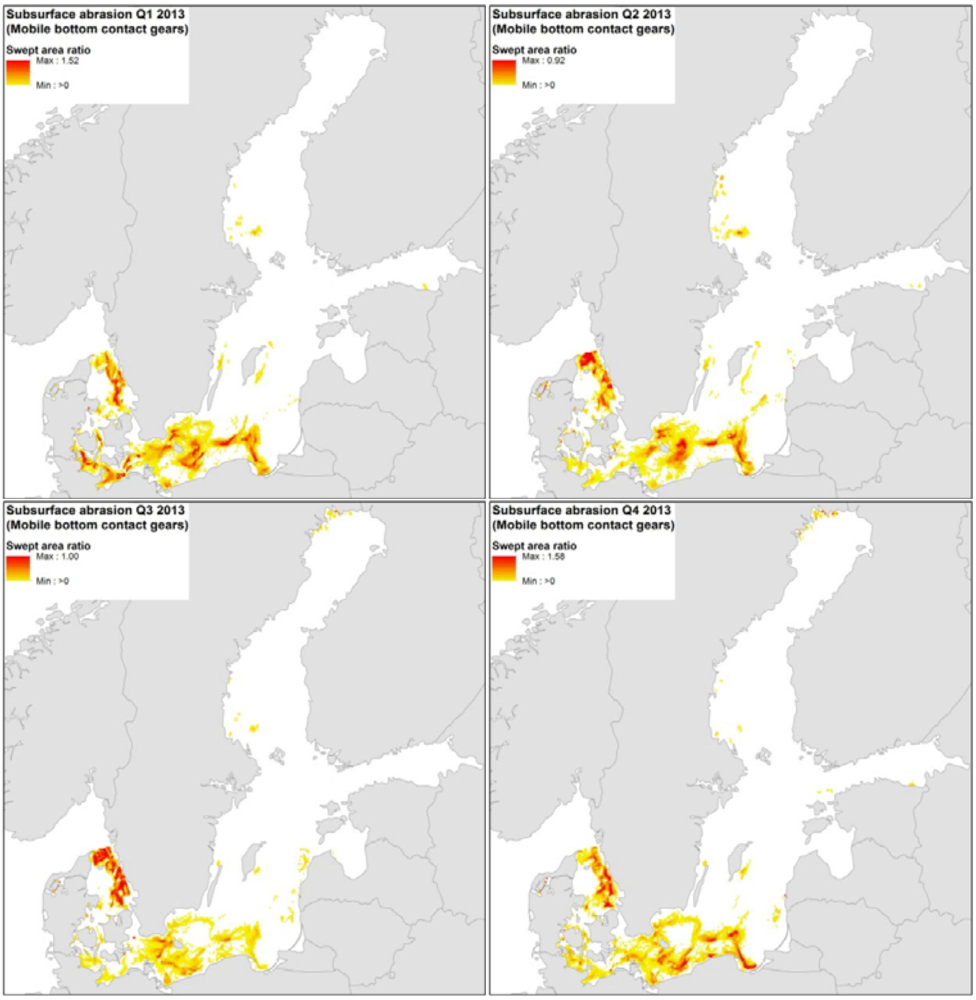
HELCOM VMS - effort (hours) for mobile bottom contact gears by quarter, 2013



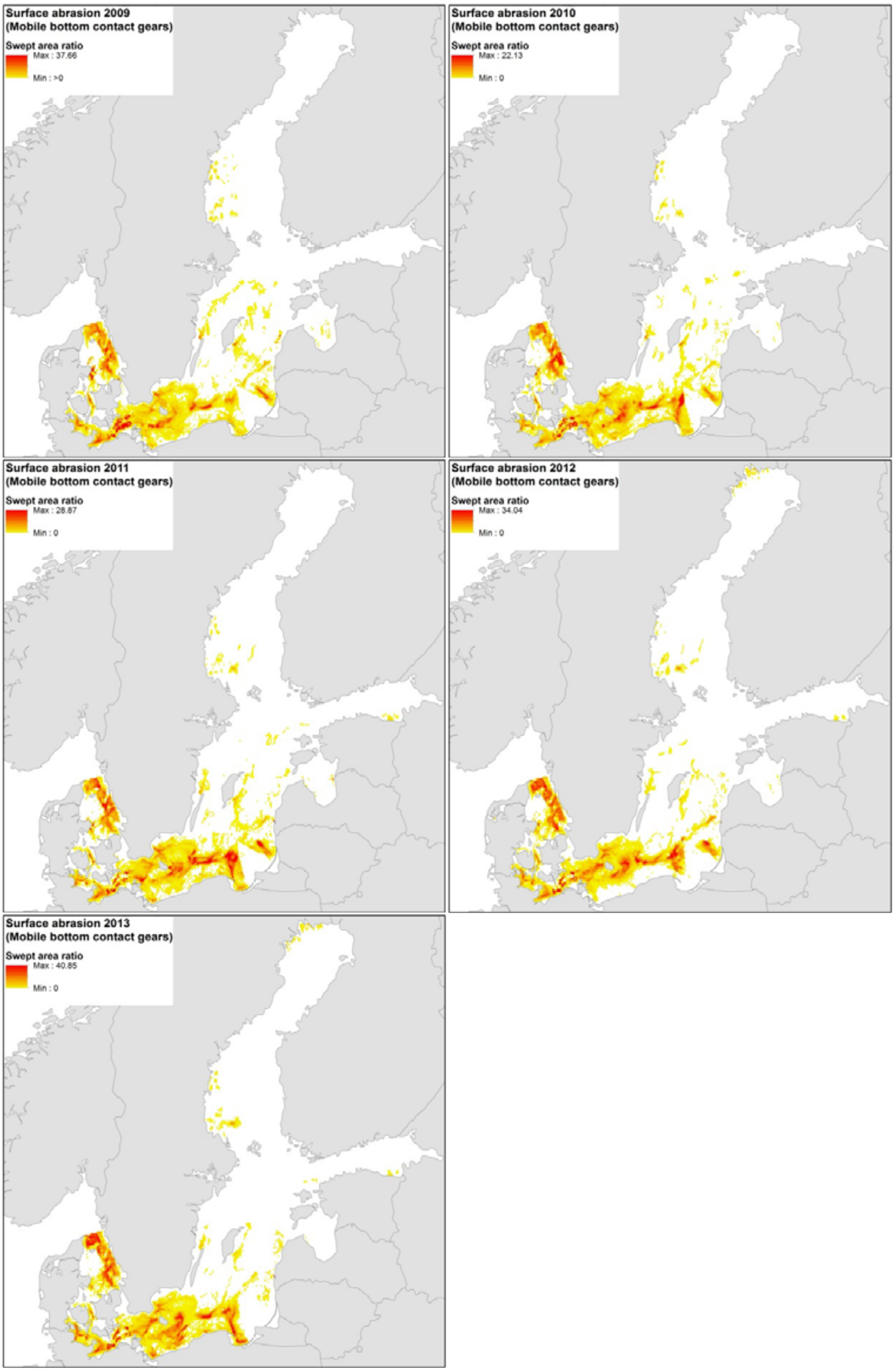
HELCOM VMS - sub-surface intensity, 2009–2013



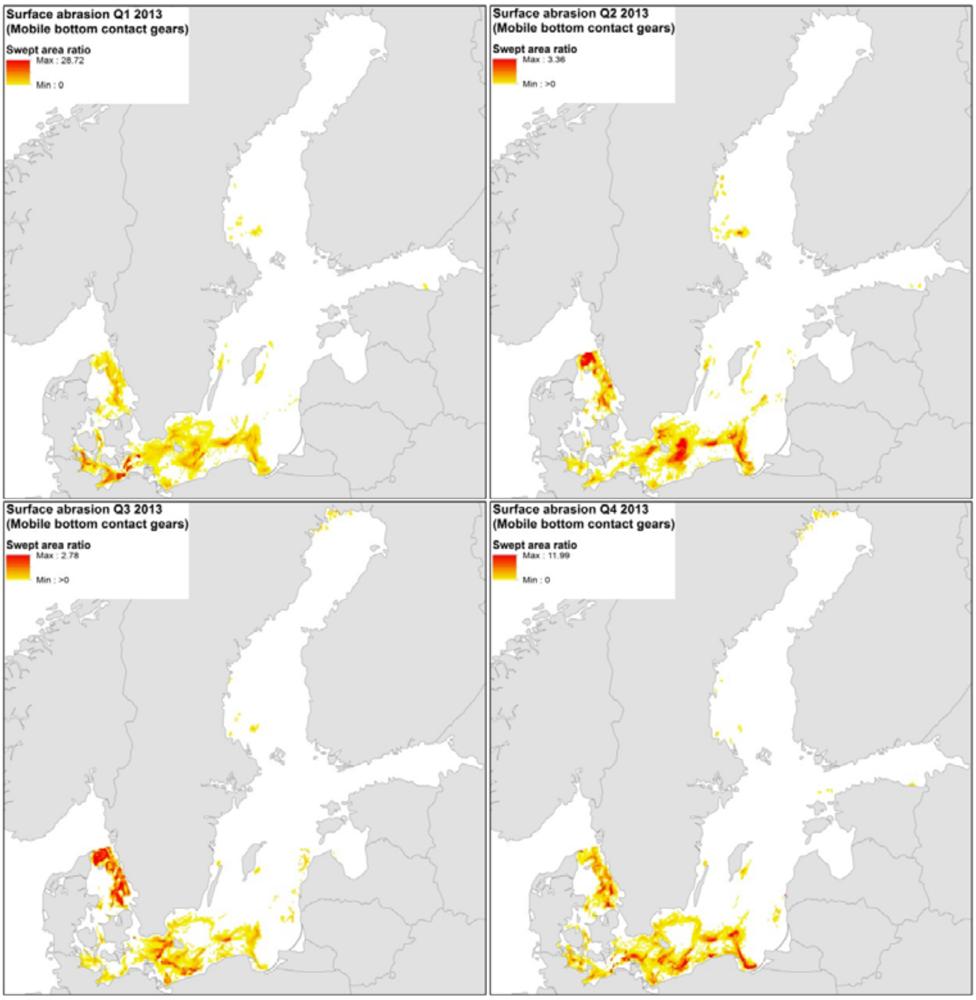
HELCOM VMS - sub-surface intensity, quarter 1–4 2013



HELCOM VMS - surface intensity, 2009–2013



HELCOM VMS - surface intensity, quarters 1–4 2013



Annex 14: Technical minutes from the RGBENTH

Review Group Technical Minutes

Review Group: Method development, operationalization and testing – indicators for benthic habitats (RGBENTH)

Reviewers: Koen Vanstaen (Chair)
Carolyn Lundquist
Gerjan Piet

Secretariat: Sebastian Valanko, Michala Ovens

Review period: 9 July – 3 August 2015

This review group worked by correspondence during the period indicated. Two teleconference meetings were held during the review – one on the 9th July 2015 to agree the approach to the review, request any additional documentation or clarification from the ICES Secretariat and assign tasks to the reviewers. A second meeting was held on the 20th July to discuss progress and preliminary conclusions, and ensure consistency in approach to the reviews and agree deadlines for completion.

Review introduction

The review group reviewed the reports provided by the working groups. WGSFD provided an extensive report (*WGSFD 2015 draft report.docx*) which addressed both OSPAR request a) and the HELCOM request. BEWG provided their entire meeting report (*BEWG 2015 draft report.odt*), with sections relevant to the OSPAR request found on pages 18–20 (request c), pages 31–33 and Annex 3 (request b). WGMHM produced a separate output relevant to OSPAR request b) (*WGMHM ToR E.doc*). Background documentation provided by ICES included: the OSPAR list of threatened and/or declining species and habitats (*OSPAR list species and habitats.doc*) and OSPAR BDC Collation of technical specifications for biodiversity indicators (*OSPAR_COBAM_indicators_03in01_technicalspecs.pdf*).

OSPAR REQUEST A: USING MOBILE BOTTOM CONTACTING GEAR DATA, PRODUCE FISHING ABRASION PRESSURE MAPS2 (2009–2013) USING THE BH3 APPROACH AS A FOLLOW-UP OF THE OSPAR REQUEST TO ICES (REQUEST 5/2014).

Introduction

The Marine Strategy Framework Directive (MSFD) aims to achieve Good Environmental Status (GES) across the EU's marine waters by 2020. A set of criteria and indicators were produced by the Commission to help Members States implement the Directive. Descriptor 6 of the MSFD is concerned with seafloor integrity, such that the functioning of marine ecosystems is maintained. One of the criteria for this descriptor is physical damage (6.1). OSPAR facilitates the coordinated implementation of the MSFD and as part of this work ensures compatibility and consistency in approaches between Member States.

As part of the coordination activity, OSPAR is overseeing the development of Benthic Habitat Indicator 3 (BH3): Physical damage of predominant and special habitats.

Request

OSPAR requested support from ICES in the development of common and candidate biodiversity indicators for benthic habitats. Specifically, the request was to: *Using mobile bottom contacting gear data, produce fishing abrasion pressure maps (2009–2013) using the BH3 approach as a follow-up of the OSPAR request to ICES (Request 5/2014). Fishing abrasion pressure maps should be analysed by gear distribution, and type, in the OSPAR maritime area and be based on the methodology propose on the physical damage indicator (BH3). Specifically ICES is requested to:*

i) collate relevant national VMS and logbook data;

ii) estimate the proportions of total fisheries represented by the data;

iii) using methods developed in Request 5/2014, where possible, collect other non-VMS data to cover other types of fisheries (e.g. fishing boats < 12m length);

iv) prepare maps for the OSPAR maritime area (including ABNJ) on the spatial and temporal intensity of fishing using mobile bottom contacting gears (BH3 approach).

The ICES Working Group on Spatial Fisheries Data (WGSFD) included this request in their Terms of Reference for their 2015 meeting. The meeting was held in June 2015 at the ICES Headquarters in Copenhagen, Denmark.

RGBENTH assessment of WG response

i) Collate relevant national VMS and logbook data

The ICES data call appears suitable to collate the relevant VMS and logbook data even though not all member states answered the call. Because of this only OSPAR areas II and III are adequately covered for the calculation of indicators/metrics. Further efforts should be made to resolve issues with or lacking data submissions by certain Member States. Where data were submitted in an incorrect format or were incomplete, assistance should be provided to resolve future issues. Where data were not provided, ICES and OSPAR or HELCOM should seek to ensure Member States provide the necessary data, as incomplete data only allow for incomplete assessments. Tables 4.2.1.1 and 4.2.1.2 swept area are useful for trends over time but the absolute values are dependent on the member states that delivered data.

The data checks appear adequate and caveats identified in 4.1.6 appear comprehensive. The revised data exchange format should allow an improved calculation of future metrics and maps. We recommend that an extra bullet point is added to section 4.1.6 that highlights the limitation of logbook data in this section, as the vessel under 10m overall length are not adequately captured by such data.

ii) Estimate the proportions of total fisheries represented by the data

As indicated in the report: Ideally this would be an estimate based on effort, but in the available data, the effort in the aggregated VMS data is reported as fishing hours and the effort in the aggregated logbook data is reported as fishing days, these two variables can't be compared directly. Landed weight is assumed to be a reasonable alternative of the datasets available to estimate the proportions. This assumption is however not validated or substantiated in the report, and should therefore be clearly listed as a limitation.

Building on the comment in section i) regarding the use of logbook data, it is recommended that the limitations on the percentages presented should be made clearer. The percentages mainly apply to vessels >15m and vessels between 10 and 15m. It may be beneficial for the report to mention somewhere the absolute values and relative proportions of registered fishing vessels by vessel length to put this into context.

Based on these limitations, the high percentages (>90%) of all bottom contact gears suggest that the data of those gears are sufficiently representative. Dredge gear was noted as an exception to this rule, with significantly lower percentages (~40–60%). The report would have benefitted from some discussion to validate this result.

iii) Cover other types of fisheries

The approach in 4.5.2 to superimpose logbook-based distributions of the fishing boats <12 m on top of the VMS-based distributions is probably the only possibility to address this issue using the data available to the WG. However, because you lose the small spatial scale (logbook data presented at ICES rectangle scale) this will result in a marked overestimation of impact when combining pressure and habitat sensitivity data in the BH3 methodology. In addition and as indicated, the method is very sensitive to the assumption of 24 hours fishing, which was shown for at least the Dutch fleet to be considerably less, i.e. closer to 17 hours (Piet *et al.*, 2007). We recommend that further work is therefore undertaken to inform a more appropriate duration before the results are used.

AIS also does not cover all the smaller vessels, so unless these smaller vessels are required to use VMS (preferably) or AIS, we just need to acknowledge that these small vessels cannot be included in the analysis. For each reporting area some estimate should be provided of the importance of these other fisheries based on e.g. effort or landed weight.

In the UK work has been undertaken in recent years to address the inshore fishing vessel gap. Breen *et al.* (2015) reported on an approach to address this issue. We recognize that this work was only recently published and that the WG may not have come across this work. The review group is also not aware whether the data used in this approach are available across the OSPAR area.

Using the data available we feel the WG has done the best possible. There is however an issue in relation to the data availability for smaller vessels which hampers these assessments.

iv) Prepare maps

The method shown in Figure 4.3.1.2.1 "Workflow for production of fishing effort and swept area maps from aggregated (c-square) VMS data" is appropriate and probably the best approach within the limitations discussed.

OSPAR REQUEST B: EVALUATE THE APPLICABILITY OF A REDUCED LIST OF HABITATS IN SUPPORT THE DEVELOPMENT OF TYPICAL SPECIES INDICATOR (BH1).

Introduction

The Marine Strategy Framework Directive (MSFD) aims to achieve Good Environmental Status (GES) across the EU's marine waters by 2020. A set of criteria and indicators were produced by the Commission to help Members States implement the Directive. Descriptor 1 of the MSFD is concerned with maintaining biological diversity, such that the quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions. One of the indicators for this descriptor (1.6.1) assesses the typical species composition based on presence of species in samples in all habitats across the region. The target would be to maintain the proportion of typical species within each habitat type, compared to reference conditions. OSPAR facilitates the coordinated implementation of the MSFD and as part of this work ensures compatibility and consistency in approaches between Member States. As part of the coordination activity, indicator 1.6.1 is also referred to as Benthic Habitat Indicator 1 (BH1).

Request

OSPAR requested support from ICES in the development of common and candidate biodiversity indicators for benthic habitats. Specifically, the request was to: *Evaluate the applicability of a reduced list of habitats in support the development of Typical Species indicator (BH1). This work should consider those habitats that have previously been identified by the COBAM Benthic experts group. Evaluation should consider data availability, and suggest possible prioritisation of habitats already included in the OSPAR list of threatened and declining habitats.*

Two ICES working group included this request in their Terms of Reference for their 2015 meeting: Benthos Ecology Working Group (BEWG) and the Working Group on Marine Habitat Mapping (WGMHM). Both working groups held their meetings in May 2015 in Calvi, France, and Reykjavik, Iceland, respectively.

Summary of WG reports

WGMHM reviewed the OSPAR list and provided brief comments in their report. WGMHM was unclear on reasons why "special habitats" had been proposed. WGMHM also commented on the inclusion of generic habitats which are made up of several EUNIS habitats. The WGMHM suggests that a generic habitat will be "problematic" for indicator use, as their typical species composition will show large variation. Generic habitats include: coral gardens, seapen and burrowing megafauna and deep sea sponge aggregations. There was no prioritization beyond this recommendation, but prioritization criteria were suggested.

BEWG benefitted from representation by members who have been heavily involved in the OSPAR indicator development work for benthic habitats (incl. BH1). The group reviewed available lists (OSPAR & COBAM). The group prioritized the habitats based on 5 criteria, but the prioritization was incomplete due to a lack of experts for certain habitats. The report suggested that this would be completed intersessionally, but no clarity on timelines was provided.

RGBENTH assessment of WG response

Both working groups provided incomplete responses to the advice request. This is likely due to a lack of clarity in the advice request and/or background documentation, as well as lack of expertise within the working group (BEWG).

- *Lack of clarity*

  The WGMHM commented on the lack of clarity why "special" habitats had been proposed for consideration under BH1 instead of "predominant" habitats.

  The Review Group agrees that background information was very limited in relation to BH1 and mainly included decision statements, without reasoning.

- *Lack of expertise*

  The BEWG reported that their prioritization was incomplete due to a lack of expertise in relation to rocky habitats. This meant that the prioritized list presented was incomplete and can therefore not be considered in drafting advice as it stands.

BEWG developed a list of 5 criteria to prioritise habitats. Criteria 2 (*Specific expertise represented in BEWG*) was not deemed appropriate by the Review Group, as expertise should be brought to the WG, instead of habitats being excluded from prioritization. The criteria used should be unambiguous and it was felt that some of the criteria in the report failed this test and should be improved.

WGMHM developed a list of 11 criteria to allow prioritization of habitats. The list was considered complementary to the BEWG criteria. The list is comprehensive and the Review Group generally agrees with the criteria proposed. It is probable that some of the criteria were already taken into account during the development of the BH1 Indicator and the resulting recommendation to focus on special habitats. Therefore, some criteria may be excluded to reduce the task associated with prioritization. Other criteria could be combined as they are closely related (e.g. 3 and 11).

WGMHM did not undertake any prioritization of habitats based on the criteria proposed. Three habitats were considered "problematic", namely: coral gardens, seapen and burrowing megafauna, and deep sea sponge aggregations. Full prioritization would have been useful based on the expertise within the WG.

Using their five criteria, BEWG shortlisted 6 habitats. Two of these habitats (seapen and burrowing megafauna; deep sea sponge aggregations) were included in the BEWG list, but were considered low priority by the WGMHM due to their geographic variations in typical species composition.

RGBENTH recommendations

- To make best use of the working groups' time, it is recommended that any requests are accompanied by fully documented background information. Different terminology was used in the different documentation ("OSPAR T&D habitats; special habitats; reduced list of habitats) which caused confusion.
- ICES and its WGs should ensure the necessary expertise is available to respond to the advice requests. Consideration should be given to working group working together on advice requests as opposed to splitting requests by area of expertise or duplicating effort.
- Of the two prioritization approaches proposed, the criteria proposed by the WGMHM are recommended with minor modifications. The prioritization will need to be undertaken at the ADG meeting, as no appropriate prioritization was presented in the WG reports.
- Prioritisation may benefit from being undertaken at EUNIS Level 5 instead of the higher OSPAR definition levels. Although this will result in a higher number of habitats requiring review, it is likely a large number will receive low prioritization due to not meeting the wide geographic distribution criteria.
- Prioritisation of EUNIS habitats with already defined characteristic species lists could be considered initially, as this would negate the initial task of developing species lists for each habitat.
- Further consideration should be given to the predominant habitats to ensure none of these habitats would be more suitable than the special habitats considered.
- Based on the recommendations above, a prioritized list may look like the list below and should be finalized by ADGBENTH.

DESCRIPTION	OSPAR Regions where the habitat occurs	Prioritised (Y/N)
HABITATS		
Carbonate mounds	**I, V**	**Y**
Coral Gardens	**I, II, III, IV, V**	**N[1]**
Cymodocea meadows	**IV**	**N[2]**
Deep-sea sponge aggregations	**I, III, IV, V**	**N[1]**
Intertidal *Mytilus edulis* beds on mixed and sandy sediments	**II, III**	**Y**
Intertidal mudflats	**I, II, III, IV**	**Y**
Littoral chalk communities	**II**	**N[2]**
Lophelia pertusa reefs	**All**	**Y**
Maerl beds	**All**	**Y**
Modiolus modiolus beds	**All**	**Y**
Oceanic ridges with hydrothermal vents/fields	**I, V**	**N[3]**
Ostrea edulis beds	**II, III, IV**	**Y**
Sabellaria spinulosa reefs	**All**	**Y**
Seamounts	**I, IV, V**	**Y**
Sea-pen and burrowing megafauna communities	**I, II, III, IV**	**N[1]**
Zostera beds	**I, II, III, IV**	**Y**

1: Definition too broad, significant geographic variation expected.
2: Limited geographic distribution across OSPAR area.
3: Unlikely to be subject to human induced pressure.

OSPAR REQUEST C: EVALUATE MONITORING AND ASSESSMENT REQUIREMENTS FOR MULTIMETRIC INDICATOR (BH2) AND/OR TYPICAL SPECIES (BH1).

Introduction

The Marine Strategy Framework Directive (MSFD) aims to achieve Good Environmental Status (GES) across the EU’s marine waters by 2020. A set of criteria and indicators were produced by the Commission to help Members States implement the Directive. Descriptor 1 of the MSFD is concerned with maintaining biological diversity, such that the quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions. Descriptor 6 of the MSFD is concerned with seafloor integrity, such that the functioning of marine ecosystems is maintained. OSPAR facilitates the coordinated implementation of the MSFD and as part of this work ensures compatibility and consistency in approaches between Member States. As part of the coordination activity, OSPAR is overseeing the development of Benthic Habitat Indicator 2 (BH2): Multi-metric indices.

A multi-metric index (MMI) (BH2) indicator of quality of benthic habitat communities was endorsed by COBAM, BDC (February 2013) and OSPAR (June 2013) as one of the common indicators for OSPAR subregions II, III and IV [ICG-COBAM(1) 14/4/3 Add. 2]. This MMI indicator is explicit in the indicator 6.2.2 of the Commission Decision on GES (2010/477/UE) and partly implicit in the indicators 1.6.1, 1.6.2 and 6.2.1. Further development and validation across regional benthic communities and habitat types is required for the MMI indicator to be generally suitable for MSFD/OSPAR. This indicator should be sensitive to both a variety of pressure types, and to a pressure gradient, and should be applicable to intertidal, shallow and shelf benthic habitats, including both special and dominant habitat types at EUNIS level 4 or 5 biological community classification levels.

The BH1 indicator (ICG-COBAM(3) 13/4/1 Add. 14-E) refers to typical species composition, which requires complete species inventories of all habitats including current and historical (pre-disturbance) species composition. Typical species are a selected subset that have one of the following qualities: structure or functional species; indicator of habitat quality; sensitive to habitat condition; or are long-lived or have low fecundity. Typical species are analysed using frequency or density, or IndVAL or SIMPER statistics, with typical analyses being of changes in pressure, density or biomass with changing pressure.

Multiple indicators have been used previously in the OSPAR region, and two MMI formulations were proposed. The first consisted of three ecological parameters of species richness, species diversity (Shannon) and a third, the proportion of sensitive, tolerant and opportunistic species using the Infaunal Trophic Index (ITI) or the AMBI index, as a proxy for disturbance. A second proposed approach would incorporate both ecological and pressure data with sampling occurring along a pressure gradient concurrent with sampling of paired nearby reference un-impacted locations. Data from monitoring programmes would initially be used to determine and refine indicators and to standardize data requirement to calculate these indicators across different benthic habitats and pressure types.

Request

OSPAR requested support from ICES in the development of common and candidate biodiversity indicators for benthic habitats. Specifically, the request was to: *Evaluate monitoring and assessment requirements for multimetric indicator (BH2)2 and/or typical species (BH1)2, by providing:*

i) overview of existing monitoring programmes with associated benthic sampling stations (e.g. WFD, MPA, Natura2000, impact assessment studies, etc.), taking into account the work done under the JMP project/art 11 reporting by countries.

ii) overview of existing network of sampling stations and monitoring frequency across all OSPAR regions.

iii) evaluation of on-going monitoring with regard to, geographical coverage, parameters consistently measured across the whole network, monitoring design and sampling strategy for *assessment requirements (BH2/BH1). Evaluation should identify any gaps and indicate how they could be completed (monitoring sampling strategy and/or methods).*

The ICES Benthos Ecology Working Group (BEWG) included this request in their Terms of Reference for their 2015 meeting. BEWG held their meeting in May 2015 in Calvi, France.

RGBENTH assessment of WG response

Monitoring a network of EUNIS habitats using BH2 indicators was previously proposed within the main OSPAR regions, complementing BHI monitoring with focus on habitat x pressure paired sampling locations across different pressure types. Monitoring was proposed (p96, BDC 15/3/Info.1-E) as networks of monitoring stations at three nested scales: sub-regional; national; and finer scale adopted to local pressure and habitat types. Sampling methodologies should be determined based on standardized methods (e.g., ISO 2011 for soft sediment benthic macrofauna). For deeper waters, monitoring by bioregion using EUNIS 3 habitat classifications was suggested, whereas higher resolution EUNIS 4 was suggested for the coastal zone, with standardized box cores sieved on a 1 mm mesh (BDC 15/3/Info.1-E).

The BEWG provides limited information in reference to OSPAR Request C (primarily p 17–20). We note that within the ToR listed in the 2015 BEWG report, only part of Request C is listed (overview of existing monitoring programmes; their ToR F) and reference is made to discussions at the meeting with the Benthic Habitat WG chair to focus in this year on insights for MMI monitoring (p19). The JMP is summarized in the BEWG report for the North Sea and Celtic Sea. The JMP project has produced a metadata catalogue and also provided a weblink to other technical reports. Links with conference presentations from a joint conference with BALSAM and IRIS_SEAS are also provided, though no summary of information within these links is provided. Many of the weblinks provided were not accessible and would therefore have benefited from being summarized in the report. A second abstract in the BEWG report summarized recommendations from a North Sea benthos long-term dataset and suggested stratified sampling across habitats and a North Sea wide minimum benthic sampling design. One map (North Sea) was provided, detailing apparent 'optimal sampling allocation'. Details of spatial allocations (e.g. depth, substrate, habitat type) were not provided and the weblink to access additional information on the spatial allocation process did not lead to the final report. It is suggested that spatial allocation (Figure 1, p20) is based on the size of strata and benthic community variability, though without more detailed information, visual interpretation of this map suggests monitoring gaps in some regions (Ger2, NL2, NL3) with some large strata having few monitoring points, and unclear justification as to whether this low sampling effort is due to low variability in benthic community composition.

The JMP catalogue appears to include all EU member states, and at least North Sea and Celtic Sea benthic monitoring. Information from the JMP catalogue is not summarized in the BEWG report, which would have been a useful response to OSPAR request c), including information on the number of stations in each region and strata, the geographic extent of monitoring stations, the EUNIS habitats covered by monitoring, and the frequency of monitoring. It appears that at least part of this information exists in the JMP catalogue, and ICES should suggest further detail in the database to provide additional missing information to allow evaluation of the OSPAR benthic monitoring network. The brief information recommended sampling to evaluate MMI indicators could be achieved using constituent variables, though these were not defined.

No information was provided with respect to monitoring frequency (c/ii) or beyond the North Sea. No information was provided with respect to geographical coverage, parameters consistently measured across the whole network, monitoring design and sampling strategy, or identified gaps (c/iii).

RGBENTH Recommendations

In summary, the request for information from BEWG on benthic monitoring was incomplete and primarily refers to reports, metadata catalogues and technical documents. Inadequate summary information from these documents was presented in the BEWG report or advice derived for it in response to the request. Only limited descriptions of information related to the ToR were provided, making it challenging to assess whether the OSPAR specific request 2015/4 has been responded to.

To adequately assess this request, summary statistics of JMP benthic monitoring should be provided, including: recommended number and location (by spatial allocation method suggested) and actual monitoring stations to determine gaps in monitoring, and for monitoring effort to be allocated and evaluated by strata, size of strata, and EUNIS habitat type. Frequency of monitoring should be summarised, as well as which constituent variables are collected in order to determine the subset of proposed MMI indicators that can be evaluated across the OSPAR region.

On p19 of the BEWG report a recommendation to ICES to compile information and prepare a heat map of MMI related monitoring activities for the North and Celtic Seas (and ideally beyond) is proposed. The review group felt that this recommendation overlaps with the current request and that it would have been useful if BEWG could have undertaken this work in response to the current request.

Reasons for the incomplete response to the existing request are unclear. The structure from the BEWG report suggests that the ToR was dealt with by inviting related presentations, which may have taken the focus away from the request. Dealing with the request only may provide a more focused response. Without compilation of existing information on monitoring, gaps cannot be identified, and if sampling parameters are inconsistent, MMI indicators are unlikely to be compared across the region. It is possible that this request will be actioned further in subsequent years, as item ii) and iii) of OSPAR request c) were not included in this year's BEWG Terms of Reference.

HELCOM REQUEST: PRESSURES FROM FISHING ACTIVITY (BASED ON VMS/LOGBOOK DATA) IN THE HELCOM AREA RELATING TO BOTH SEAFLOOR INTEGRITY AND MANAGEMENT OF HELCOM

Request

HELCOM requested support from ICES to assess pressure from fishing activity in the HELCOM area relating to seafloor integrity and management of HELCOM MPAs. Specifically, the request was to:

a) Produce maps and shape-files of fishing intensity for the HELCOM area based on a 0.05 x 0.05 c-square degree grid. The maps should consist of a set of the polygonal feature classes and be submitted in the ESRI shape file format. Polygons should indicate the areas with equal fishing intensity measured in hours per year or per season being classified in the way harmonised with similar maps produced for the OSPAR region when applicable.

b) The maps and shape files of fishing intensity should be calculated for bottom contact gear and mid-water trawl and longline for every year in the period from 2009 to 2013 and for each quarter of 2013. In particular the following maps should be produced:

i) intensity of fishing by each fishing activity for each year in the period from 2009 to 2013;

ii) total intensity for each year in the period from 2009 to 2013;

iii) total intensity and by each fishing activity by quarter in 2013.

c) Where available and possible, provide information on fishing intensity for bottom contact gear and mid-water trawl and longline in the 174 official HELCOM MPAs in whole 2013 and first quarter 2013. The information should be provided in the forms listed in paragraph a) of the current request. Information on overall fishing effort should also be provided.

d) Estimate the proportion of total fisheries represented by the data.

The ICES Working Group on Spatial Fisheries Data (WGSFD) included this request in their Terms of Reference for their 2015 meeting. The meeting was held in June 2015 at the ICES Headquarters in Copenhagen, Denmark.

RGBENTH assessment of WG response

a) Produce maps and shape-files of fishing intensity

The review group felt that the WG addressed this adequately.

b) Produce maps and shape-files for different gears

As discussed as part of the OSPAR request, the method used is deemed appropriate. We are however unclear why mid-water trawl and longline could not be covered.

c) Information on fishing activity within HELCOM MPA's

The information expressed in fishing hours suggests that some fishing occurs in these MPA's. Some discussion and/or additional analysis on the chance that these are spurious registrations (e.g. speed falling within the "fishing" interval even if not fishing) should come with these results.

d) Estimating the proportion of total fisheries represented by the data

See above as per OSPAR request.

Generic RGBENTH recommendations

1. The Review Group experienced difficulties getting a complete background picture to the request. We recommend that future requests by OSPAR/HELCOM are supplied with a briefing note providing such information in a single place. The Review Group expects that ICES Working Groups will have experienced similar difficulties and that this will have affected the completeness of the responses. This was confirmed during informal discussions with WG members who confirmed they were not very clear what was expected of them (especially in relation to OSPAR request b) and c)).
2. The responses to the OSPAR request by the three working groups were presented in three different formats. The BEWG response to the request was buried in the main meeting report. We recommend that ICES provides guidelines and a template to working groups when responding to requests. Providing justification, and where possible references to do so, would be essential, as it was felt that this was missing from some of the responses provided.

Additional references to those for review

Breen, P., Vanstaen, K., and Clark, R.W. E. (2015) Mapping inshore fishing activity using aerial, land, and vessel-based sighting information. ICES Journal of Marine Science, 72: 467–479.

Piet, G. J., Quirijns, F. J., Robinson, L., and Greenstreet, S. P. R. 2007. Potential pressure indicators for fishing, and their data requirements. ICES J. Mar. Sci., 64: 110-121.