Regional Coordination Group
North Atlantic
North Sea & Eastern Arctic

Regional Coordination Group
Baltic

Intersessional Subgroup (ISSG) 2022-2023 Reports

RCG NANSEA AND RCG BALTIC REPORT

Part III

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Gdańsk, Poland

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1 ISSG End-users and RCGs

1.1 Background

The aim of this ISSG is to review and streamline dialogue between data providers (RCGs) and end users (ICES) in order to identify effective processes to meet end-user needs and allow the RCG to prioritize its activity relating to future data collections, storage and transmission functions. The ISSG was established as a pan regional group in 2018. During the RCG NA, NS & EA and RCG Baltic Technical meeting in 2020 it was decided that this ISSG should have a more generic focus. It was therefore decided to keep the annual information meetings between ICES and the RCG chairs to ensure the good cooperation and to be able to follow the progress over time.

1.2 Work-plan

Main tasks defined for 2022-2023:

1. Create overviews of the impact of various factors on data collection from commercial fisheries sampling and research surveys:
    - Improve guidance for 2022
    - Evaluate and visualize responses
    - Consider restructuring questionnaire for 2023 linking with sampling schemes defined in NWP
2. Communication channel between RCG chairs and ICES, COM and other end-user (e.g. ACs)
3. Communicate the mandates and remits document within ICES
4. Follow-up the proposed route of recommendations
5. Follow-up the pending recommendations of previous TM

1.3 Progress during 2022 - 2023

During the season 2022-2023 the ISSG had one virtual meeting (17th March) with ICES and the Commission. At this meeting general issues were discussed (minutes of the meeting can be found in Annex I.I), including:

- Communication channel between ICES, DGMARE and RCG chairs
    - RCG's Mandate and remits document
    - Route of recommendations
    - ICES recommendations database
    - Follow-up on RCG recommendations 2020-2022
- End user needs on a general scale
- RCG questionnaire "Impact of various factors on data collection" (see also Annex I.II)
- UK/ Third countries related issues
    - RDB/RDBES
    - Participation in RCG work
    - Surveys
- Follow-up on action points defined at the 2022 RCG ISSG End Users meeting
- Update on RCG ISSGs work

Since 2020 RCG has been analysing the impact of covid-19 on data collection from commercial fisheries. This task has been performed by means of a questionnaire sent to National Correspondents. The impact of covid-19 gradually decreased, however other factors disrupting data collection appeared. Therefore, in 2022 it was decided to restructure the questionnaire. A more general questionnaire was designed covering any impact factors. Feedback from 1st and 2nd quarter 2022 was analysed and the results were presented at the RCG 2022 Technical Meeting. The RCG suggested to continue collecting information from remaining quarters of 2022, which was done at the beginning of 2023. The responses covering all quarters 2022 were analysed and visualised in series of heatmaps and supporting plots separately for each region (Annex 1.II). The results were presented at the RCG ISSG End Users meeting (17th March).

1.4 Roadmap/follow-up

Main tasks defined for 2023-2024:

1. Create overviews of the impact of various factors on data collection from commercial fisheries sampling and research surveys
2. Communication channel between RCG chairs and ICES, COM and other end-user (e.g. ACs)
3. Communicate the mandates and remits document within ICES
4. Follow-up the proposed route of recommendations
5. Follow-up the pending recommendations of previous TM

1.5 SG Participants

Name	E-mail	RCG	Role	MS
Maciej Adamowicz	madamowicz@mir.gdynia.pl	Baltic	Chair	POL
Dália Reis	dalia.CC.Reis@azores.gov.pt	NANSEA	Chair	PRT
Josefine Egekvist	jsv@aqua.dtu.dk	NANSEA	Chair	DNK
Helen McCormick	Helen.McCormick@Marine.ie	NANSEA	Expert	IRL

ANNEX 1.1. Minutes Regional Coordination Group Intersessional Subgroup End-User meeting

Date	17th March 2023	**Venue**	
Time	10:30 – 14:05	Online, MS Teams	

Attendees

Name & Surname	Organisation	Role & position
Dália Reis	RCG NANSEA	Co-chair
Josefine Egekvist	RCG NANSEA	Co-chair
Maciej Adamowicz	RCG Baltic	Co-chair
Helen McCormick	RCG ISSG End Users	RCG expert
Rosa Fernández	RCG Secretariat	Observer
Susana Rivero	RCG Secretariat	Observer
Lotte Worsøe Clausen	ICES	End-user
Jan de Haes	ICES	End-user
Henrik Kjems-Nielsen	ICES	End-user
Ruth Fernández	ICES	End-user
Monika Sterczewska	DG MARE	End-user

Objectives

- The main objective of this RCG ISSG meeting is to keep and maintain the dialogue between data providers (RCGs) and end-users.

Agenda

1. Communication channel between ICES, DGMARE and RCG chairs
2. Follow up on end-user needs on a general scale
3. RCG questionnaire "Impact of various factors on data collection"
4. UK / Third countries related issues
5. RCG recommendations from 2022 and pending recommendations from 2021 and 2020
6. ISSG End User actions from 2022 season
7. Update on ISSG work (inform about tasks, responsible chairs)
8. Updates on RWP

Specific issues addressed

Communication channel between ICES, DGMARE and RCG chairs

Following, previous discussions in 2021 and 2022 on how to improve both the (i) contents and (ii) the route of the recommendations, the RCG chairs and ICES secretariat review the actions taken in this regard:

(i) Content

The mandate and remits of the RCG NANSEA and RCG Baltic document has proven useful to better target the recommendations to RCGs. Lotte commented that it has actively been used in sense checking WG, recommendations are checked and sometimes dismissed. When a recommendation is dismissed the relevant WG is informed, and the mandate and remits document is normally sent along with the feedback. Jan also mentioned that the document has been shown to during the first day of the WG, it has been included in the briefing presentation. It was agreed to make the document more accessible through the RCG website, make it available on the RCG NANSEA and Baltic sections. Then, inform ICES Secretariat (Jan) ***(action point RCG Secretariat).***

(ii) Route of recommendations

The route of the recommendations proposed last year (Figure 1) was reviewed and there is no need for modifications. Important note is that while this Figure seems quite static, it should leave room for flexibility in timing.

ICES noted that the route is good to keep each other updated throughout the year, however some delays might be expected due to the timing of some of ICES WGs.

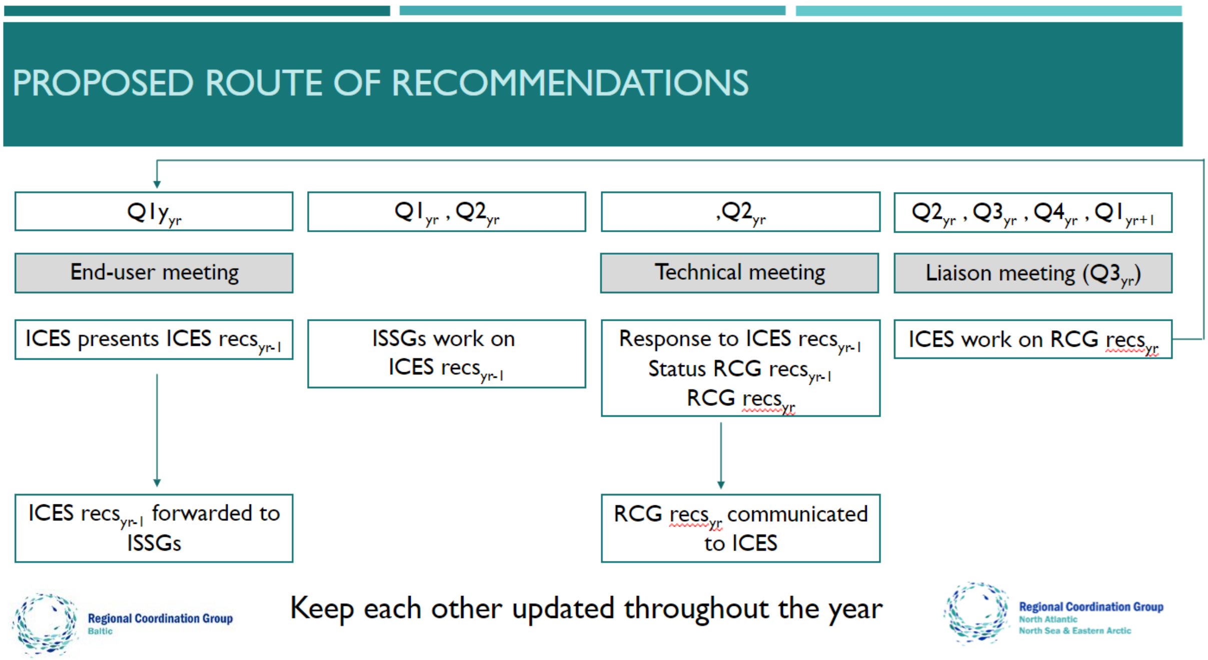

Figure 1: Proposed route of recommendations throughout the year

Communication channel between ICES, DG MARE and RCG chairs - ICES recommendation database

Within ICES the recommendations are registered in GitHub (using "issues" in GitHub). Recommendations can then be ticked as "in progress", "finished" etc. RCG Baltic and NANSEA chairs have been invited through email to join the ICES-EG/RCG recommendations repository. However, Josefine and Dália still don´t have access. ***Action point Jan*: To resend the invitation to Dália and Josefine to join the repository.

Lotte suggested a new way of organizing the recommendations on GitHub, adding new categories to "status", for example: sense-checked; re-submit/clarifications; ongoing; closed issues. ***Action point RCG chairs:*** feedback to ICES on this suggestion.

> ***Q:*** Does ICES have a guide for classifying the recommendations, or guidelines for prioritization?
> ***A:*** No as such, Lotte liked the idea. This is something that could be considered at broader level at ICES Secretariat.

Synergies ideas from SECWEB and the RCG Secretariat

On ICES side, EWG are introduced to more general knowledge about RCGs on the first day they start.
The RCG website has linked access to ICES SharePoint for the different RCG and ISSGs. In addition, more detailed information about ISSG is also available on the website https://www.fisheries-rcg.eu/intersessional-subgroups/
One of the outputs of Secweb project is the stakeholder's database that is now operational and needs to be populated in the coming months. The database comes with a manual and a short video tutorial. Lotte would like to broadcast the stakeholder´s database. ***Action point RCG Secretariat:*** update ICES on the progress of the stakeholder´s database.

Follow up end-user needs on general scale

Regarding granting access to new experts to ICES SharePoint there is a need to improve communication.

GitHub - ICES-EG/RCGs (https://github.com/ices-eg/RCGs): A place for the Regional Coordination Groups (RCGs) to store scripts (e.g., for map-plotting, age-length relationships) to make them available to other groups and improve the development and exchange. ***Action point Jan:*** to confirm that for requesting access to the RCG GitHub for ISSG members, the ISSG chair should write to taf@ices.dk with Jan CC.

Data transmission and data needs
DG MARE is considering developing a questionnaire to report issues with data transmission. RCG chairs would like to know more about the scope of the questionnaire so they can assess whether it could be aligned with the RCG questionnaire on impact factors on data collection. The idea is not to duplicate the work.

Monika acknowledges the questionnaire; however, the needs of the Commission are different. The information from the questionnaire on impact factors is usually available one year after the issue has happened. The Commission needs to react quickly for political reasons or administrative purposes. ***Action point DG MARE/RCG chairs:*** further discuss the possibility of aligning/combining questionnaires.

RCG questionnaire "Impact of various factors on data collection"

The questionnaire design has been adapted in order to cover for other factors (apart from COVID 19) disrupting data collection.
Helen McCormick presented the impact of various factors heatmaps for 2022 (by quarter and area). Overall, the trend is moving to less impacts, compared to 2020 and 2021, with only two stocks showing high impact mainly for at sea sampling. The influencing factors were a combination of other, legislation, fuel prices and the corona virus. The war in Ukraine had little impact.

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If the questionnaire is to be continued there is room for improvement; for example, in the case of legislation there are different interpretations, thus in the guidelines this point could be more precise. Similarly, when referring to effort precise that it compares to previous years.
During the TM in 2022 experts pointed out that the questionnaire was not very user friendly. RCG suggests restructuring the questionnaire information would be collected on sampling schemes (define in WP) instead of stocks.

Action point RCG: Forward the presentation to Lotte and Monika.
Action point Lotte: Forward the heatmaps to the benchmark group.
Action point RCG chairs: Fine tune the questionnaire and guidelines.

UK and third countries related issues

How do we ensure RDB/RDBES data submission, quality checking, processing and use in relation to third countries?
ICES WGRDBESGOV 2022 has forwarded a recommendation to use the RCG ISSG Quality for develop a procedure to check the quality and completeness of the data uploaded to the RDBES. The RDBES core group has started working on this, but it needs to be further developed and extended to sampling data.

> **Q:** Should third countries be invited to join ISSG Quality? Or should this be done in an ICES WG?
> **A:** Better to keep these discussions within ICES, because third countries like Norway, Iceland or UK might not feel comfortable moving to a "UE structure" like the RCGs. The idea is to have everyone on board around ICES.

Participation of third countries in RCG work

> **Q:** If an ISSG or RCG would like to invite third countries to their meeting, who should we contact? Is there a contact list for third countries?
> **A:** From the legal point of view, RCGs are EU MS; other participants, such as third countries, can take part as observers. Therefore, there are no official contact points for third countries. The ICES Secretariat (through ACOM members) could facilitate contact with third countries if they need to be involved in certain discussions for e.g., by forwarding the invitation from the RCG.

Survey effort issues related to third countries

The UK is not contributing to the cost-sharing of surveys anymore. Therefore, consider the scenario of necessary survey effort reduction, especially now with markedly higher vessel costs related to fuel.

The UK is an ICES member country; MoU between ICES and UK. In the MoU surveys and collaboration will continue through ICES. The UK will continue to contribute data to the RDBES (once properly rolled out) under the ICES data call. The UK is updating their data collection plan at the end of 2024. The re-evaluation will include ICES as end-user.

Lotte, about the survey reduction effort, she wants to separate the discussion about financial issues and the technical issues. The research question that ICES could address is that by which percentage can the survey effort be reduced? Instead of how much money each research institute can afford, that is for the research institute themselves to work out.

Action point RCG chairs: check with ISSG surveys where the problem lies with UK. Check if UK is still conducting the survey and if UK is doing what they declared in MoU.

RCG recommendations from 2022 and pending recommendations from 2021 and 2020

RCG 2022 recommendation

R01: ICES give download rights of RDB/RDBES data to ISSG chairs for the ISSG [ICES WGRDBESGOV]
Henrik noted that if you get access to download data, then you get access to other countries' data. As long as the people are clear of the type of data you can access from one country to another, download each other´s data across LDF and other RCGs. Regarding RDB access, ICES needs to make it clear that everybody agrees that this is how we will do it. RCG should sign the agreement when using the data from the RDB.

There is a tool to specify what data and for what purpose it is being downloaded. However, this is a work in progress, and the tool is not operational yet. ICES is working to make RDB as accessible and operational as possible.

Action point Henrik: share some notes clarifying the issues to be considered before all RCG ISSG chairs can download all EU countries data from the RDB and RDBES.
Action point RCG: follow up to make the communication clear about RDB access.

Dália shared the feedback from ISSG Diadromous regarding RDB, the group working with eel is not using RDB. WGEEL has developed their database because it argued that RDB is not fit for its data. Lotte noted that ICES wants RDBES to be the database for ICES, so any data from eel, salmon or any other species will have to go there. With time all stock assessors should get their data from RDBES. There might be a need for developments, and that is something that ICES will work on. Henrik commented that WGEEL should check if cast data fits into the table and then step by step work from there. Perhaps it could be formulated as a future recommendation for WGEEL.

Pending RCG 2021 recommendations

- R01: Collate examples of data sharing agreements [ICES WGRDBESGOV]
- R10: Provide support about the RDBES data model for SSF [ICES WGRDBESGOV]
- R11: Provide advice about how much sampling effort is needed for a robust estimation of bycatch [ICES WGBYC]
- R12: Provide advice to improve the risk assessment evaluation methodology [ICES WGBYC]
- R13: Provide support about the inclusion of MRF into the RDBES [ICES WGRDBESGOV]
- R14: Provide support about the development of a RWP for MRF [ICES WGRFS]
- R15: To define the criteria to propose a regional list of species [ICES WGRFS]

ICES followed up with the chairs of the different groups to see what the status is. Comments are in GitHub. R11, Ruth mentioned that there are two workshops planned in 2023 related to that topic. ***Action point Ruth:*** forward the ToR for the workshop. R15 Ruth referred to the latest report of WFBYC https://ices-library.figshare.com/articles/report/Working_Group_on_Bycatch_of_protected_Species/18621773

Pending RCG 2020 recommendations

R06 (Revision of the survey effort and coverage of the IBWSS) –still in progress.

ISSG End User actions from 2022 season – follow up

Most action points defined in end-user meeting 2022 have been dealt with.
Remaining action points were discussed

- Action point 2, Maciej has access to GitHub recommendation. However, Dália and Josefine have got access, but they can´t view the full set. Jan is checking the problem.

Action	Partner/Person in charge	Status
1. Share the RCG mandate and remits document with the relevant ICES groups.	Lotte/Jan	Done
2. Resend the invite to Dalia and Maciej to join the ICES-EG/RCG recommendations repository.	Jan	Ongoing
3. RCG chairs and secretariat need to narrow down what type of link they would like to have and communicate this to Jan.	RCG chairs and secretariat	Done
4. Once action point 3 is communicated, forward this information to the relevant IT people within ICES.	Jan	Done
5. Work on making WKLIFE datacall smoother.	Lotte/ICES	Ongoing
6. Discuss bi-laterally (Blanca & Lotte) the more general mail on DT that was sent by ICES.	Blanca/Lotte	Done
7. Provide DTMT format in which data transmission issues can be posted.	Blanca	Done
8. Forward the presentation with the RCG COVID-19 heatmaps to Lotte and Blanca.	RCG chairs	Done
9. Once received forward the RCG COVID-19 heatmaps to the relevant ICES WGs.	Lotte	Done
10. If any questions arise on the RCG COVID-19 heatmaps Lotte will directly contact Maciej/Helen.	Lotte	Done
11. Jan will go through the notes on the recommendations and will let RCG chairs know if there is any immediate action needed from the RCG side.	Jan	Done
12. Approach WGQUALITY chair when Shiny R app is further developed.	RCG chairs	Pending
13. Take feedback on visibility of ISSGs on RCG website back to next SecWeb meeting.	RCG secretariat	Done
14. RCG chairs will be updated on anything related to RCG work once there is clarity on suspension of ICES meetings.	Lotte	Done

RCG ISSGs

An update of the RCG ISSG is given, all ISSGs are actively working or will start working soon.

Updates on RWP

Both Fishn'Co and Secweb projects co-funded by MARE/2020/08 grant were finalised in February 2023, after 2-month extension from the initial deadline.

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Fishn'Co delivered on all work packages and will hand over the proposed regional work plans for RCG NANSEA/BAL and RCG Large Pelagics at the ISSG RWP meeting on 21 March 2023. The RCG ECON has already taken over their proposed regional work plan.

To keep the RCG secretariat and website in 2023, the Member States enter individual agreements with the service provider in the Secweb project, following the developed budget scenario. During the RCG NANSEA/BAL technical meeting, the ISSG National Correspondents will further explore how to secure the RCG secretariat beyond 2023.

Overview Action Points End-User meeting 17 March 2023

Action	Partner/Person in charge
1. Publish the RCG mandate and remits on the RCG website. Inform Jan	RCG Secretariat
2. Resend the invitation to Dalia and Josefine to join the ICES-EG and RCG recommendations repositories	Jan
3. RCG chairs feedback about the recommendations GitHub - proposed categories for the status of the recommendations	RCG chairs
4. Provide feedback to ICES on the progress with the stakeholder´s database	RCG Secretariat
5. Meeting to discuss possibilities to align questionnaires on data transmission issues and various impact factors on data collection	RCG chairs/Monika DG MARE
6. Forward the presentation with the various impact factors heatmaps to Lotte and Monika	RCG chairs
7. Once received, forward the various impact factors heatmaps to the benchmark ICES WGs	Lotte
8. Fine tune the questionnaire on various impacts factors on data collection	RCG chairs
9. Check with ISSG Surveys what is the situation with UK	RCG chairs
10. Short document clarifying the issues to be considered before all RCG ISSG chairs can download all EU countries data from the RDB and RDBES	Henrik
11. Forward the ToR for Bycatch workshop	Ruth
12. Send notes about MARE grants to be updated on the presentation	Monika
13. Convene a meeting to do sense-checking together; RCG chairs and ICES, sometime in April before the TM	Jan

The meeting ends by 14:05 (CET).

ANNEX 1.11. Impact of various factors on data collection in 2022 (presented during 17th March 2023 End User meeting)

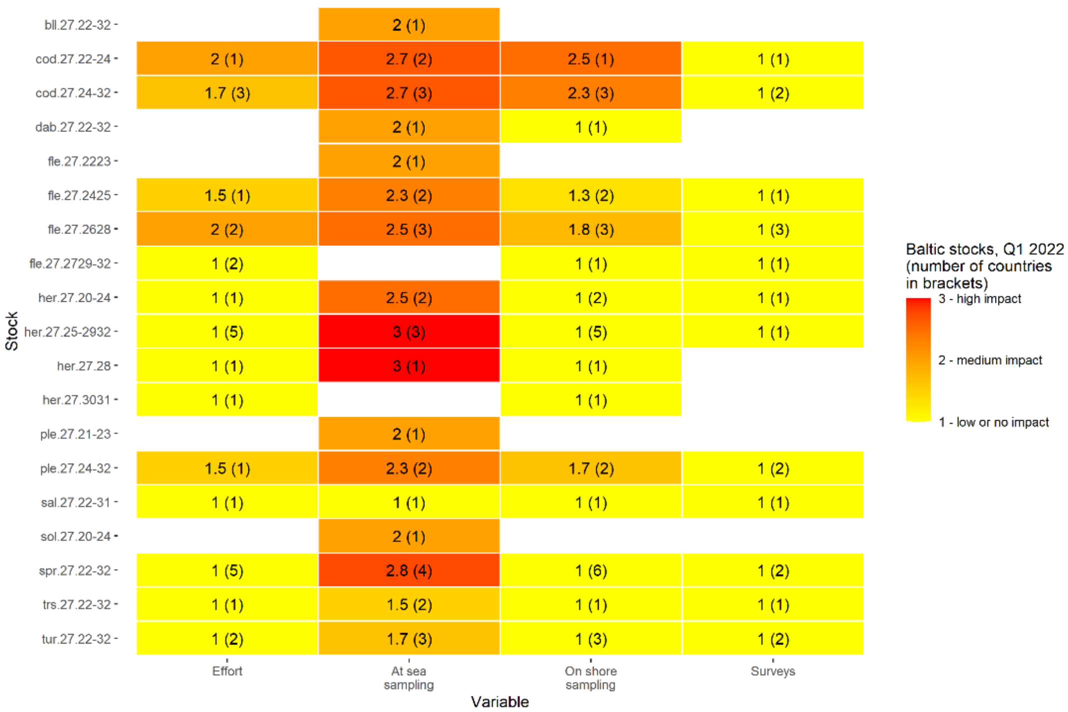
A questionnaire was designed to collect information on the impact of various factors on data collection, covering: fishing effort, at sea sampling, on shore sampling and surveys. NC were requested to complete the questionnaire with the information from 2022. The following questions were addressed in the questionnaire:

- Did any factor influenced the fishing effort in 2022?
- Was your at sea sampling disrupted by any factor in 2022?
- Was your on shore sampling disrupted by any factor in 2022?
- Did any factor disrupt your surveys in 2022?

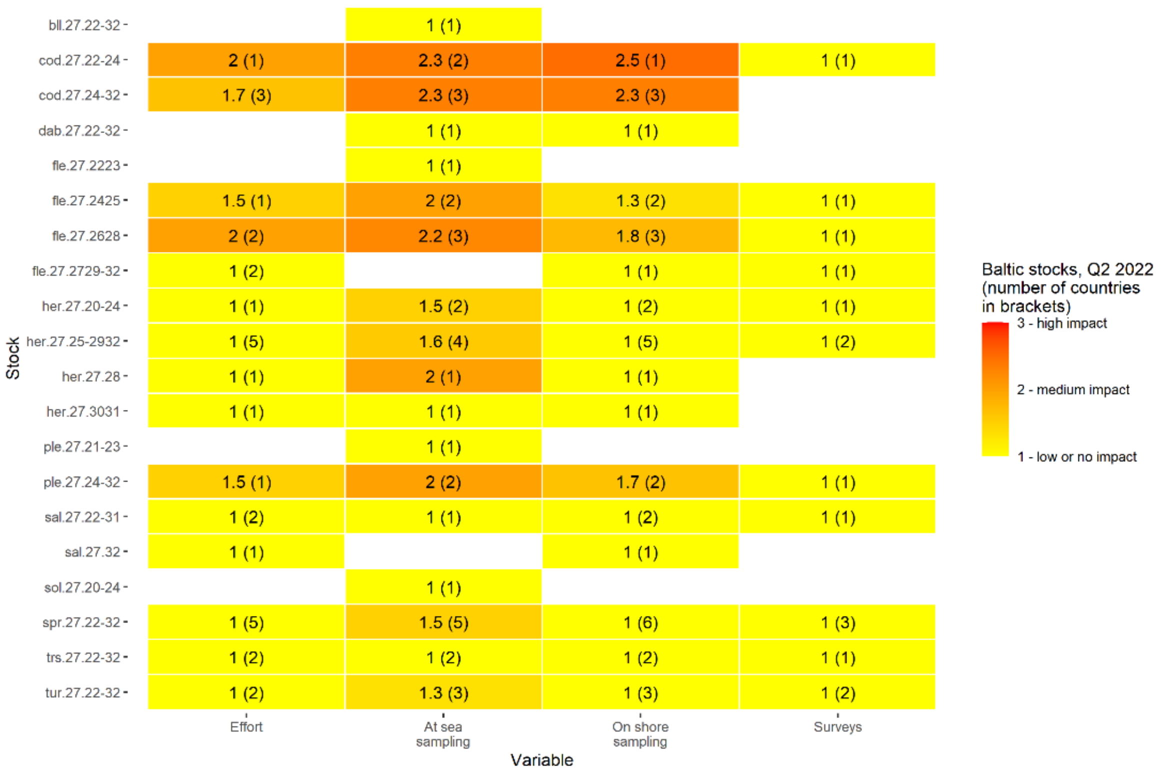
MSs were requested to answer the questions for each stock with high impact (75-100%), medium impact (25-75%), low/Null impact (0-25%), or not applicable. The responses were scored (1 - low/null impact, 2 - medium impact, 3 - high impact) and heat plots of the average score were created by quarter, stock and region.

Baltic stocks

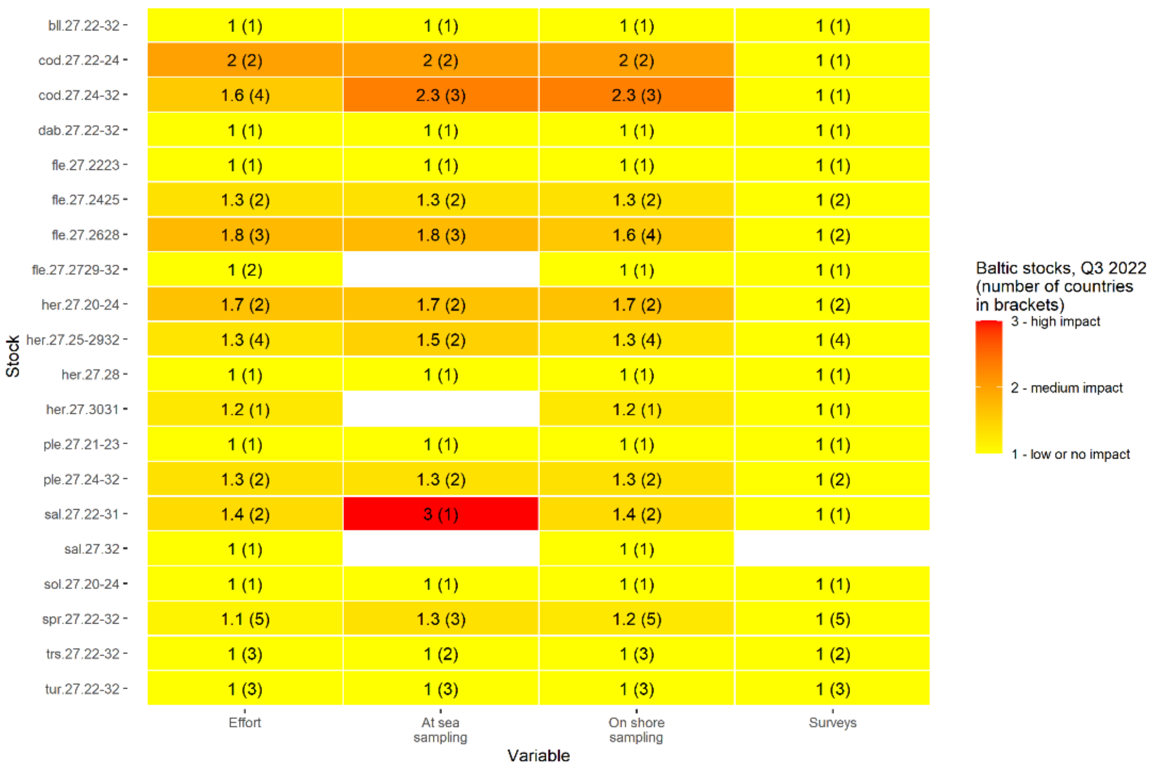
Baltic stocks Q1 2022



Baltic stocks Q2 2022



Baltic stocks Q3 2022



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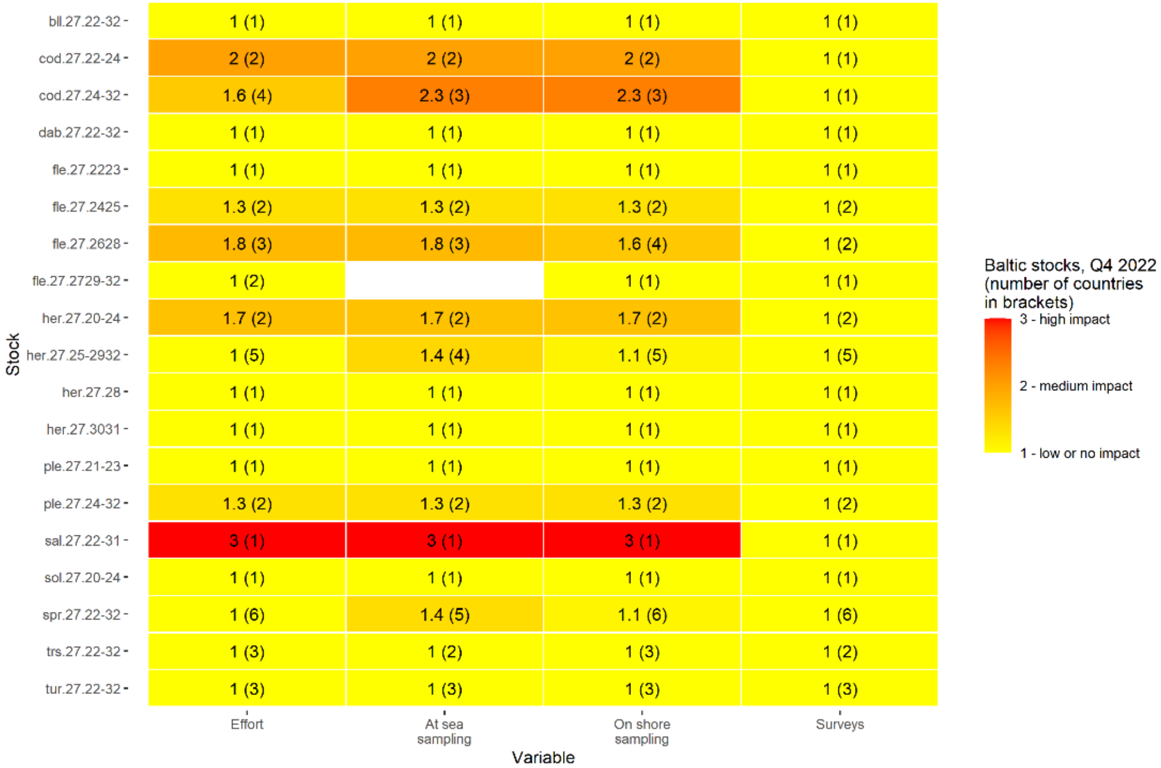
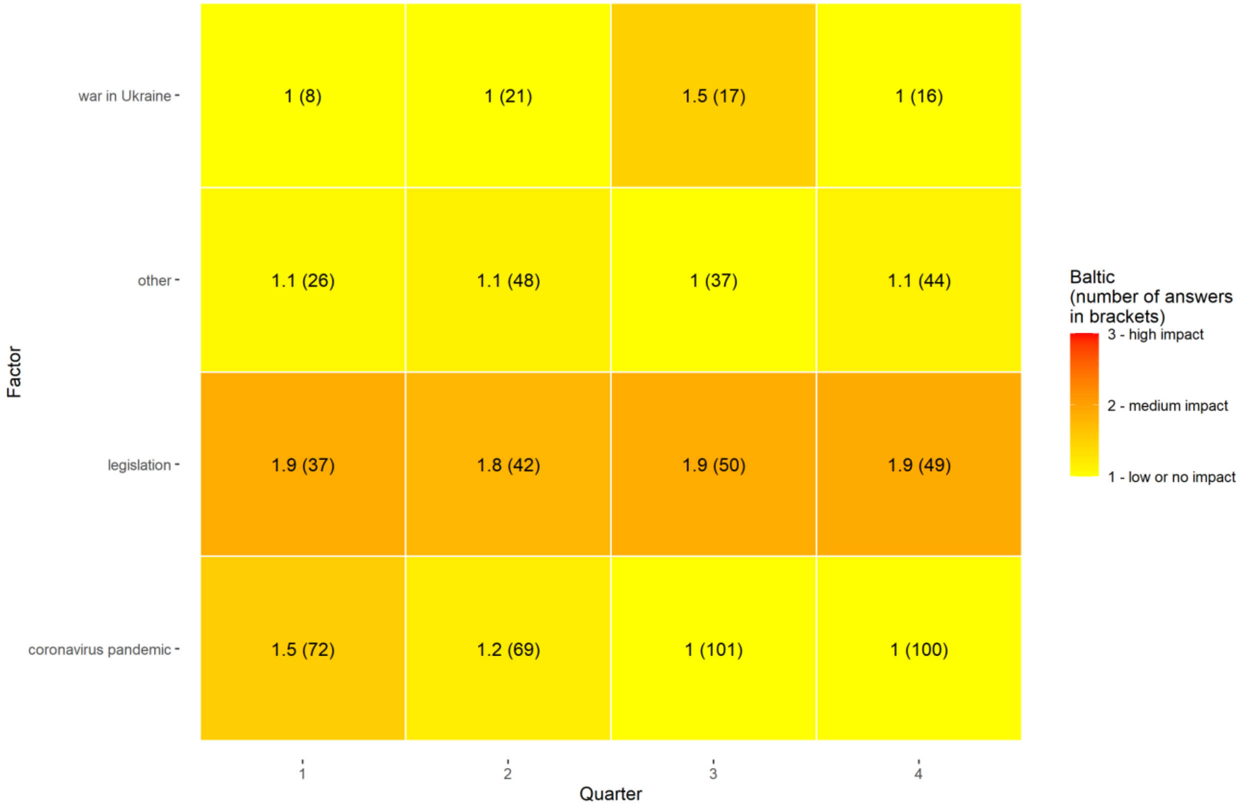
Baltic stocks Q4 2022

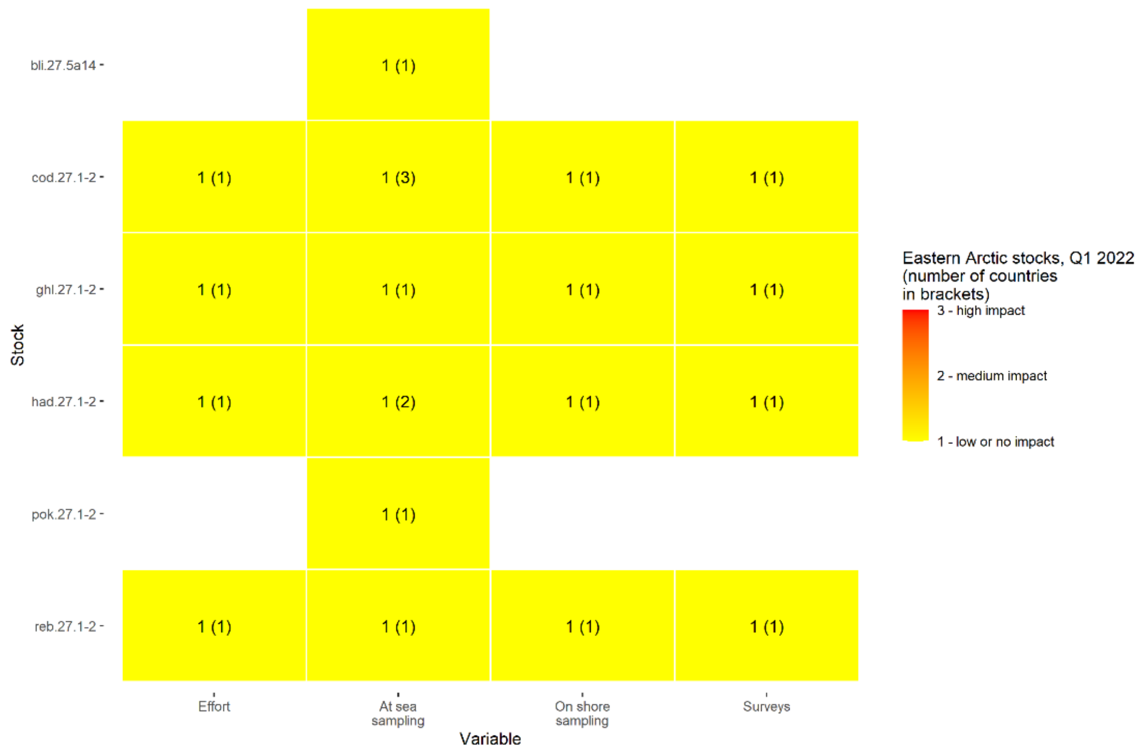


Baltic region – supplementary plots

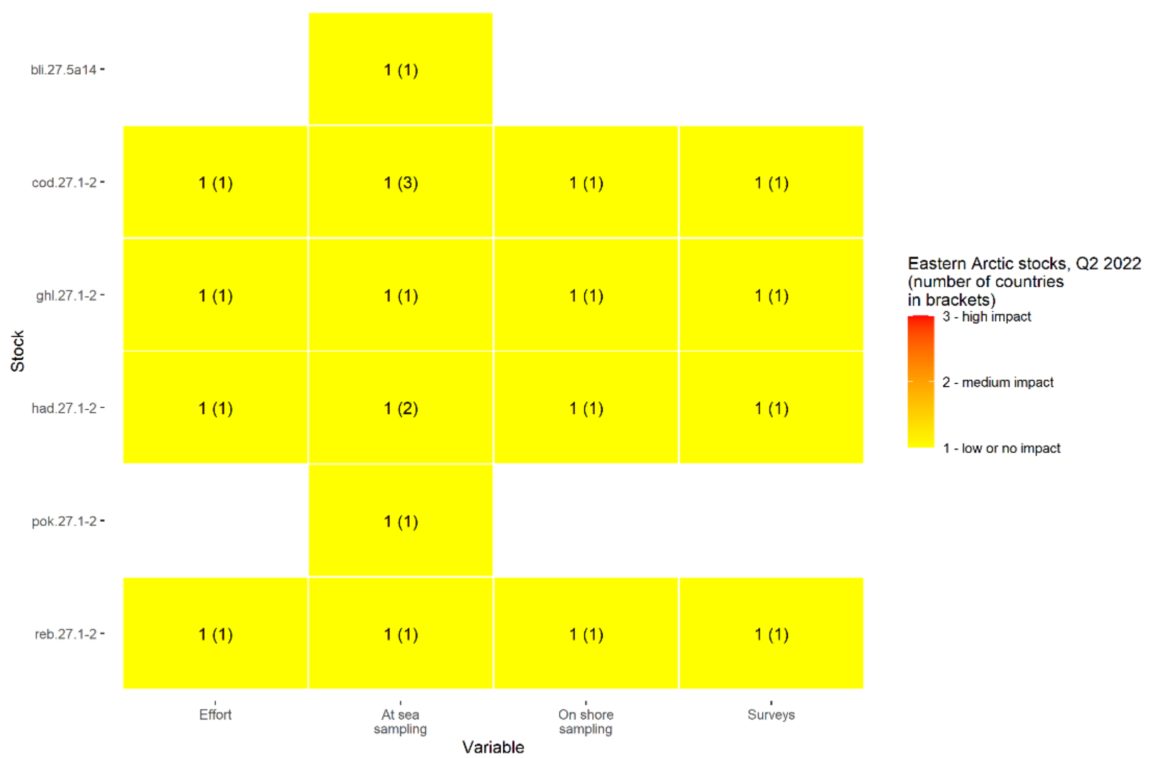


Eastern Arctic stocks

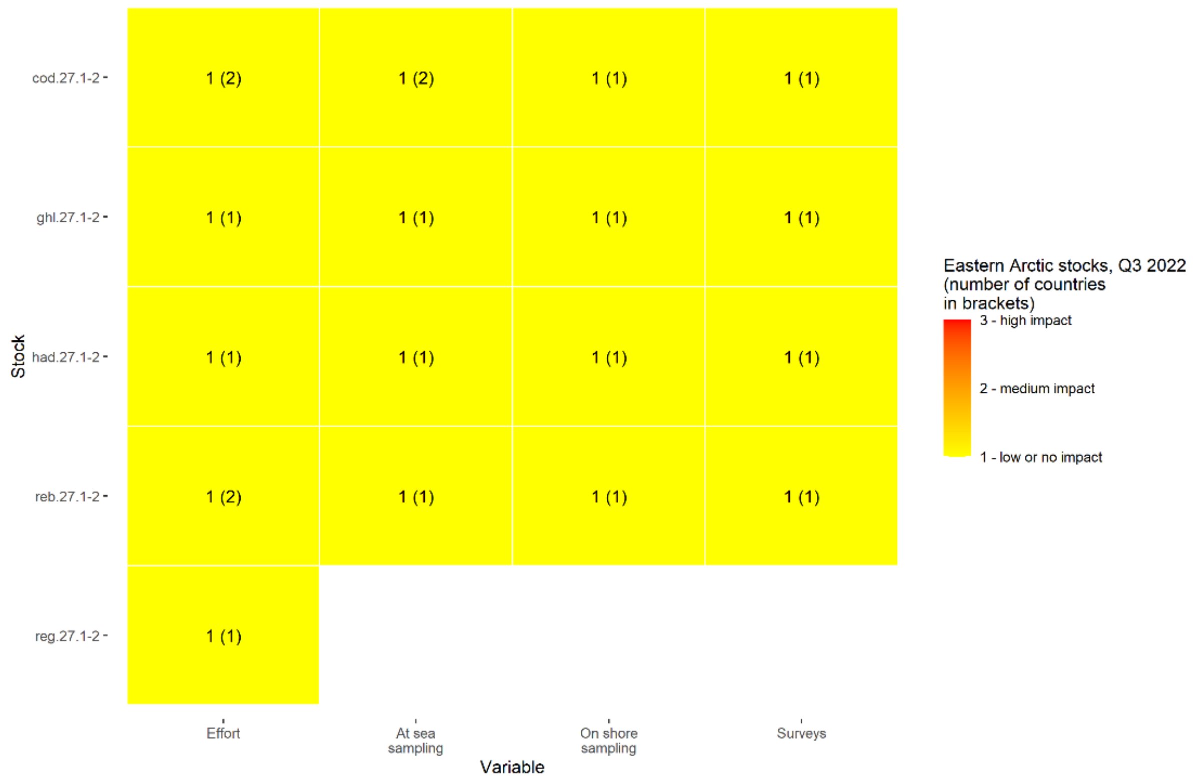
Eastern Arctic stocks Q1 2022



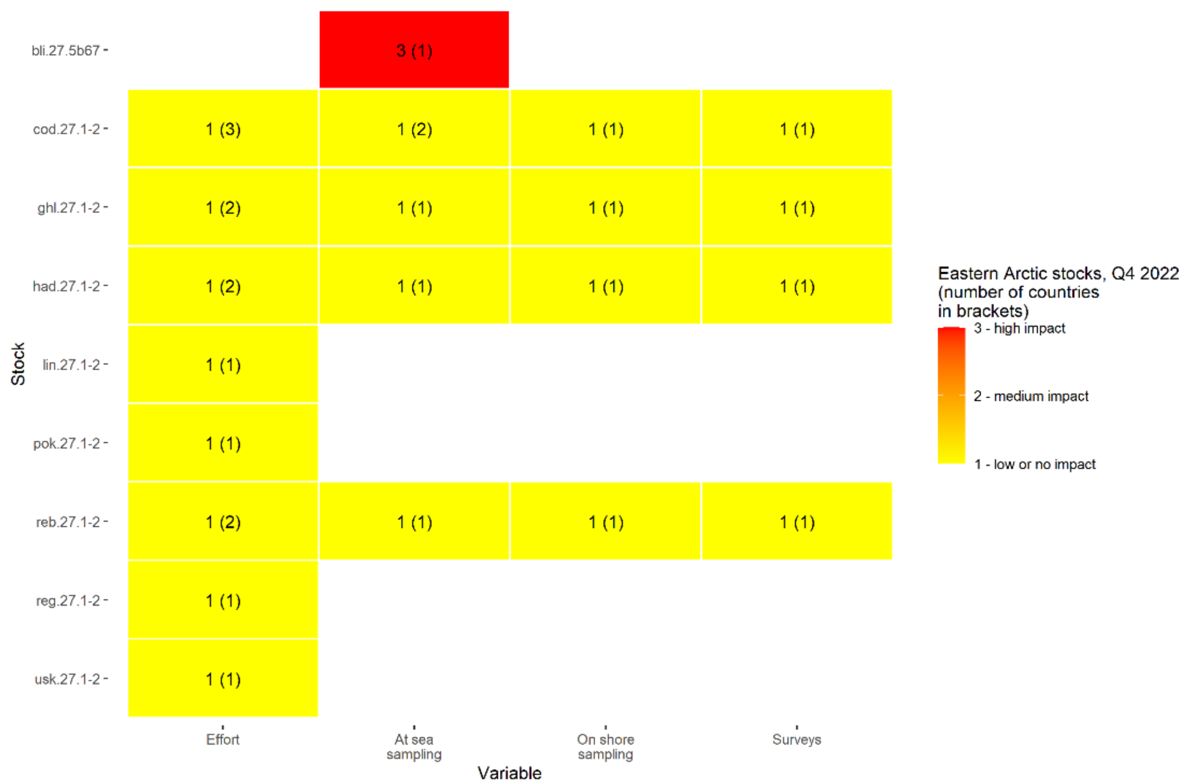
Eastern Arctic stocks Q2 2022



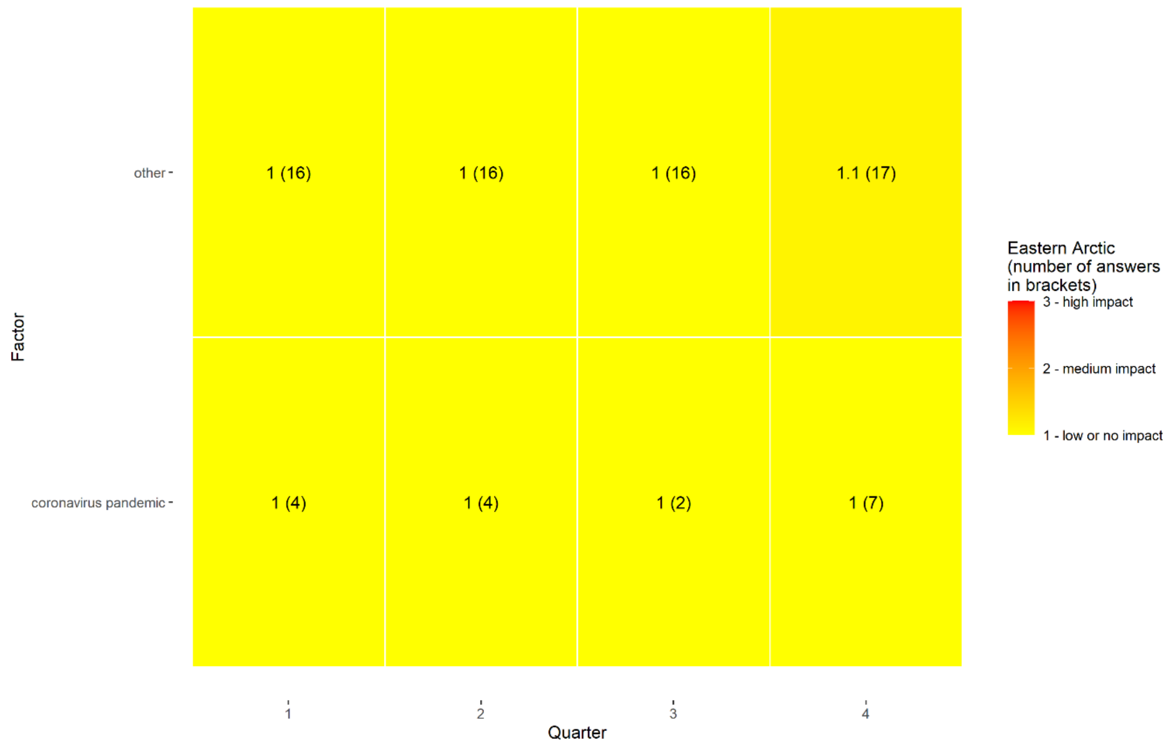
Eastern Arctic stocks Q3 2022



Eastern Arctic stocks Q4 2022



Eastern Arctic region – supplementary plots



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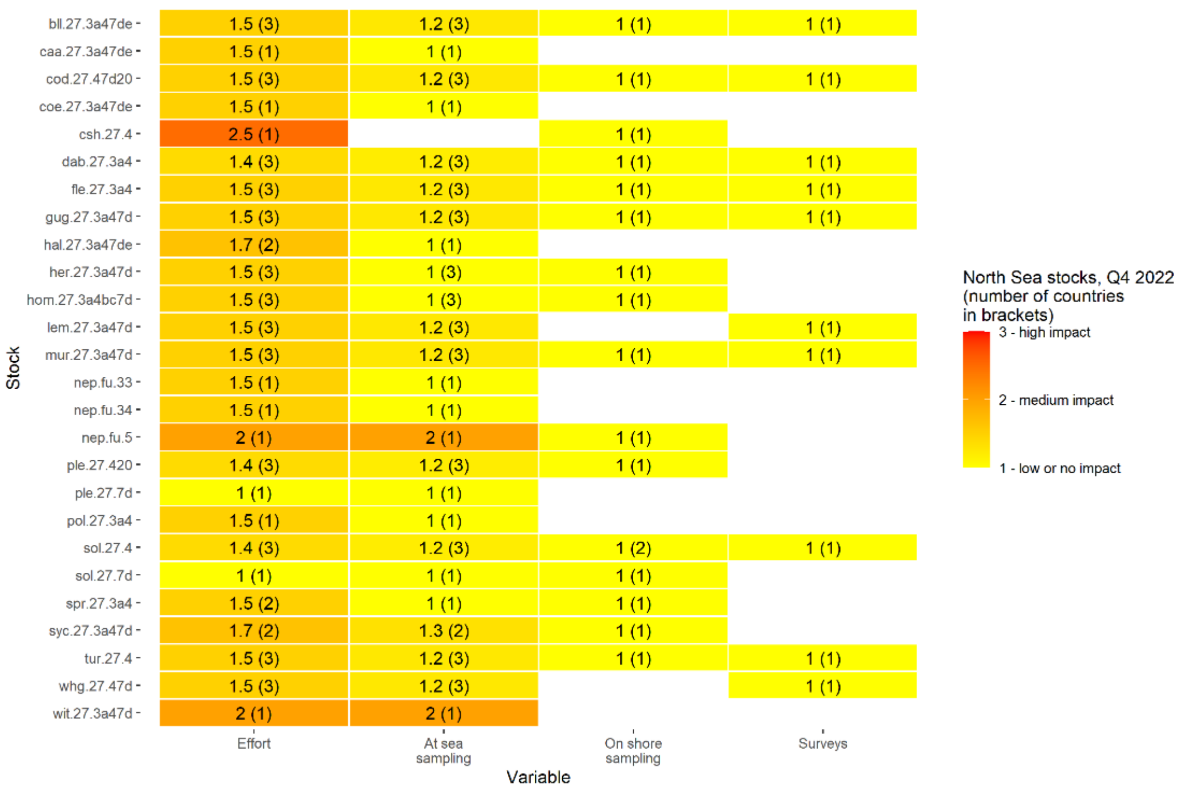
North Sea stocks

North Sea stocks Q1 2022

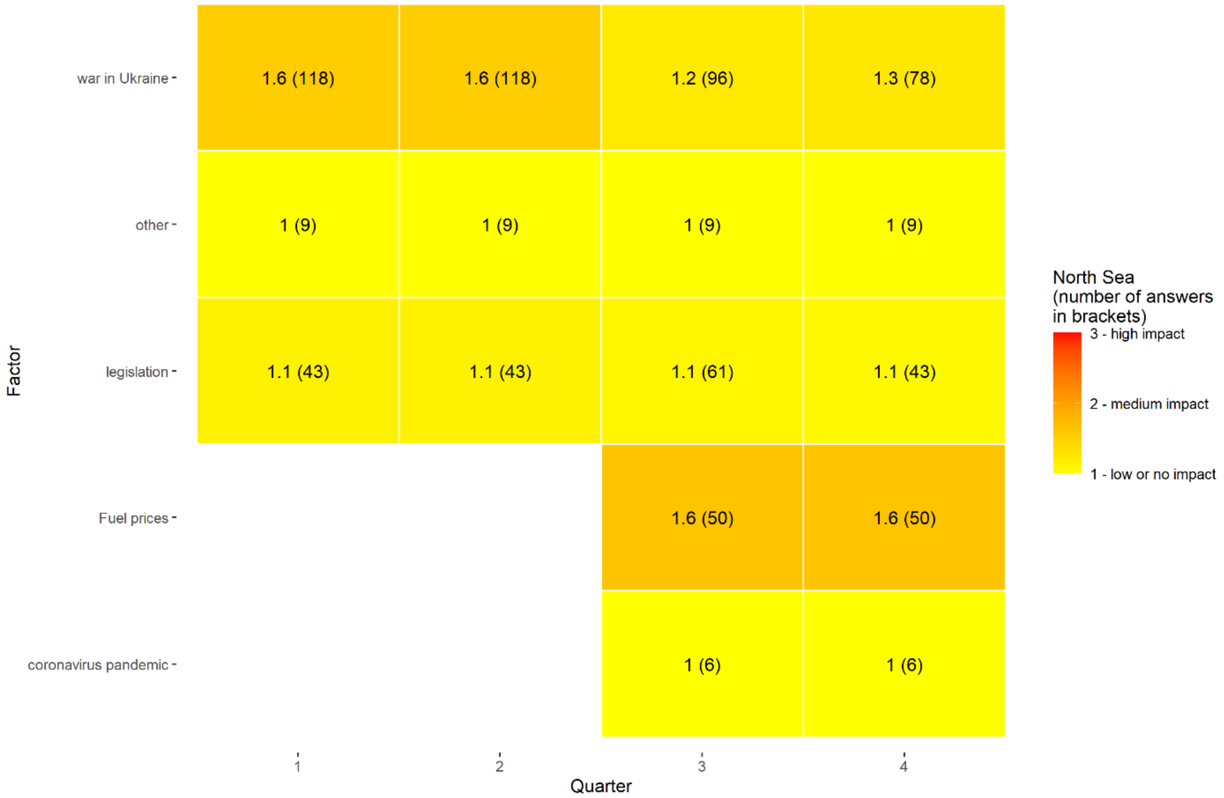
North Sea stocks Q2 2022

North Sea stocks Q3 2022

North Sea stocks Q4 2022



North Sea region – supplementary plots



North Atlantic stocks

North Atlantic stocks Q1 2022

Stock	Effort	At sea sampling	On shore sampling	Surveys
ane.27.8		1 (1)	3 (1)	1 (1)
ane.27.9a		2 (2)	2 (2)	1 (2)
ank.27.78ab				2 (1)
ank.27.78abd	1.5 (1)	1 (1)		
ank.27.8c9a		2 (2)	2 (2)	1 (2)
aru.27.5b6a	2 (1)	1 (2)	1 (2)	1 (1)
boc.27.6-8	1 (2)	2 (2)	1 (2)	1 (1)
bss.27.8ab	1 (1)	1 (1)	1 (1)	1 (1)
bss.27.8c9a	1 (1)	2 (2)	1 (2)	1 (2)
cod.27.6a	1.5 (2)	1 (1)	1 (2)	1 (1)
cod.27.6b	1 (1)			
cod.27.7a	1.7 (2)	1.7 (2)	3 (1)	
cod.27.7e-k	1.2 (3)	1.5 (3)	1 (2)	1 (1)
had.27.6b	1 (1)	3 (1)	1 (1)	
had.27.7a	1.3 (2)	1.7 (2)	2 (1)	
had.27.7b-k	1.2 (3)	1.2 (3)	1 (2)	1 (1)
hke.27.8c9a	1 (1)	2 (2)	2 (2)	1 (2)
hom.27.9a	1 (1)	2 (2)	2 (2)	1 (2)
jaa.27.10a2	1 (1)	3 (1)	1 (1)	1 (1)
ldb.27.7b-k8abd				2 (1)
ldb.27.8c9a	1 (1)	2 (2)	2 (2)	1 (2)
lez.27.4a6a	1 (1)	2 (1)	1 (1)	2 (1)
meg.27.7b-k8abd	1.3 (2)	1 (2)	3 (1)	1 (1)
meg.27.8c9a	1 (1)	2 (2)	2 (2)	1 (2)
mon.27.78abd	1.2 (3)	1.2 (3)	2 (2)	1.5 (2)
mon.27.8c9a	1 (1)	2 (2)	2 (2)	1 (2)
mur.27.67a-ce-k89a	1.3 (2)	1.8 (4)	1 (2)	1 (2)
nep.fu.15	1 (1)	1 (1)	1 (1)	
nep.fu.16	1 (1)	1 (1)	1 (1)	
nep.fu.17	1 (1)	1 (1)	1 (1)	
nep.fu.19	1 (1)	1 (1)	1 (1)	
nep.fu.20-21	1 (1)	1 (1)	1 (1)	
nep.fu.2021	1 (1)	1 (1)	1 (1)	1 (1)
nep.fu.22	1.2 (3)	1 (3)	1 (2)	1 (1)
nep.fu.2324	1 (2)	1 (2)	1 (2)	1 (2)

Variable

North Atlantic stocks, Q1 2022
(number of countries
in brackets)
3 - high impact
2 - medium impact
1 - low or no impact

Stock	Effort	At sea sampling	On shore sampling	Surveys
nep.fu.2627	1 (1)	1 (1)	1 (1)	1 (1)
pil.27.7	1.5 (1)	1 (1)		
pil.27.8abd	1 (1)	1 (1)	3 (1)	1 (1)
pil.27.8c9a	1 (1)	2 (2)	2 (2)	1 (2)
ple.27.7a	2 (2)	1 (2)	2 (1)	
ple.27.7bc	2 (1)	3 (1)	1 (1)	
ple.27.7e	1.5 (1)	1 (1)		
ple.27.7fg	1.5 (3)	1 (3)	1 (2)	1 (1)
ple.27.7h-k	1.5 (3)	1.5 (3)	1 (2)	1 (1)
ple.27.89a	1 (1)	2 (2)	1 (2)	1 (2)
pok.27.7-10	1.5 (2)	2 (2)	1 (3)	1 (2)
pol.27.67	1.2 (3)	1 (2)	1 (2)	1 (1)
pol.27.89a	1 (1)	2 (2)	1 (2)	1 (2)
sbr.27.10	1 (1)	3 (1)	1 (1)	1 (1)
sbr.27.6-8	1 (1)	1 (1)	1 (1)	1 (1)
sbr.27.9	1 (1)	2 (2)	1 (2)	1 (2)
sho.27.89a	1 (1)	2 (2)	1 (2)	1 (2)
sol.27.7a	1.3 (2)	1.7 (2)	1.3 (2)	
sol.27.7bc	1 (1)		2 (1)	
sol.27.7e	1.5 (1)	1 (1)	1 (1)	
sol.27.7fg	1.2 (3)	1.5 (3)	1.2 (3)	1 (1)
sol.27.7h-k	1.2 (3)	1.5 (3)	1 (3)	1 (1)
sol.27.8ab	1 (2)	1 (2)	1 (2)	1 (1)
sol.27.8c9a	1 (1)	2 (2)	1 (2)	1 (2)
syc.27.67a-ce-j	1.3 (2)	1.2 (3)	1 (1)	1 (1)
syc.27.8abd	1 (2)	1 (2)	1 (2)	1 (2)
syc.27.8c9a	1 (1)	2 (2)	1 (2)	1 (2)
syt.27.67	1.5 (1)	1.3 (2)		
whg.27.6a	2 (2)	1 (1)	1 (2)	1 (1)
whg.27.6b	3 (1)	3 (1)	3 (1)	
whg.27.7a	2 (2)	1 (2)	1 (1)	
whg.27.7b-ce-k	1.8 (3)	1.5 (3)	1 (2)	1 (1)
whg.27.89a	1 (2)	1.7 (3)	1 (3)	1 (3)

Variable

North Atlantic stocks, Q1 2022
(number of countries
in brackets)
3 - high impact
2 - medium impact
1 - low or no impact

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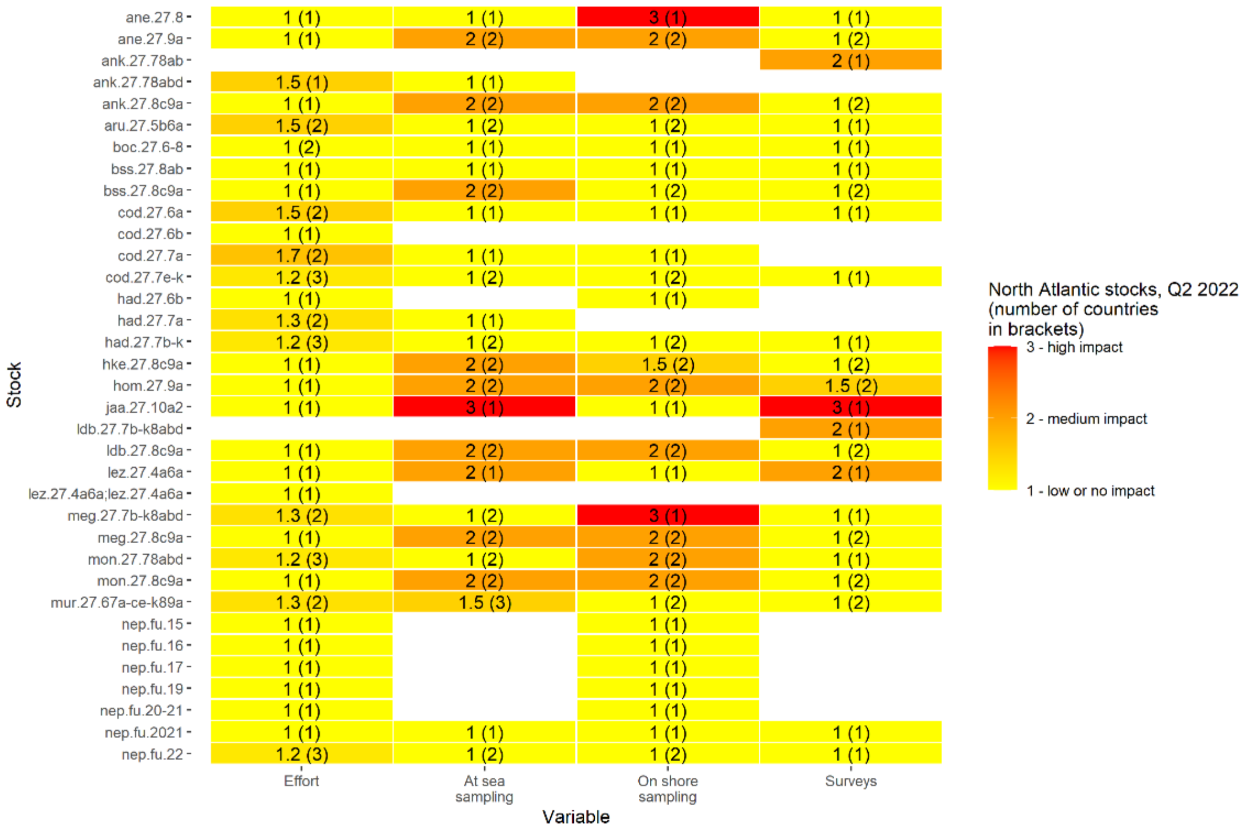
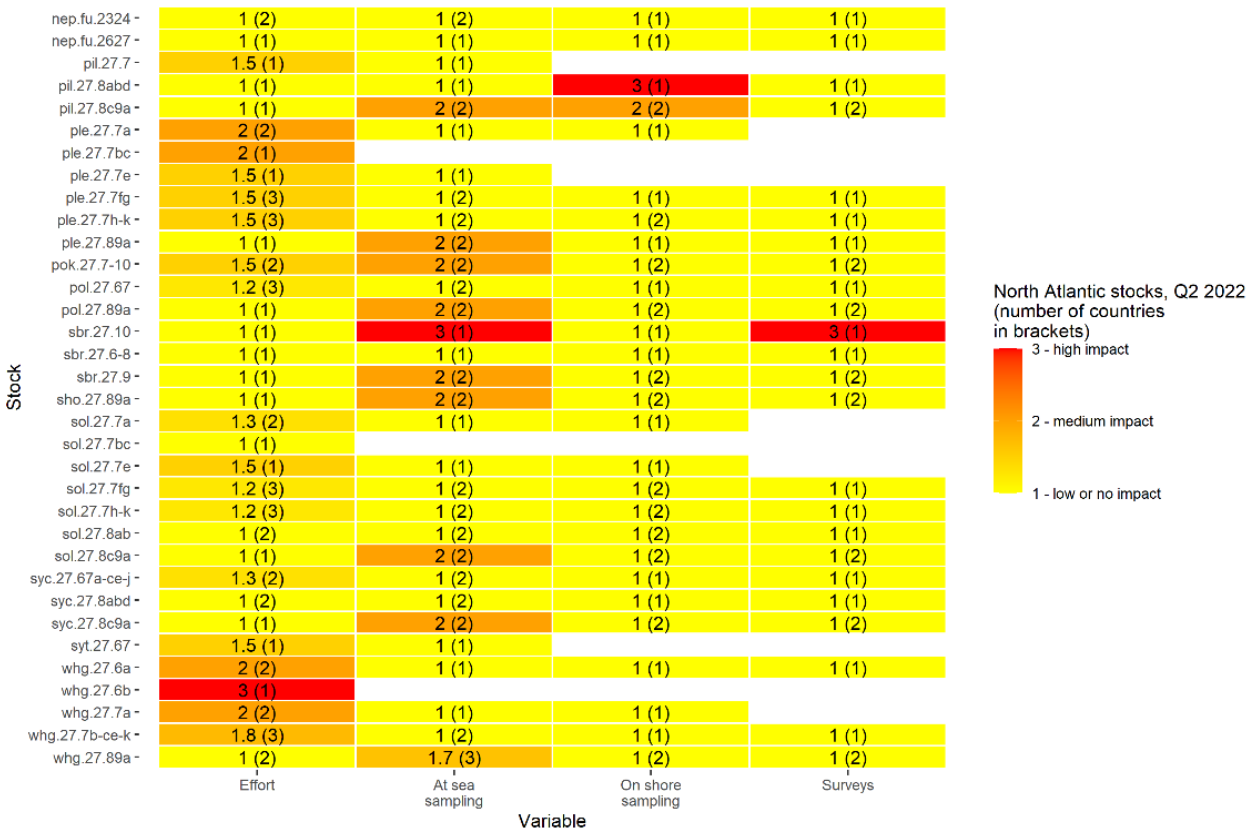
North Atlantic stocks Q2 2022





North Atlantic stocks Q3 2022

Stock	Effort	At sea sampling	On shore sampling	Surveys
ane.27.8	1 (1)	1 (1)	1 (1)	1 (1)
ane.27.9a	1 (2)	2 (2)	1 (2)	2 (2)
ank.27.78abd	1.5 (1)	1 (1)		
ank.27.8c9a	1 (2)	2 (2)	1 (2)	1 (2)
aru.27.5b6a	1.5 (2)	1 (2)	1 (2)	1 (1)
boc.27.6-8	1 (2)	2 (2)	1 (2)	1 (2)
bss.27.8ab	1 (1)	1 (1)	1 (1)	1 (1)
bss.27.8c9a	1 (2)	2 (2)	1 (2)	1 (2)
cod.27.6a	1 (2)	2 (2)	1 (2)	1 (1)
cod.27.6b	1 (1)		3 (1)	
cod.27.7a	1.7 (2)	1 (1)	1 (1)	
cod.27.7e-k	1.2 (3)	1 (3)	1 (2)	1 (1)
had.27.6b	1 (1)		1 (1)	
had.27.7a	1.3 (2)	1 (2)	2 (1)	
had.27.7b-k	1.3 (2)	1.5 (3)	1 (2)	1 (1)
her.27.irls	1 (1)	1 (1)		
hke.27.8c9a	1 (2)	2 (2)	1 (2)	1 (2)
hom.27.9a	1 (2)	2 (2)	1 (2)	1 (2)
jaa.27.10a2	1 (1)	3 (1)	1 (1)	1 (1)
ldb.27.8c9a	1 (2)	2 (2)	1 (2)	1 (2)
meg.27.7b-k8abd	1.3 (2)	1 (2)	1 (1)	1 (1)
meg.27.8c9a	1 (2)	2 (2)	1 (2)	1 (2)
mon.27.78abd	1.2 (3)	1 (3)	1 (2)	1 (1)
mon.27.8c9a	1 (2)	2 (2)	1 (2)	1 (2)
mur.27.67a-ce-k89a	1.2 (3)	1.4 (4)	1 (2)	1 (2)
nep.fu.15	1 (1)	1 (1)	1 (1)	1 (1)
nep.fu.16	1 (1)	1 (1)	1 (1)	1 (1)
nep.fu.17	1 (1)	1 (1)	1 (1)	1 (1)
nep.fu.19	1 (1)	1 (1)	1 (1)	1 (1)
nep.fu.20-21	1 (1)	1 (1)	1 (1)	1 (1)
nep.fu.2021	1 (1)	1 (1)	1 (1)	1 (1)
nep.fu.22	1.2 (3)	1 (3)	1 (2)	1 (2)
nep.fu.2324	1 (2)	1 (2)	1 (1)	1 (1)
nep.fu.2627	1 (1)	1 (1)	1 (1)	1 (1)
pil.27.7	1.5 (1)	1.7 (2)		

Variable

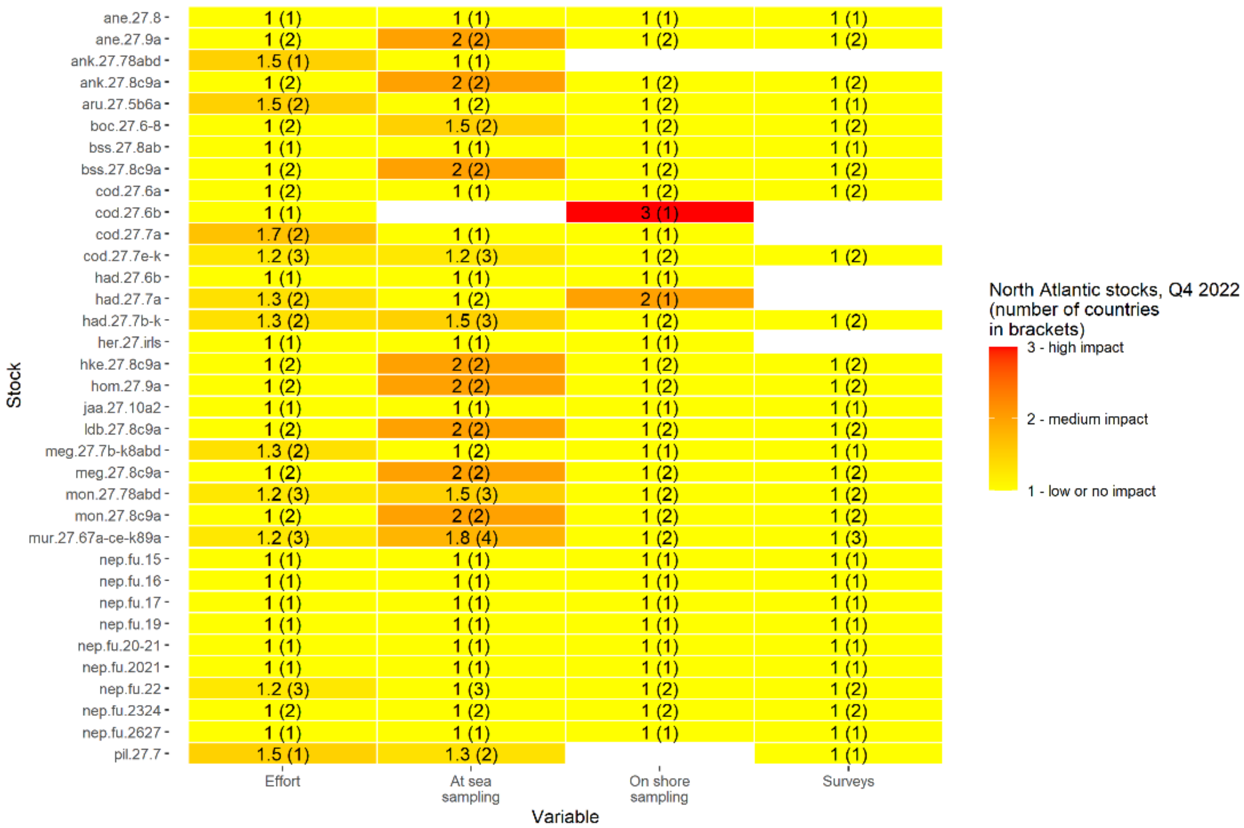
North Atlantic stocks, Q3 2022
(number of countries
in brackets)
3 - high impact
2 - medium impact
1 - low or no impact

Stock	Effort	At sea sampling	On shore sampling	Surveys
pil.27.8abd	1 (1)	1 (1)	1 (1)	1 (1)
pil.27.8c9a	1 (2)	2 (2)	1 (2)	1.5 (2)
ple.27.7a	2 (2)	1.7 (2)	1 (1)	
ple.27.7bc	3 (1)		1 (1)	
ple.27.7e	1.5 (1)	1 (1)		
ple.27.7fg	1.5 (3)	1 (3)	1 (2)	1 (1)
ple.27.7h-k	1.5 (3)	1 (3)	1 (2)	1 (1)
ple.27.89a	1 (2)	2 (2)	1 (1)	1 (1)
pok.27.7-10	2.3 (3)	1.7 (3)	1 (3)	1 (2)
pol.27.67	1.5 (3)	1 (2)	1 (2)	1 (1)
pol.27.89a	1.5 (2)	2 (2)	1 (2)	1 (2)
sbr.27.10	1 (1)	3 (1)	1 (1)	1 (1)
sbr.27.6-8	1 (1)	1 (1)	1 (1)	1 (1)
sbr.27.9	1 (2)	2 (2)	1 (2)	1 (2)
sho.27.89a	1 (2)	2 (2)	1 (2)	1 (2)
sol.27.7a	1.7 (2)	1 (1)	1.3 (2)	
sol.27.7bc	1 (1)		1 (1)	
sol.27.7e	1.5 (1)	1 (1)	1 (1)	
sol.27.7fg	1.2 (3)	1 (2)	1 (3)	1 (1)
sol.27.7h-k	1.2 (3)	1 (2)	1 (3)	1 (1)
sol.27.8ab	1 (2)	1 (2)	1 (2)	1 (1)
sol.27.8c9a	1 (2)	2 (2)	1 (2)	1 (2)
syc.27.67a-ce-j	1.3 (2)	1 (2)	1 (1)	1 (1)
syc.27.8abd	1 (2)	1 (2)	1 (1)	1 (1)
syc.27.8c9a	1.5 (2)	2 (2)	1 (2)	1 (2)
syt.27.67	1.5 (1)	1 (1)		
usk.27.6b		2 (1)		
whg.27.6a	1.5 (2)	1 (1)	1 (2)	1 (1)
whg.27.6b	2 (1)	1 (1)	1 (1)	
whg.27.7a	2 (2)	1.7 (2)	1 (1)	
whg.27.7b-ce-k	1.3 (2)	1 (2)	1 (2)	1 (1)
whg.27.89a	1 (3)	1.7 (3)	1 (2)	1 (2)

Variable

North Atlantic stocks, Q3 2022
(number of countries
in brackets)
3 - high impact
2 - medium impact
1 - low or no impact

North Atlantic stocks Q4 2022



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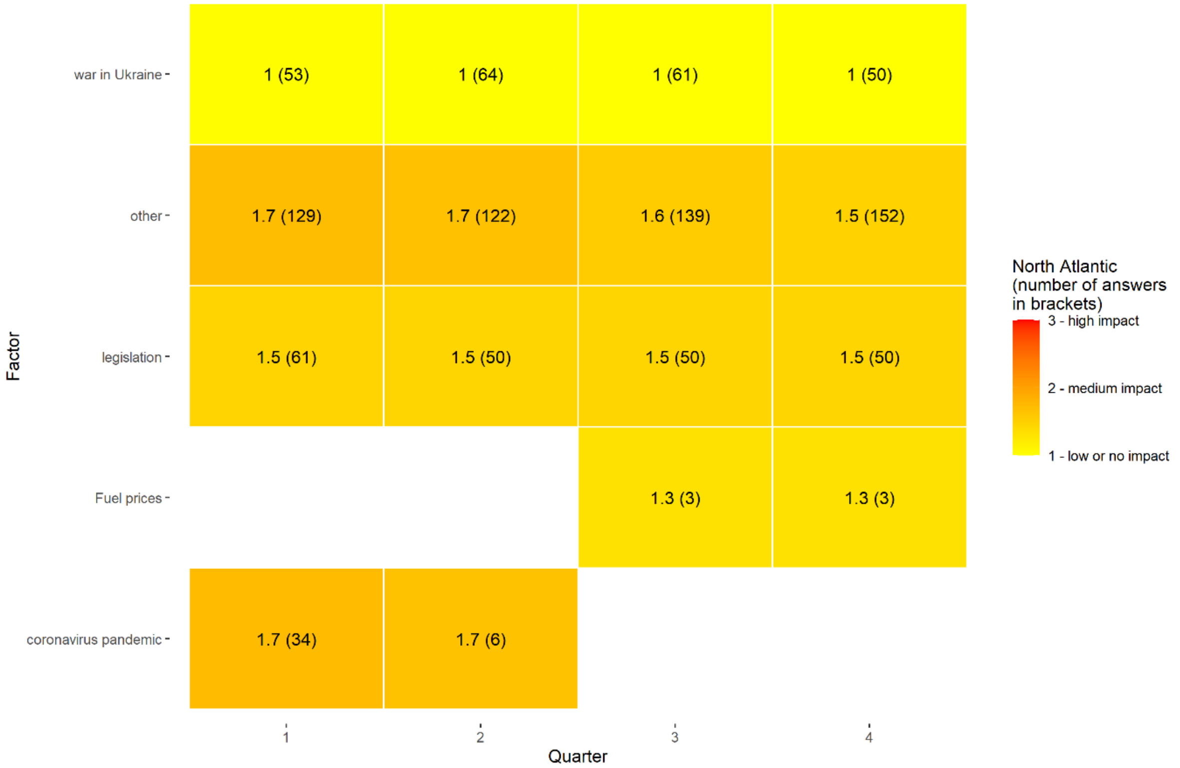
North Atlantic region – supplementary plots



Pan-regional stocks

Pan-regional stocks Q1 2022

Stock	Effort	At sea sampling	On shore sampling	Surveys
alf.27.nea	1 (1)	3 (1)	1 (1)	1 (1)
anf.27.3a46	1.3 (2)	1 (2)		
aru.27.123a4	2 (1)	1 (1)	1 (1)	
aru.27.6b7-1012		1 (1)	1 (1)	1 (1)
bli.27.nea		1 (1)	1 (1)	1 (1)
bsf.27.nea	1 (1)	2 (2)	1 (2)	1 (2)
bss.27.4bc7ad-h	1.8 (2)	1.7 (2)	2 (1)	
ctc.27.nea	1.5 (1)	1 (1)		
dgs.27.nea	1.5 (2)	1.7 (3)	1 (1)	1 (1)
ele.2737.nea			1 (1)	
gag.27.nea	1.2 (3)	1.5 (3)	1 (2)	1 (2)
gfb.27.nea	1 (2)	1.7 (3)	2 (2)	1 (2)
ghl.27.561214		1 (1)		
gur.27.3-8	1.5 (3)	1.4 (4)	1 (2)	1 (1)
had.27.46a20	1.3 (5)	1.5 (5)	1 (2)	1 (1)
her.27.1-24a514a	2 (1)	2 (2)	1 (1)	
hke.27.3a46-8abd	1.4 (4)	1.8 (4)	2 (2)	1 (1)
hom.27.2a4a5b6a7a-ce-k8	1.3 (3)	1.7 (3)	1.7 (3)	1 (1)
lez.27.4a6a	1 (1)	1 (1)		
lin.27.3a4a6-91214	1.2 (3)	1.5 (3)	2 (2)	1 (1)
mac.27.nea	1.4 (4)	1.4 (6)	1.5 (4)	1.2 (4)
occ.27.nea	1.5 (1)	1 (1)		
pok.27.3a46	1 (2)	1.5 (3)	1 (1)	
Rajidae	1.7 (5)	1.7 (5)	1.6 (4)	1 (2)
reb.2127.dp;reb.2127.sp;reb.27.14b	1 (1)	1 (1)	1 (1)	1 (1)
rng.27.5a10b12ac14b;rng.27.5b6712b	1 (1)	1 (1)	1 (1)	1 (1)
rng.27.5b6712b	1 (1)	1 (1)	1 (1)	1 (1)
sck.27.nea	1 (1)	3 (1)	1 (1)	1 (1)
sdv.27.nea	2 (1)	2 (3)	1 (1)	1 (1)
spr.27.7de	2 (1)	1 (1)	1 (1)	
sqc.27.nea	1 (1)	1 (1)		
sqr.27.nea	1 (1)	1 (1)		
whb.27.1-91214	1.3 (3)	1.5 (4)	1 (4)	2 (3)

Variable

Pan-regional stocks, Q1 2022 (number of countries in brackets)
3 - high impact
2 - medium impact
1 - low or no impact

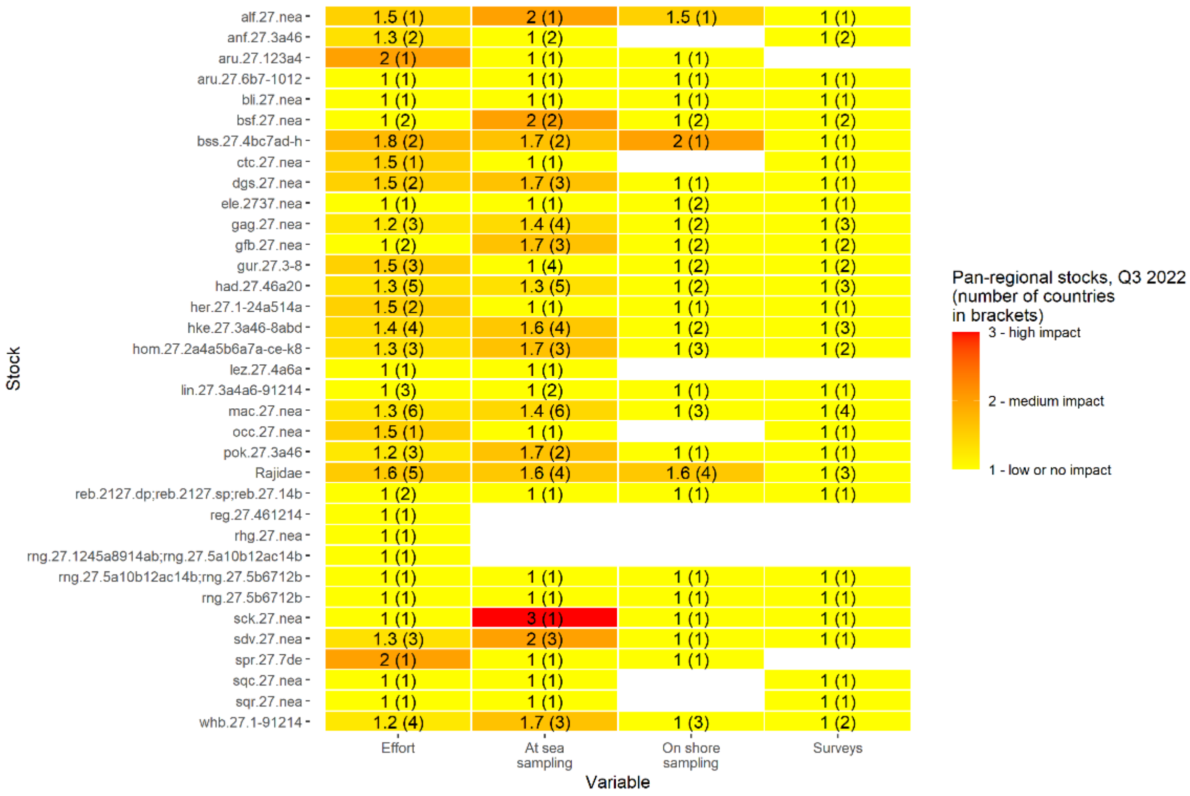
Pan-regional stocks Q2 2022

Stock	Effort	At sea sampling	On shore sampling	Surveys
alf.27.nea	1 (1)	3 (1)	1 (1)	3 (1)
anf.27.3a46	1.3 (2)	1 (2)		
aru.27.123a4	2 (1)	1 (1)	1 (1)	
aru.27.6b7-1012	1 (1)	1 (1)	1 (1)	1 (1)
bli.27.nea	1 (1)	1 (1)	1 (1)	1 (1)
bsf.27.nea	1 (1)	2 (2)	1 (2)	1 (2)
bss.27.4bc7ad-h	1.8 (2)	1.7 (2)	2 (1)	
ctc.27.nea	1.5 (1)	1 (1)		
dgs.27.nea	1.5 (2)	1 (2)	1 (1)	1 (1)
ele.2737.nea			1 (1)	
gag.27.nea	1.2 (3)	1.5 (3)	1 (2)	2 (2)
gfb.27.nea	1 (2)	2 (2)	1.5 (2)	3 (1)
ghl.27.561214		1 (1)		
gur.27.3-8	1.5 (3)	1 (3)	1 (2)	1 (1)
had.27.46a20	1.3 (5)	1.6 (4)	1 (2)	1 (1)
her.27.1-24a514a	2 (1)	1 (1)	1 (2)	
hke.27.3a46-8abd	1.4 (4)	1.5 (3)	1.5 (2)	1 (1)
hom.27.2a4a5b6a7a-ce-k8	1.3 (3)	1 (2)	2 (2)	1 (1)
lez.27.4a6a	1 (1)	1 (1)		
lin.27.3a4a6-91214	1.2 (3)	1 (2)	2 (1)	1 (1)
mac.27.nea	1.5 (3)	1.3 (5)	1.7 (3)	1.7 (3)
occ.27.nea	1.5 (1)	1 (1)		
pok.27.3a46	1 (2)	1.3 (2)		
Rajidae	1.7 (5)	1.6 (4)	1.6 (4)	2 (2)
reb.2127.dp;reb.2127.sp;reb.27.14b	1 (1)	1 (1)	1 (1)	1 (1)
rng.27.5a10b12ac14b;rng.27.5b6712b	1 (1)	1 (1)	1 (1)	1 (1)
rng.27.5b6712b	1 (1)	1 (1)	1 (1)	1 (1)
sck.27.nea	1 (1)	3 (1)	1 (1)	3 (1)
sdv.27.nea	2 (1)	2 (2)	1 (1)	1 (1)
spr.27.7de	2 (1)	1 (1)	1 (1)	
sqc.27.nea	1 (1)	1 (1)		
sqr.27.nea	1 (1)	1 (1)		
whb.27.1-91214	1.3 (3)	1.7 (3)	1.5 (4)	1 (1)

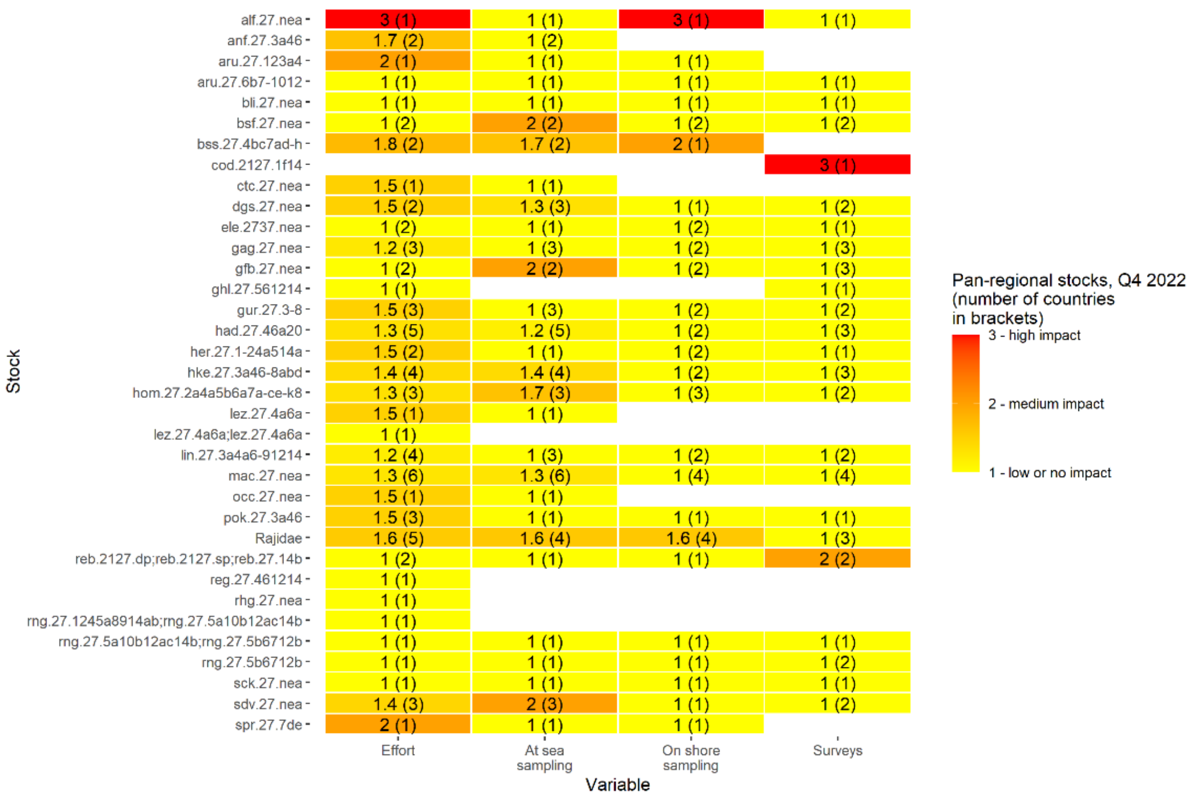
Variable

Pan-regional stocks, Q2 2022 (number of countries in brackets)
3 - high impact
2 - medium impact
1 - low or no impact

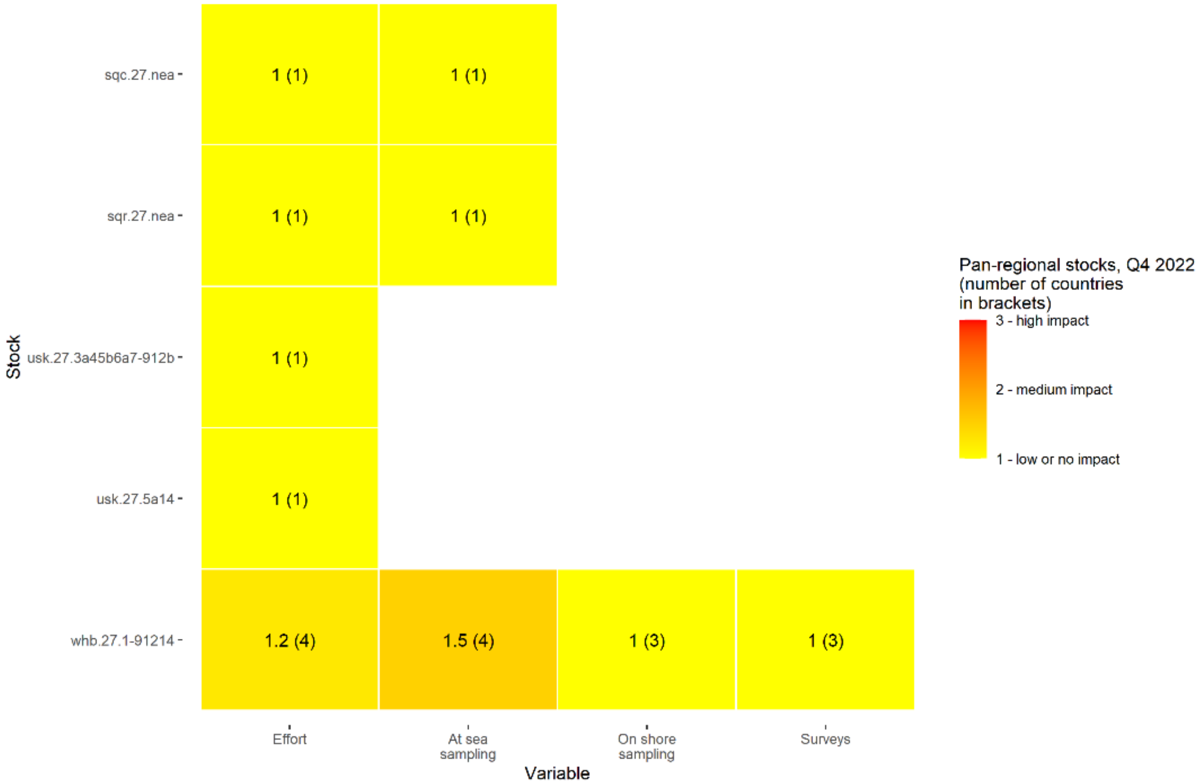
Pan-regional stocks Q3 2022



Pan-regional stocks Q4 2022



Pan-regional stocks Q4 2022



Pan-regional – supplementary plots

2 ISSG RDB Catch, Effort and Sampling Overviews

2.1 Background

The intersessional subgroup on Catch, Effort and Sampling Overviews was established by LM 2018 to streamline and facilitate the work on the fisheries and sampling data of the MS and prepare data overviews in advance of the RCG meetings. Before the subgroup was set up, the different RCGs conducted data analysis and overviews separately with minimal exchange, resulting in redundancies and efficiency loss. Furthermore, a substantial part of the work was being carried out during the RCG meetings themselves and so not readily available to inform RCG preparation and meeting discussions. The intersessional subgroups are intended to work throughout the year, self-organising in terms of their work and having an RCG chair as point of contact. The pan regional subgroup on Catch, Effort and Sampling Overviews consists of members of all three RCGs (RCG NS&EA, RCG NA and RCG Baltic) and had Josefine Egekvist (chair RCG Baltic) as contact point during its activities.

It is chaired by Ana Cláudia Fernandes (IPMA, Portugal) and Lucía Zarauz (AZTI, Spain). The tasks and output from the subgroup fall into 2 main types of work i) To develop tools for internal RCG work and ii) Preparatory work for decision making, including input for regional work plans and working groups.

2.2 Work-plan

The RCG Baltic & NANSEA proposed the following tasks for this period 2022/2023:

1. Start to adapt the code of the fisheries and sampling overviews to the RDBES data
2. Simplification of the code for producing the annual fisheries overviews
3. Clarify the use of the different functions in the main code so it is more user friendly to perform the changes needed (e.g. by documenting the process, or numbering the functions in the code and in the folders)
4. Develop and test the template for the benchmarks
5. Use the WGBFAS overviews and their feedback for improvements, as a start point
6. Decide on a set of figures to be published in the RCG website
7. Continue to improve the overviews by incorporating the end users feedback

The subgroup chairs decided on a work plan in consultation with the responsible RCG chair and ISSG participants. The plan was elaborated in January 2023.

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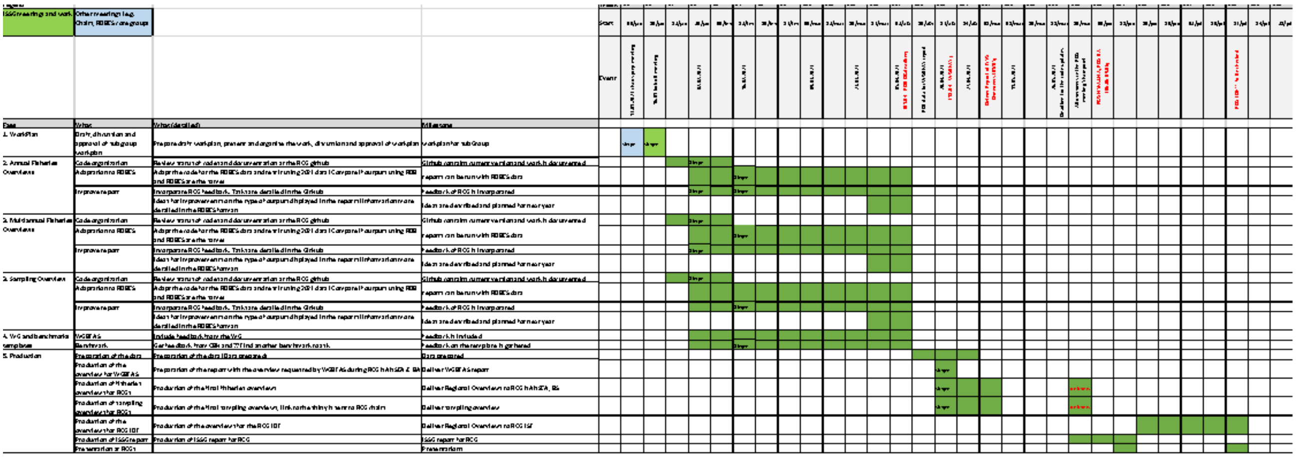

Figure 2.1 – Workplan prepared in January and updated with the ISSG work developments.

The group prioritised tasks 1, 4, 5 and 7. Accordingly, subgroup work was divided into five main blocks:

- **Development of the catch and effort overviews (annual, multiannual)**: to compile the feedback on the catch and effort overviews, update the codes and processes in the repository, integrate new outputs and produce the annual overviews for the last year and multiannual overviews for last six years for all three RCG regions.
- **Development of sampling overview (shiny)**: to compile and revise the feedback received on the sampling overview and develop the shiny app accordingly. This includes the updating of the codes and processes in the repository, the integration of new outputs and the production of the final app.
- **Development of WG and benchmarks templates**: to incorporate the feedback of WGFAS and produce the report and to develop a template for the benchmark and ask a benchmark group for feedback.
- **Adaptation to RDBES format**: This block of work covered the adaptation of the code of the fisheries and sampling overviews to the RDBES.
- **Other tasks.**

The decision on a set of figures to be published in the RCG website (task 6) was left to be worked on during the RCG TM 2023, so that it can be in line with the new Data Licence which is being developed.

The group acknowledges that the complexity of the code and the functions utilised in the annual overview, hamper it developments because it's a task that requires a high amount of time consumption to understand all the code, and these reasons limit the number of people actively involved in this work. Therefore, and due to limited resources and time, the tasks related with the simplification and clarification of the code used in the annual fisheries overview (task 1 and 3) were not prioritised for this period.

2.3 Progress during 2022-2023

The group met in biweekly online meetings (via Teams) from January 2023 dealing with specific tasks, reviewing progress and adjusting workloads. 10 group meetings were performed from January to June 2023. Minutes were circulated after each meeting (and put in the sharepoint) to keep a record on the progress achieved and tasks ahead.

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The format agreed in previous years for RDB data extraction and preparation was used with 2022 data. The data used for the work produced in this year does not include UK countries as a flag country, but they may be present in the cases of landings abroad.

The SharePoint (SP) for RCG Intersessional Work was used to hold documents, protocols, minutes and final overviews (04. Working documents/ISSG RDB Overviews). The SP was also used to store RDB data extracts (06. Data).

The group decided to keep and update the RCG GitHub (in the ICES EG section) as the repository for the r-scripts developed. The GitHub Projects facility was found very useful in recording the work progress. All the tasks to be performed by the group were compiled in the 'Projects' panel. There are 4 different projects ('WG and Benchmark templates', 'Multiannual fisheries overviews', 'Sampling overviews' and 'Annual fisheries overviews') with the description of the tasks to be accomplished for each of them. These tasks were prioritised, and people were assigned to develop each of them according to their availability and "expertise" in the subject. During the meetings, time was also used for clarification of the tasks and to discuss/agree on the way forward for the improvement of the overviews.

The incorporation of new participants as contributors to the RCG GitHub was delayed, hampering the start of ISSG work.

As the scripts become more complex, the group discussed the need to harmonise the coding style and define some best practices. A couple of style guides have been uploaded in the SP under the folder "Supporting documentation". In addition, some ideas applied by WGRDBES-EST whilst developing "RDBEScore" were borrowed:

- We generally use the "*Tidyverse*" style https://style.tidyverse.org/ except we use camelCase for variable names;.
- Prefer nouns when naming your objects; use concise and meaningful names; avoid using names of existing objects.
- Use verbs as start of function names (e.g., import…; generate…)
- It is preferable to use base R but the following packages (and their dependencies) are also allowed: *data.table*, and *dplyr* (not the whole *tidyverse*). If contributors wish/need to use other packages this must be discussed beforehand.

The work accomplished in the different blocks of work is described below:

2.3.1 Development of the catch and effort overviews (annual, multiannual) and of sampling overview (shiny):

The group reviewed the feedback of the different RCGs, the Liaison meeting and the NCs, received in previous years that was not incorporated yet.

Data preparation

The data preparation for producing the new reports was made after the deadline of the RDB data call and the data extraction (25th April). Some changes in the input data used for producing the overviews were performed:

- In the RCG TM feedback from previous years, there was a suggestion to have the vessel size range starting in '<8 m' instead of '<10 m' but, when trying to accommodate this in the data preparation, we realised that there are no specific records in the CE with that 'VesselLengthCategory' and in CL only one country in the Baltic reports data '<6 m' and present no information for the length range between '6-<10'. Those '<6 m' records were changed to ''<10m' for harmonisation of the outputs.
- There are some countries reporting the Atlantic chub mackerel as *Scomber japonicus*. This species is from the Pacific and does not occur in the Atlantic and Mediterranean waters. For that reason, the name of that species in the data was corrected to *Scomber colias*.
- In previous years the species of *Trachurus spp* were all reported together. However, there is specific data collection and sampling for *Trachurus trachurus* and some countries asked to keep it separated from the remaining *Trachurus* species. This change can also be observed in the overviews prepared this year.

The new data prepared that is used to produce the overview reports is stored in the 'Data' folder from the ISSG RCG SharePoint.

Development of the reports

The code was updated to run with the current R version, the texts were revised, and data policy links were updated. In addition, the following developments were discussed and/or performed:

Annual reports:

- The text was slightly improved and the data licence policy information was updated.
- The possibility of downloading Fleer Register Information data directly from the EC website was discussed. In more recent years the website changed, and the data format extracted from the website changed too. Now it's more complicated to read this data directly from the website. Also, the website has a known bug which means the data is not fully downloaded when there is a larger amount of information. In our case, we are downloading files for each country at the time, so there's not such a problem. The group decided to keep the same procedure from previous years.
- Regarding the representation of landings abroad, although the report already has a nice figure regarding this topic, the usefulness of the information on these landings abroad is related to when we have it by species/stocks, to help distribute the sampling effort allocation by country. The step forward is to explore and restrict the outputs to the species/stocks that are usually landed abroad, in each region. Then the way of visualisation of these results (e.g. spatial, plots, table?) can be better explored. This task was not accomplished this year and was postponed for the next year.
- Harmonisation of the naming and criteria used in the functions to produce the barplots and maps
- The inclusion of graphics with the information on the value by country and catch group was evaluated. There are many NAs in the data and that availability of information depends on the country (some countries do not provide this information at all). Two different options to present those results were discussed. One that includes 2 graphs, one with the value reported by country and another with the proportion of the value reported related to the landings to have an idea of the misreporting percentage of the species value, and the other option, where all the information is displayed in the same graph. The first option was selected to present this information, but it was not incorporated in the main code yet.

Multiannual reports:

- The text was slightly improved and the data licence policy information was updated.

Sampling overviews (shiny):

The work developed by the ISSG was performed in the current shiny app, using the RDB data format. The improvements were made to accommodate part of the feedback from previous years. The number of people involved in this part of the work is still low, but even so, some progress was made:

- The code relative to the interactive map hosted in the application was reviewed. The possibility of filtering by catch category has been added to the user interface sampling explorer. The map has been implemented with the possibility of showing statistics for each of the coordinates combinations by using pop-ups. Other than the variable of interest that is selected by the user (one of: "Number of fish with age recorded", "Numbers of trips with age samples", "Number of weight measurements", "Numbers of trips with recorded weight", "Numbers of fish with maturity stage readings", "Numbers of trips with recorded maturity stage", "Numbers of fish with length measurements", "Numbers of trips with length samples"), the statistics contained in the pop-ups are: "Vessel country flag", "Number of trips contributing", "Quarter", "Species", "Sampling type", "Latitude", "Longitude". The pop – ups are opened and closed on-click. It has been discussed the implementation of graphs and tables in these pop-ups to show interactions between variables considered. This might be developed in the future.
- The code relative to the inventory tables was reviewed. According to the to-do list, a new table was added in order to summarise the data using the information contained in the trip record type (TR) of the commercial sampling (CS) table in The Regional DataBase (RDB) Exchange Format. This table is thus named "TR inventory table" and aggregates the data for the variables "VesselIdentifier" and "Harbour" (among other variables shared with the other two inventory tables) to calculate the number of fish measured, the number of trips with length samples and the weight.
- An "app.R" file script has been added to the application´s root folder. This file launches the application by calling directly the relevant scripts.
- In order to facilitate the collaboration and save time for new programmers contributing to the project, some of the scripts have been formatted and modified in order to include a header and/or comments providing explanations of their content and their aim.

The group discussed if the sampling reports shall include some spatial analysis of the data. At this stage, it was decided to prioritise the developments proposed during the RCG TM, but this task can be implemented in future years.

In the 'Sampling overviews' GitHub project, there is a task related to the analysis of the sampling coverage that was started in 2020/2021 and was postponed in the latest years. The approach to use still needs to be a bit explored and discussed.

- In the draft report of Fishn'Co, there is a similar analysis using the RDBES data format and also WGRDBES-EST is starting the work on the development of the R package 'RDBESviasualise'. It will be important to have some kind of coordination between the group of people involved in these work developments, not to overlap/duplicate tasks.

The shiny up is getting more complex and it is difficult to find the bugs. There was a proposal to use the *golem* R package for the app and to document it. It will be useful to improve the development of the app.

The whole set of code needed for running the app is stored on the subgroup GitHub. Moreover, as last year, the app will be launched on the AZTI shinyapps.io, where all the people with data access can run the app on their own. There is also a download functionality, to allow the usage of these data for e.g. reports and data requests. The document on sampling statistics contains exemplary overviews on sampling intensity and distribution of the most recent year and it also contains the information on how to set up the shiny R application on personal devices.

Production of the overviews

The different reports were then produced with the new data and minor changes of the code were still performed to improve the presentation of the results. These reports are available in the SharePoint for RCG Intersessional Work (Working documents/ISSG Overviews):

- Annual overviews for each region (NSEA, NA and BA) – word documents
- Annual overviews for the Small Scale Fisheries (SSF) for each region (NSEA, NA and BA) – word documents
- Multiannual overviews by region (NSEA, NA and BA) for the period (2016-2021) – html documents
- Sampling overview: shiny app and word document

2.3.2 Development of WG and benchmarks templates

After the last RCG Technical Meeting it was prepared a Benchmark template document to be presented at the RCG Decision Meeting and agreed by the National Correspondents (NCs). The document was accepted by all NCs present, and the step forward was to take it to the CBH Benchmark to be tested and discussed. At the end, the template was not presented during the proposed benchmark and no other benchmark was suggested on time to be discussed. The group would like to have RCG TM input regarding other potential benchmarks where the template can be presented and the group can take some feedback for improvements, in order to have a final version ready at the RCG TM 2024.

For WGBFAS, the overviews prepared and sent to the group had the same format and type of information reported in previous years.

The group reviewed the feedback received from WGBFAS in 2022. The code was updated to run with the current R version, the texts were revised, and data policy links were updated. In addition, the following developments were made:

- The code for producing these species reports was improved to be able to produce individual reports by species using the same script;
- In the section of Annual Landing and Effort were added Statistical Rectangle in the axis of the maps.
- For stocks were created maps with Annual Landing and Effort by Statistical Rectangle and plots of Landings(1000t) by Metier level 5.

The WGBFAS reports were presented for cod, sprat, plaice and herring and sent to the WG on time. These reports are available in the SharePoint for RCG Intersessional Work (Working documents/ISSG Overviews).

This ISSG has already received the WGBFAS 2023 feedback and the group appreciated the support of this ISSG and the provision of the stock overviews. Several of the graphs (e.g. annual landings by species and by stock per rectangle; Total landings number of trips sampled for lengths/ages; Annual fishing effort) will be used in the 2023 report and have proven very helpful in discussions during the groups meeting in April 2023. WGBFAS will also inquire about the possibility of using some of the graphs in the Fisheries overview section (which is managed by WKFOG and thus needs their approval). The use of these graphs in the WGBFAS report is possible because the respective National Correspondent gave them permission to use the figures, regardless of the restriction made by the Data License).

In the 2023 feedback, WGBFAS requested a stock overview for Baltic Sea flounder and its stocks, and made several suggestions on how to improve the maps and figures in 2023/2024 ISSG work:

1. Landing and effort maps:
   - Map titles and labels need improvement and better description
   - For herring and sprat: Monthly (instead of quarterly) overviews for landings and effort
   - For herring and sprat: Landings: pie-chart per rectangle showing mixing of SPR and HER

2. Metier overview:
   - Should be by species/stock

3. Sampling intensity and location maps (large interest to use after correction by WGBFAS)
   - Map titles and labels need improvement and better description
   - Adding Management area (or Subdiv borders) to the maps
   - Sampling intensity needs to be shown by species or stock (bubbles are now identical between the documents and stocks)
   - Instead of GPS coordinate bubbles, aggregate by rectangle?
   - Or combine landings and sample bubbles to a unit sampled/landings or effort (to lose one of the variables and make the maps easier to read, esp. the quarterly maps)

4. Gear sampling overview (highly appreciated by WGBFAS)
   - Spell out the gear names for report reader to understand
   - Sort gears by importance or landings?
   - Similar to sampling maps: maybe combine variable to a sampling cpue and reduce variables displayed (only color code for landings vs. sampled)

2.3.3 Adaptation to RDBES format

In relation to the conversion to RDBES data format, there was a discussion about whether to (1) adapt the scripts, so that they can run with the new RDBES format, or (2) adapt RDBES data into RDB format, so that we can keep the code as it is and maintain compatibility of the time series in the multiannual reports.

As a first approach, it was decided to adapt RDBES data into RDB format to produce the annual and multiannual catch and effort overviews. This also gives the chance to investigate possible deviations of the outputs obtained when compared to the RDB, although this type of investigation can be done under another forum (e.g. quality reporting issues) and is questionable if this ISSG could/should do it or not.

Regarding the CL and CE tables, the work of looking into the compatibility of fields between the two formats and the evaluation of the best way to do the conversion started to be performed but it was not completed. For this reason, the production of the new input data, derived from the RDBES data format, was not fully accomplished and no reports were produced. The group expects to finish this task during the next period of work (2023-2024). In the meanwhile, the group would like to discuss this approach during RCG TM and have some opinions on the best way to do the transition for the new input data and reporting.

The adaptation of CS data is more complex, as it includes several hierarchies with different sampling designs and a lot of new variables. Because of this complexity, the group decided not to convert RDBES data into RDB format to be used/tested in the present shiny app. Instead, the group decided to develop (or adapt) a new shiny app specifically for the new RDBES data format, that will allow the presentation of more different types of information about the sampling and the data. In order to avoid duplication of effort this work should be collaboratively performed between this ISSG's members and the ICES Working Group on Estimation with the RDBES data model (WGRDBES-EST) members that are contributing to the development of the R package *RDBESvisualise* https://github.com/ices-tools-dev/RDBESvisualise . Since the RDBES data format allows more detailed recording of sampling information it will be important to spend time planning which data are the most useful for users to explore in an app. Previous discussions in the FishNCo project have highlighted that the coverage (e.g. spatial, temporal, technical) of sampling programmes is of interest, as are variance estimates.

Then, there will be two different apps for the sampling data. One for the RDB data which is the one used and developed so far, and another to run with RDBES data (in 2024 the RCG data call will only ask for RDBES data), that will continue to be developed in a collaborative way with WGRDBES-EST.

2.3.4 Other tasks

2.3.4.1 Gillnet fisheries in the Baltic

We received a request from ICES in August, asking if we could assess the decrease in the effort due to the drastic reduction of gillnet fisheries in the Baltic Sea. The request came from an informal question from DGMARE.

A multiannual overview in the Baltic adapted to display only the GNS and GTR fleet was produced and sent to ICES, which found it very useful. However, the report was not sent to DGMARE. After consultation with RCG and WGRDBESGOV chairs, we decided to keep it restricted, until we have the revision of the data licence, which is in progress now.

2.3.4.2 Input for ISSG PETS

The chair of ISSG PETS contacted this ISSG to ask if it would be feasible to identify all the fisheries that are not sampled in the NANSEA & Baltic regions. This subject was a request made by DGENV during WKPETSAMP2. The aim would be to identify if those fisheries could be considered as high-risk fisheries in what relates to the different PET groups or species.

This request will be discussed and evaluated during the RCG TM 2023.

2.4 Roadmap/follow-up

The work of the subgroup will be presented during the 2023 RCG TM. The tasks proposed for the next period will be decide during the RCG TM (this report will be updated accordingly with the tasks decided)

The subgroup will continue the work on a regular basis throughout the year to improve their achievements and give feedback to the RCG-chairs in regular intervals.

2.5 SG Participants

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3 ISSG Métier and transversal variable issues

3.1 Background

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

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

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

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

3.2 Work - plan

ToRs and work plan (specific tasks) for 2022 - 2023:

1. Continue following and evaluating the implementation of the métier codes and maintaining métier reference lists and script.
2. Advice on standardization and harmonization of métier coding on a pan-regional level (RCG NANSEA and Baltic, RCG Med&BS, RCG LDF, RCG LP).
3. Make métier descriptions from the 2022 RDBES data call (which is not a test data call for the CE and CL data).
4. Review the fecR package (calculating fishing effort) in relation to the RDBES data format.
    a. This should include a review of scenarios where no logbook data are available.
    b. Possible collaboration with ISSG SSF and RCG MED&BS on this.
    c. Possible questionnaire on fecR package (are MS using it for RDBES data preparation).
5. Link with the alternative fleet segmentation suggested by RCG Econ to enhance the link between the two approaches. Analysis of the variation in métiers within the fleet segmentation.

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

3.3 Progress during 2022 -2023

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

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

3.4 Roadmap/follow-up

Main outcomes and communication between the ISSG and other groups

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

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

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

1. Continue following and evaluating the implementation of the métier codes on a pan-regional level and maintaining métier codes and other reference lists and script.
2. Update métier descriptions from the 2023 RDBES data call *(tables CE & CL)*
3. Based on information received from the questionnaires sent out in spring 2023, evaluate the use of cross-validation methods in MS to combine data coming from different declarative sources, the ongoing common practices and develop, on this basis, best practices guidelines, with a focus on the RDBES CE and CL tables.
4. Work on a template to document CE and CL data uploaded to RDBES[1]
5. Continue following up on the development of the fecR package and its efforts to calculate fishing effort metrics that are harmonized/homogenized between MS (note: depends on the outcome of upcoming FDI meetings)
6. Continue following the development under RCG-Econ of an alternative fleet segmentation and advice on it in order to enhance and keep the link between the two approaches[2] (depending on the RCG-Econ work on this especially the feedbacks of the 3rd workshop scheduled in May 2023)

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

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

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

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

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

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

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

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

The updated métier codes reference list (at DCF level 6 and level 7) is available under the ISSG GitHub and is included in the FDI data call annexes recently issued. The list has also been sent to ICES data center and the métier DCF level 6 vocabulary //vocab.ices.dk/?ref=1647, i.e., CodeType=Metier6_FishingActivity has been updated as well as the métier DCF level 7/National fishing activity vocabulary //vocab.ices.dk/?ref=1614, i.e. CodeType=NationalFishingActivity for tuna fisheries.

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

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

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

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

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

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

Métier code discussed	Agreement
LLS_DEF_6_0_0	Accept to be changed into the following métier code "LLS_DEF_0_0_0" depending on the general acceptance from RCG LDF in their next meeting
MIS_DES_0_0_0	Accept to be changed into the following métier code "MIS_MIS_0_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_CRU>=40_0_0	Accept to be changed into the following mesh size range "OTB_CRU_3269_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_DEF_>=70_0_0	Accept to be changed into the following mesh size range "OTB_DEF_70119_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_DEF_>=80_0_0	Accept to be changed into the following mesh size range "OTB_DEF_70119_0_0" depending on the general acceptance from RCG LDF in their next meeting
OTB_MCF_>=70_0_0	Accept to be changed into the following mesh size range "OTB_MCF_70119_0_0" depending on the general acceptance from RCG LDF in their next meeting
PS_SPF_0_0_0	Accept to be changed into the following métier code "PS_SPF_>0_0_0" depending on the general acceptance from RCG LDF in their next meeting
PS_SPF_10_0_0	Accept to be changed into the following mesh size range "PS_SPF_10-31_0_0" depending on the general acceptance from RCG LDF in their next meeting

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

Métier code discussed	Agreement
OTM_DEF_100-129_0_0	Accept to be changed into the following mesh size range "OTM_DEF_100119_0_0" depending on the general acceptance from RCG LDF in their next meeting

Métier code discussed	Agreement
OTB_DWS_100-129_0_0	Accept to be changed into the following mesh size range "OTB_DWS_100119_0_0" depending on the general acceptance from RCG LDF in their next meeting

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

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

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

Métier	Description
GNC_DEF_<16_0_0	Encircling gillnets, Demersal species, mesh size less than 16 mm
GNC_DEF_>=16_0_0	Encircling gillnets, Demersal species, mesh size larger than or equal 16 mm
GNC_DEF_>0_0_0	Encircling gillnets, Demersal species, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
GTN_DEF_<16_0_0	Combined gillnets-trammel nets, Demersal species, mesh size less than 16 mm
GTN_DEF_>=16_0_0	Combined gillnets-trammel nets, Demersal species, mesh size larger than or equal 16 mm
GTN_DEF_>0_0_0	Combined gillnets-trammel nets, Demersal species, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
LA_LPF_>0_0_0	Lampara *(surrounding nets without purse lines)*, Large pelagic fish, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
LA_LPF_<14_0_0_0	Lampara *(surrounding nets without purse lines)*, Large pelagic fish, mesh size less than 14 mm
LA_LPF_>=14_0_0	Lampara *(surrounding nets without purse lines)*, Large pelagic fish, mesh size larger than or equal 14 mm
LA_SLP_>0_0_0	Lampara *(surrounding nets without purse lines)*, Small and large pelagic species, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
LA_SLP_<14_0_0_0	Lampara *(surrounding nets without purse lines)*, Small and large pelagic species, mesh size less than 14 mm
LA_SLP_>=14_0_0	Lampara *(surrounding nets without purse lines)*, Small and large pelagic species, mesh size larger than or equal 14 mm
LA_SPF_>0_0_0	Lampara *(surrounding nets without purse lines)*, Small pelagic fish, mesh size larger than 0 (to be used in cases where the mesh size is unknown)
LA_SPF_<14_0_0_0	Lampara *(surrounding nets without purse lines)*, Small pelagic fish, mesh size less than 14 mm
LA_SPF_>=14_0_0	Lampara *(surrounding nets without purse lines)*, Small pelagic fish, mesh size larger than or equal 14 mm
LH_SPF_0_0_0	Hand and pole lines (not specified), Small pelagic fish, no mesh size specified
LHM_SPF_0_0_0	Hand and pole lines (mechanized), Small pelagic fish, no mesh size specified
LHP_SPF_0_0_0	Hand and pole lines (hand-operated), Small pelagic fish, no mesh size specified
LLD_DEF_0_0_0	Drifting long lines, Demersal fish, no mesh size specified
LTL_DEF_0_0_0	Trolling lines, Demersal fish, no mesh size specified
LTL_FIF_0_0_0	Trolling lines, Finfish, no mesh size specified
SX_DEF_0_0_0	Beach and boat seines, Demersal species, no mesh size specified

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

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

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

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

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

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Métier	Request origin	Recommendations during ISSG meeting 26/1-2023
		For GTR, the following codes are already integrated in MBS reference list: CEP, CRU, DEF & MOL. ISSG considers that using unspecified group of species (=MIS) in the métier reference list should be avoid.
HAR_DEF_0_0_0	List from RCG Med&BS after September meeting	HAR is not listed as gear in EU-MAP table 5 (reference list used by ISSG for gear). Can one of the following métiers be used instead: DIV_DEF_0_0_0 (Diving) FOO_DEF_0_0_0 (Fishing on foot) If yes, they should be added.
LA_SLP_>=14_0_0	Request from Spain	The following métier codes can be added (see above) to the reference list: LA_SLP_>0_0_0 LA_SLP_<14_0_0 LA_SLP_>=14_0_0 LA_SPF_>0_0_0 LA_SPF_<14_0_0 LA_SPF_>=14_0_0 LA_LPF_>0_0_0 LA_LPF_<14_0_0 LA_LPF_>=14_0_0 Following mesh size ranges agreed for MBS list and purse seines gears. Including also SPF and LPF group of species if they could be assessed, it is better than SLP, mixed group of species, which at least could not be calculated from the R-script.
LH_MIS_0_0_0	List from RCG Med&BS after September meeting	Is the target species assemblage unknown? Can one of the codes from EU-MAP be used: ANA: Anadromous CAT: Catadromous CEP: Cephalopods CRU: Crustaceans DEF: Demersal fish DES: Demersal species DWS: Deep-water species FIF: Finfish (try to avoid) FWS: Freshwater species GLE: Glass eel LPF: Large pelagic fish MCD: Mixed crustaceans and demersal fish MCF: Mixed cephalopods and demersal fish MDD: Mixed demersal and deep-water species MOL: Molluscs MPD: Mixed pelagic and demersal fish SLP Small and large pelagic fish SPF: Small pelagic fish For LH, the following codes are already integrated in MBS reference list: CEP, DEF, FIF & LPF (+ SPF which will be added). ISSG considers that using unspecified group of species (=MIS) in the métier reference list should be avoid.
LHP-LHM_CEP_0_0_0	Request from Spain	Recommend using the métier code "LH_CEP_0_0_0" (already in the reference list)

Métier	Request origin	Recommendations during ISSG meeting 26/1-2023
LHP- LHM_FIF_0_0_0	Request from Spain	Recommend using the métier codes "LH_FIF_0_0_0" or "LH_DEF_0_0_0" which are already in the reference list.
LHM_DWS_0_0_0	List from RCG Med&BS after September meeting	Listed in the métier list but marked as 'to be included at regional level' as 'No'? should we include this new group of species (DWS – Deep-water species) in MBS list for LH gears? If yes the following métier codes can be added to the list: LHP_DWS_0_0_0 LH_DWS_0_0_0 LHM_DWS_0_0_0
LHM_LPF_0_0_0 & LHP_LPF_0_0_0	List from RCG Med&BS after September meeting	Already in the MBS métier codes reference list
LHP_FIF_0_0_0	List from RCG Med&BS after September meeting	Already in the MBS métier codes reference list
LHP_SPF_0_0_0	List from RCG Med&BS after September meeting	The following métier codes can be added (see above) to the reference list: LHP_SPF_0_0_0 LH_SPF_0_0_0 LHM_SPF_0_0_0
LLD_DEF_0_0_0	List from RCG Med&BS after September meeting	The following métier code can be added (see above) to the reference list: LLD_DEF_0_0_0
LLS_DEF_0_0_0	List from RCG Med&BS after September meeting	Already in the MBS métier codes reference list
LLS_MIS_0_0_0	List from RCG Med&BS after September meeting	Is the target species assemblage unknown? Can one of the codes from EU-MAP be used: ANA: Anadromous CAT: Catadromous CEP: Cephalopods CRU: Crustaceans DEF: Demersal fish DES: Demersal species DWS: Deep-water species FIF: Finfish (try to avoid) FWS: Freshwater species GLE: Glass eel LPF: Large pelagic fish MCD: Mixed crustaceans and demersal fish MCF: Mixed cephalopods and demersal fish MDD: Mixed demersal and deep-water species MOL: Molluscs MPD: Mixed pelagic and demersal fish SLP Small and large pelagic fish SPF: Small pelagic fish For LLS, the following codes are already integrated in MBS reference list: CAT, DEF & FIF. ISSG considers that using unspecified group of species (=MIS) in the métier reference list should be avoid.
LTL_FIF_0_0_0	List from RCG Med&BS after September meeting	The following métier codes can be added (see above) to the reference list: LTL_FIF_0_0_0 LTL_DEF_0_0_0

Métier	Request origin	Recommendations during ISSG meeting 26/1-2023
		ISSG considers avoiding using FIF, preferred DEF which could be also calculated from the R-script.
MIS_MIS	List from RCG Med&BS after September meeting	Recommend using the métier code "MIS_MIS_0_0_0" (already in the reference list)
Misc	List from RCG Med&BS after September meeting	Recommend using the métier code "MIS_MIS_0_0_0" (already in the reference list)
SB-SV_DEF_0_0_0	Request from Spain	The following métier code can be added (see above) to the reference list: "SX_DEF_>0_0_0" ISSG considers that SX as a "mixed" gear is a codification more in line with the codifications agreed for the other gear codes.
SB_SPF_0_0_0	List from RCG Med&BS after September meeting	Recommend using the métier code "SB_SPF_>0_0_0" (already in the reference list)

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

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

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

Figure 3.1 resumes the check done from the FDI data. Green indicates that the métier is already in the LDF métier code reference list, yellow means that the métier can be recoded into a métier code available in the reference list and red means that the métier code is not in the LDF métier code reference list. Most of the métier codes colored with red have very few fishing days (<10 fishing days in lot of the cases) and it is some years ago since they have been used. For the two métiers with more than 10 fishing days : 1) the métier code "OTB_MOL_60-89_0_0" has been used recently, but is now replaced by a new accepted métier code used by Spain *("OTB_CEP_>0_0_0")* and it could be recoded in it and 2) the métier code "OTB_MCD_0_0_0" has been used only in 2014, 2016 and 2017 by Portugal, and the code is not in use anymore. Therefore, no changes are needed on the LDF métier list in the NAFO area.

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

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

Figure 3.1: Métier codes submitted for NAFO areas for the FDI data call 2014-2020 (from public effort table)

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

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

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

Background

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

For tuna fisheries *(carried out by Large Pelagic Fisheries and monitored by tuna fisheries RFMOs (ICCAT, IATTC, IOTC, WCPFC & CCSBT))*, Spain has uploaded the métiers on a DCF level7 in the METIER field for the FDI data call. The métier on DCF level7 are more precise than the ones on DCF level6 and could include for example the specific principal target species in addition to the target species assemblage. The métier codes provided by Spain in the FDI data call were those agreed by RCM Med&BS and LPF in 2014. Spain highlighted that for tuna fisheries' monitoring and evaluation, as agreed by Tuna fisheries RFMOs and RCG LPF, it is necessary to consider this level as target species assemblage remain insufficient overlapping different species composition and fisheries which should be considered separately. Otherwise, the quality of the data would be compromised. Since the codes on this level don't fit with the level 6 structure, and to keep harmonization and standardization between regions, fisheries and countries, it has been suggested to introduce an optional métier field for DCF level7 in the FDI data call to solve the issue.

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

FDI data call specifications

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

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

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

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

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Métier on DCF level 7	Description of target species that are added to the métier on DCF level 6	ISSG suggestion for métier codes in meeting 26/1-2023
PS_LPF_>0_0_0 (TROP) PS_LPF_10-31_0_0 (TROP) PS_LPF_32-69_0_0 (TROP) PS_LPF_70-119_0_0 (TROP) PS_LPF_>=120_0_0 (TROP)	Combinaton of the following tuna species: Yellowfin tuna (Thunnus albacares) Skipjack tuna (Katsuwonus pelamis) Bigeye tuna (Thunnus obesus)	PS_LPF_>0_0_0_TRO PS_LPF_10-31_0_0_TRO PS_LPF_32-69_0_0_TRO PS_LPF_70-119_0_0_TRO PS_LPF_>=120_0_0_TRO
PS_LPF_>0_0_0 (BFT) PS_LPF_<14_0_0 (BFT) PS_LPF_>=14_0_0 (BFT)	Only for MED&BS area Bluefin tuna (Thunnus thynnus)	PS_LPF_>0_0_0_BFT PS_LPF_<14_0_0_BFT PS_LPF_>=14_0_0_BFT

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

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

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

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

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

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

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

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

A/ General overview

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

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

Table 3.1 : Fishing days and landings by country provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage from the country in relation to the total effort/landings.

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

Table 3.1 show that a total of more than **1 200 thousand fishing days** have been provided for almost **2,5 million tons**. **Portugal** did **not** provide any **fishing effort data** *(table CE)*, only landings data have been provided *(table CL)*. Almost 60% of the total fishing days provided were performed by Spain and France. Spain, France, Denmark and Netherlands contribute each to more than 10% of the total landings provided.

Table 3.2 show the same information by vessel length groups. All the 14 countries provided data for less than 10 meters *(VL0010)*, 10-12 meters *(VL1012)* and more than 12 meters *(VL12XX)* length vessels. Ireland provided only landings data for less than 10 meters (no fishing effort data). Belgium do not have any vessels less than 10 meters length and provided only ~100 fishing days for 10-12 meters length vessels. Finally, Germany provided few landings data (20 tons) with vessel length information not informed *("NK")*.

Table 3.2: Fishing days and landings by country and vessel length group provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage from the country in relation to the total effort/landings. In addition, the column KG/Fishing Days show the landing per fishing day.

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

B/ MIS métiers submission

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

Table 3.3: Number of countries providing data by gear code for the RBDES 2022 data call for 2021 data. In addition, fishing days, landings by gear and % FishingDays and % Landings from the gear in relation to the total effort/landings.

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

Table 3.3 show that **only 6 countries** provided **at least one** row with a "MIS métier": Denmark, France, Ireland, Netherlands, Sweden and Portugal. Other countries do not provide any "**MIS métier**". It represents a total of **around 4,4 thousand Fishing Days** for **around 77 thousand tons** i.e. **less than 0.5% of the total fishing days** and **~3% of the total landings** provided.

Table 3.4: Number of countries reporting MIS gear code and the métier DCF level 5 code. In addition, fishing days, landings by métier level 5 code and %Fishing Days and %Landings from the level 5 group in relation to the total MIS effort/landings.

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

The possibility given to countries to provide the targeted group of species with a "MIS fishing gear" has been used by few countries according to table 3.4, except France which provided data for its seaweeds' fishery with the code **"MIS_SWD".** This métier code could be **converted** into the **"HMS_SWD"** métier code i.e. **"Harvesting gear Seaweeds"**. It represents ~50% of the total Fishing Days provided with a "MIS fishing gear" and ~75% of the total landings *(more than 50 thousand tons)*. Therefore, the following continued analysis focused on the "MIS_MIS" métier submission in RDBES by country.

C/ MIS_MIS métier submission

The same **6 countries** provided at least one row with **"MIS_MIS" métier**. According to table 3.5 it represents a total of **around 1.6 thousand Fishing Days** for **around 19.4 thousand tons** i.e. **less than 0.2% of the total fishing days** and **1% of the total landings** provided.

Table 3.5: Number of countries reporting MIS_MIS DCF level 5 in RDBES CE and CL data. In addition, fishing days, landings by métier level 5 code and %Fishing Days and %Landings from the level 5 group in relation to the total effort/landings.

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

Table 3.6 indicates that the "MIS_MIS" métier is provided for all the vessel length ranges. The 6 countries provided "MIS_MIS" métier for vessels less than 10 meters length for landings but only 4 for fishing effort as Portugal and Ireland do not provide any fishing effort data for vessels less than 10 meters length. In terms of fishing effort "MIS_MIS" métier represents a very small proportion. That is not the case in terms of landings especially for **vessels 10-12 meters length** (**~3% of the total landings provided**) and even more for **vessels less than 10 meters length** (**~13% of the total landings provided**). For **vessels more than 12 meters length**, fishing effort and landings provided with a **"MIS_MIS" métier** represent **less than 0.1%** of total fishing effort and landings provided.

Table 3.6: DCF level 5 MIS_MIS métiers by vessel length group. Total fishing days, total landings, number of countries reporting the MIS_MIS code in RDBES CE and CL, Fishing days and landings with the MIS_MIS code, and the percent fishing days and percent landings within the vessel length group.

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

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

Table 3.7:DCF level 5 MIS_MIS métiers by country. Total fishing days, total landings, fishing days and landings reported with the MIS_MIS code in RDBES CE and CL and percent fishing days and percent landings within the country.

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

Denmark concentrates more than 90% of the total Fishing Days provided with "MIS_MIS" métier, nevertheless they represent only 1% of the total Fishing Days of Denmark fleets and less than 0.1% of the total landings, see table 3.7. France, Netherlands and Sweden also provided few data with "MIS_MIS" but it remains insignificant considering the total Fishing Days and Landings they have provided *(around 0.1% or less)*. The issue is different for Ireland and Portugal for which respectively more than 4% and 6% of the total landings they have provided has been supplied with the "MIS_MIS" métier. These two countries constitute more than 95% of the total Landings provided with "MIS_MIS" métier. This should be put into perspective with the fact that Portugal do not provide any fishing effort data and Ireland do not provide fishing effort for the vessels less than 10 meters length.

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Table 3.8: DCF level 5 MIS_MIS métiers by country and vessel length group. Fishing days and landings reported with the MIS_MIS code in RDBES CE and CL and percent fishing days and percent landings.

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

Finally, table 3.8 shows that the biggest issue concerns the **vessels less than 10 meters** length in **Ireland** for which no fishing effort data has been provided and all landings data have been provided with the "MIS_MIS" métier. The vessels less than 12 meters length in Portugal for which no fishing effort has been provided, present a total of more than 10% of the total landings provided with "MIS_MIS" métier associated which could be also an issue. Finally, Denmark presents 4.5% of their total fishing effort for vessels less than 10 meters length with "MIS_MIS" métier for around 8% of their total landings; it remains relatively minor considering the fishing activity data of their total fleet.

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

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

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

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

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

Background

The "RCG ISSG on métier and transversal variables issues" has been working since 2018 on a revision of the reference list of métier codes at DCF level5 & 6, starting from the RCGs NANSEA & Baltic, where the new codes have been approved. Métier codes from other RCGs (Med&BS, LDF, LP) have also been included in the reference list, and now that the codes are being implemented in data calls, there is a need for agreeing on a procedure for working pan-regionally.

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

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

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

Suggestion for procedure for managing the reference list of métier codes

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

Agreed principles for harmonized and standardized métier codes on DCF level6

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

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

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

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

Principles used for defining métier codes:

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

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

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

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

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

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

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

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

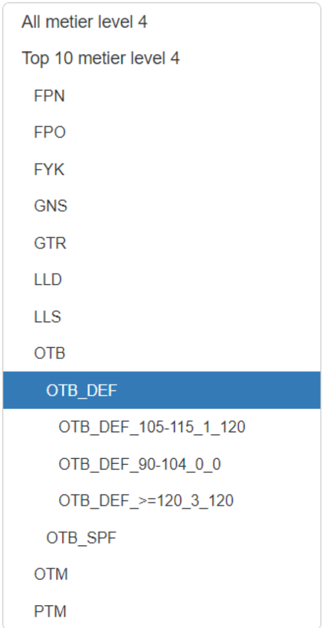


Figure 3.2: Example of the métier report html navigation pane, where it is possible to see the overview on the different levels.

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

The task is described as:

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

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

fecR package

The fecR package provides a set of functions that implement the so called "Nicosia principles for fishing effort calculation" that aim to standardize the calculation of fishing days and days at sea of across MS during e.g., FDI uploads. The development of fecR started during the 2nd Workshop on Transversal Variables (22-26 February 2016) and a first version was put online in a public repository (CRAN) in early November 2016. The use of the package for MS effort calculations was then promoted in the 2017 and 2018 FDI data calls but in December 2018 the package was put offline and archived by CRAN after its code failed to pass a few internal checks to CRAN and CRAN registered difficulties in contacting the maintainer of the package. From that moment to present, the package remained offline with only archived versions being available to MS a situation that complicated its usage in the answering of effort data calls. Such situation was largely motivated by difficulties from JRC side to find the resources needed to retake the regular updates required for the package to be put back up on CRAN. The original code, as of the last update made, remained in a private JRC GitLab, available only to a couple of developers external to JRC that, however, lacked the GitLab permissions required to put the package back online. The issue was taken up by the ISSG for its work 2022/2023.

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

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

– Fishing effort should be calculated following the Nicosia principles and time*gear*area resolution and only after that should the fishing days and days at sea be split up/divided into the more precise information available.
– Examples from the Nicosia report should be expanded and updated with examples where the target assemblage (i.e., the métier) is available or where "haul by haul" information is available.

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

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

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

Questionnaire

The actual use of the fecR package to calculate fishing effort to answer data calls was included in the questionnaire sent out by the ISSG. The questionnaire included questions regarding the fecR package: How far it is used by MS and the different scenarios not considered currently, but which could be included in the FecR package in order to improve its use to calculate standardized/harmonized fishing effort metrics. The questionnaire in Annex 3.3 was sent out and answers received are found in Annex 3.4, with the replies both compiled by question and the questionnaire received by Member State.

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

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

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

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

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

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

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

A third workshop on alternative fleet segmentation is scheduled on 3rd and 4th May 2023 as afternoon sessions, and preparation work includes work on pre-segmentation of the data. The ISSG worked in advance of the 3rd workshop assessing the variability/variety – homogeneity/heterogeneity of métiers/gears available by current DCF fleet segmentation on the basis of the RDBES 2021 data issued from the 2022 data call. This analysis is available in Annex 3.2 and constitute the input of the ISSG to the 3rd workshop.

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

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

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

In order to assess the methodologies applied by MS for working with transversal data, a questionnaire was drafted by the ISSG and was sent out to NCs by RCG secretariat on 2^{nd} February 2023 and to the ISSG members to speed up the process (see Annex 3.3). Questionnaires have been received from the following countries: *Denmark, Estonia, Finland, France, Germany, Ireland, Latvia, Lithuania, Netherlands, Poland, Spain and Sweden*. The questionnaire replies are available in Annex 3.4 both compiled by question and as they were received, by Member State. This will constitute the material for 2023-2024 ISSG work on this issue to evaluate the use of these methodologies by the MS, detail the on-going common practices and develop, on this basis, best practices guidelines to enhance standardization, homogenization and harmonization between MS in order to calculate fishing activity estimates.

The questionnaires received contain a lot of information. It was decided to combine the replies to the questions in the format received (see annex 3.4) and compiled in an excel spreadsheet.

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

Question 1 on data types available to assess fishing activity data

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

Question 2 on combination/cross-validation of data

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

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

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

Question 2b on consolidation of species composition

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

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

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

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

Question 2d on assessing gear information and effort soaking time

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

Question 2e on spatial information

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

Question 2f on métier allocation

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

Question 2g on data completeness

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

Question 4 on fecR and effort calculation

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

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

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

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

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

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

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

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

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

A questionnaire has been drafted but, considering the workload of the ISSG this year, it was decided that the draft questionnaire would not be sent out by the ISSG, but can be used as input for the FDI methodological meeting in May-June 2023 to consider it using. The draft questionnaire is found in Annex 3.1.

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

The procedures used by MS for fleet segmentation and clustering have been included as a question in the draft questionnaire available in Annex 3.1.

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

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

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

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

Issues relates to:

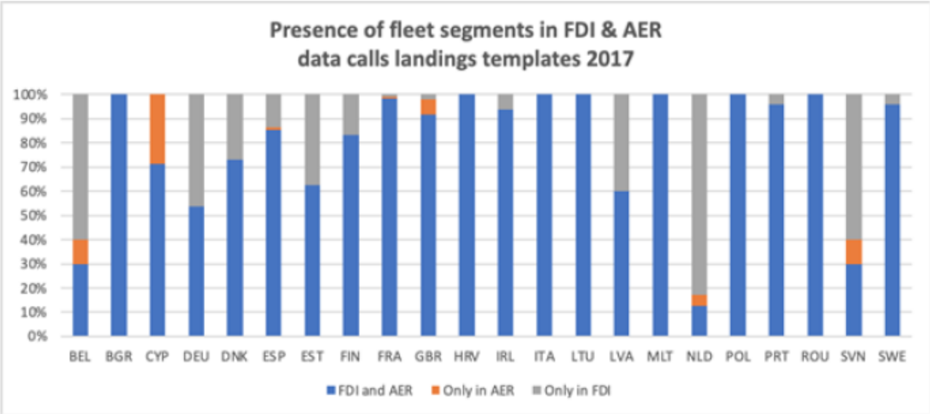
- **Timing in data exports to answer the data call**: AER data legal deadline is 30 March 2023 and some data submitted are provisional. FDI data call legal deadline is 30 June 2023.
- In the FDI it is possible to report **confidential data** and mark it as confidential which is not possible in AER

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

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

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

Below figure 3.3 from the FDI EWG 21-12 report shows fleet segments classified as available in both data calls, only available in AER and only available in FDI. It is clear that some fleet segments are only available in one data call, which may be related to clustering procedures.



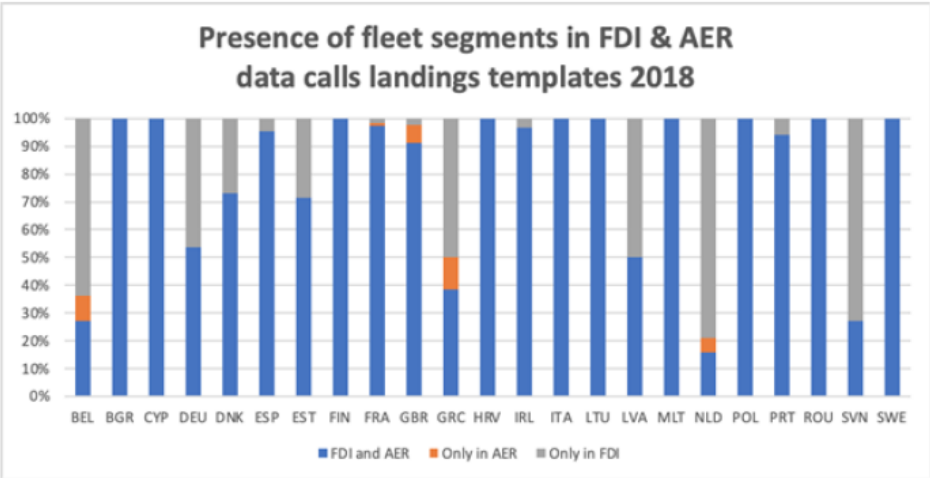


Figure 3.3: (figure 3.3.1.3 from STECF WEG 21-12 report). Fleet segments in FDI and AER landings tables for 2017 and 2018 data, classified as fleet segment available in both data calls (blue), only available in AER (orange) and only available in FDI (grey).

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

The draft questionnaire available in Annex 3.1 was developed to make an inventory of the methods used by MS to define common variables used in the AER and FDI data calls and discuss the methodologies used in MS. As a questionnaire had already been sent out by the group, and considering the workload of the ISSG, it was decided that the questionnaire would not be sent out by the ISSG but can be used as input for 2023 FDI meetings *(in May-June the FDI methodological meeting and in September the FDI meeting)*.

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

The procedures used by MS for fleet segmentation and clustering have been included as a question in the draft questionnaire available in Annex 3.1 (see above).

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

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

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

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

Fishing activity data requested in AER data call:

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

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

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

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

Fishing activity data requested in FDI data call:

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

Table G – Effort summary *(Days at sea – TOTSEADAYS, KW Days at sea – TOTKWDAYSATSEA, GT Days at sea – TOTGTDAYSATSEA, Fishing days – TOTFISHDAYS, KW Fishing days – TOTKWFISHDAYS, KW Days at sea – TOTGTFISHDAYS, Hours at sea – HRSEA, KW Hours at sea – KWHRSEA, GT Hours at sea – GTHRSEA)* by country, year, quarter, vessel length range, fishing technique, fishing gear, fishing target assemblage, fishing gear mesh size range, fishing métier, supra-region, subregion, EEZ, geo indicator

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

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

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

Country

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

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

Year

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

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

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

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

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

Supra-region

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

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

MBS = Mediterranean Sea and Black Sea

OFR = Other regions

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

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

MBS = Mediterranean Sea and Black Sea

OFR = Other fishing regions.

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

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

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

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

Fishing Technique

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

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

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

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

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

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

Vessel length ranges

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

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

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

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

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

Geo indicator

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

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

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

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

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

Species

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

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

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

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

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

Subregion

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Gear

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

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

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

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

Fishery and Activity level

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

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

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

Conclusions

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

Reference:

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

3.5 Regional Work Plans

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

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

SSF. The chairs of the ISSG RWP requested input from this ISSG on agreements on fishing activities data in general.

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

Suggestion for the RWP: Agreed methods for fishing activity variables

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

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

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

3.6 SG Participants

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ANNEX 3.1. Draft questionnaire for the task on harmonization of variable submission for AER and FDI data calls

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

Draft questionnaire Task 7 – v2022-12-09

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

Background

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

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

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

Main questions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

	FDI table A/G…	AER

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Method to assign fishing technique		
Method to assign Geo-indicator		
Method to assign principal supra-region		

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

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

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

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

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

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

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

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

ANNEX 3.2. For task 5: Analysis of variability/variety – homogeneity/heterogeneity of métiers level 4/gears available by current DCF fleet segmentation on the basis of the RDBES 2021 data issued from the 2022 data call

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

Under RCG Econ there have been two workshops considering the development on an alternative fleet segmentation from the current segmentation. To calculate this alternative fleet segmentation, an R-package has been tested considering annual vessel species composition landings but not the métiers practiced by the vessels during the year. The ISSG considers that a new fleet segmentation should reflect the exploitation strategy of the vessels and that this new segmentation should be linked to the métiers *(a vessel could practice several métiers during the year but belong to only one Fleet segmentation for the year considered which should represent its exploitation strategy)*.

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

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

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

A/ General overview - RDBES Data

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

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

Table 3.9 : *Fishing days and landings by country provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage from the country in relation to the total effort/landings.*

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

Table 3.9 show that a total of more than **1 200 thousand fishing days** have been provided for almost **2,5 million tons**. **Portugal** did **not** provide any **fishing effort data** *(table CE)*, only landings data *(table CL)*. Almost 60% of the total fishing days provided are concentrated in Spain and France. Spain, France, Denmark and Netherlands contribute each to more than 10% of the total landings provided.

Table 3.10 show the same information **by vessel length ranges**. All the 14 countries provided data for less than 10 meters *(VL0010)*, 10-12 meters *(VL1012)* and more than 12 meters *(VL12XX)* length vessels. **Ireland** provided **only landings data for less than 10 meters** *(no fishing effort data)*. Belgium do not have any vessels less than 10 meters length and very few 10-12 meters length vessels *(~100 Fishing Days provided)*. Finally, Germany provided few landings data *(20 tons)* with vessel length information not informed *("NK") (with no fishing effort data associated)*.

Table 3.10: *Fishing days and landings by country and vessel length ranges provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage from the country in relation to the total effort/landings provided. In addition, the column KG/FishingDays show the average landing per fishing day.*

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

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

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

***Table 3.11**: Fishing days and landings by Fleet Segment DCF / EU-MAP provided for the RBDES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage considering the total effort/landings provided.*

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

Table 3.11 show that the **polyvalent fleets** "Vessels using active and passive gears", "Vessels using passive gears only for vessels <12 m" and "Vessels using polyvalent passive gears only" are also three **major fleets provided** considering their total fishing effort data. Some fishing activity data have been provided for the fleet segments "Vessels not allocated" *(NO)* & "Inactive vessels" *(INACTIVE)* but it remains minor. Finally, ~190 thousand Fishing Days *(**16%**)* and ~573 thousand tons *(**23%**)* have been provided with the **Fleet Segment DCF / EU-MAP not filled out** which is quite **significant** but could be explained as "Fishing Tech" is an optional field in the RDBES data call.

***Table 3.12**: Fishing days and landings by country provided for the RDBES 2022 data call for 2021 data, with Fleet Segment DCF / EU-MAP not filled out. The % Fishing Days and % Landings represent the percentage by country of the total effort/landings provided with Fleet Segment DCF / EU-MAP not filled out.*

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

Table 3.12 show that this is the case for four countries: **Estonia**, **Latvia**, **Netherlands** and **Poland** which did not fill out "Fleet Segment DCF / EU-MAP" information. For **Germany**, 45% of total fishing effort and 12% of total landings have been provided with "Fleet Segment DCF / EU-MAP" information not filled out. Considering data provided, it concerns the German fleets practicing in the **Baltic Sea** *(27.3.c & 27.3.d)*. The

other countries have well provided the "Fleet Segment DCF / EU-MAP" information in their fishing activity data *(except very minor data in Denmark and Ireland)*.

Table 3.13*: Fishing days and landings for polyvalent fleets by vessel length ranges provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the % of effort/landings provided by vessel length range for the different polyvalent fleets compared with the total effort/landings provided by vessel length ranges with fleet segment filled in.*

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

Table 3.13 show that, considering fishing activity data filled in with "Fleet segment DCF / EU-MAP" information, **polyvalent fleets** are more informed in the **smallest vessel length ranges** i.e. for vessels 10-12 meters length and even more for vessels less than 10 meters length. As an example, polyvalent fleet "Vessels using passive gears only for vessels <12m" represent 17% of the total fishing effort informed for vessels less than 10 meters length when "Vessels using polyvalent passive gears only" represent 18% of their total landings. The polyvalent fleet "Vessels using active and passive gears" is particularly informed for vessels less than 10 meters length *(31% of their fishing effort and 19% of their landings)* but also for vessels 10-12 meters length *(9% of their fishing effort for 20% of their landings)*.

Table 3.14*: Fishing days and landings for polyvalent fleets by country provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided by country by polyvalent fleet.*

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

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

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

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

Table 3.15: *Fishing days and landings for "Demersal trawlers and/or demersal seiners" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for DTS fleet segment by fishing gear.*

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

Table 3.15 show that **more than 90%** of the total fishing effort and **almost 2/3** of the total landings of the vessels allocated to the "DTS" fleet segment is done with demersal trawls gears *(OTB, OTT or PTB)* or demersal seines *(SDN or SSC)*. Nevertheless, **"Dredgers / Trawlers"** *(3% of the total fishing effort)* or **"Mixed trawlers** using demersal and pelagic trawls**"** *(33% or the total landings)* constitute two major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of demersal trawl or demersal seine with more than 15 other gears including passive gears.

C2) Beam trawlers (TBB)

Table 3.16: *Fishing days and landings for "Beam trawlers" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for TBB fleet segment by fishing gear.*

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

Table 3.16 show that the "Beam trawlers" fleet segment regroup especially vessels **specialized** (**97%** of the total fishing effort provided and **94%** of the total landings) in one unique fishing gear: the beam trawl (TBB). Few vessels **combined** this activity with few days with **demersal bottom trawl** *(OTB)* or **dredges** *(DRB)*.

C3) Pelagic trawlers (TM)

Table 3.17*: Fishing days and landings for "Pelagic trawlers" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for TM fleet segment by fishing gear.*

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

Table 3.17 show that **more than 85%** of the total fishing effort and **90%** of the total landings of the vessels allocated to the "TM" fleet segment is done with pelagic trawls gears *(OTM or PTM)*. Nevertheless, **"Mixed trawlers** using demersal and pelagic trawls**"** *(10% of the total fishing effort and 7% of the total landings)* constitute, here also, a major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of pelagic trawls with around 10 other gears including passive gears.

C4) Dredgers (DRB)

Table 3.18*: Fishing days and landings for "Dredgers" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for DRB fleet segment by fishing gear.*

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

Table 3.18 show that **around 90%** of the total fishing effort and total landings of the vessels allocated to the "DRB" fleet segment is done with a dredge gear *(DRB or HMD)*. Nevertheless, **"Dredgers / Trawlers"** *(3% of the total landings)* or **"Dredgers / Passive gears** especially using pots & traps or nets**"** *(>5% of the total fishing effort)* constitute two major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of dredge with more than 15 other gears.

C5) Purse seiners (PS)

***Table 3.19**: Fishing days and landings for "Purse seiners" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PS fleet segment by fishing gear.*

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

Table 3.19 show that **around 95%** of the total fishing effort and landings of the vessels allocated to the "PS" fleet segment is done with purse seine gears *(PS)*. Nevertheless, **"Purse seiners"** could **combine** this activity with **"Passive gears"** especially hooks métiers" *(~5% of the total fishing effort and landings)* which constitute one major gear combined by these vessels with purse seine gears. Furthermore, these vessels could combine their main activity of purse seine with more than 10 other gears.

C6) Vessels using other active gears (MGO)

***Table 3.20**: Fishing days and landings for "Vessels using other active gears" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for MGO fleet segment by fishing gear.*

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

Table 3.20 show that the "Vessels using other active gears" fleet segment regroup especially vessels practicing "**glass eel fishing**" *(GES - 59% of the total fishing effort provided)* or "**beach seines**" *(SB – 87% of the total landings provided)*. Nevertheless, these vessels could **combine** this activity with some **"Passive gears"** *(~38% of the total fishing effort)* especially "pots and/or traps" *(FPO)*, "hooks métiers" *(LLS & LHP)* or "nets" *(GTR, GND, GNS & GNC)*. This constitute a major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of glass eel fishing or beach seine with more than 15 other gears especially passive gears *(very few combined with another active gear)*.

C7) Vessels using polyvalent active gears only (MGP)

Table 3.21: *Fishing days and landings for "Vessels using polyvalent active gears only" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for MGP fleet segment by fishing gear.*

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

Table 3.21 show that the polyvalent active fleet "Vessels using polyvalent active gears only" fleet segment regroups vessels using a large variety of active gears from "Bottom otter trawls" *(OTB)* to "Glass eel fishing" *(GES)* with no-one of them being used for the major part. The main active gears used are: **"Demersal trawls"** *(OTB, OTT & PTB)*, **"Dredges"** *(DRB)* and **"Midwater trawls"** *(OTM & PTM) (~87% of the total fishing effort and 55% of the total landings)*. "Demersal seines" *(SDN)* account for around 5% of the total fishing activity when "Miscellaneous gears" corresponding to a "seaweeds fishery" practicing in France with large number of landings is also a major fishery practiced, at least in terms of landings. Finally, "Beam trawls" and "Glass eel fishing" remain relatively minor. The 16 Fishing Days allocated to passive gears should be an error.

C8) Drift and/or fixed netters (DFN)

Table 3.22: *Fishing days and landings for "Drift and/or fixed netters" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for DFN fleet segment by fishing gear.*

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

Table 3.22 show that **around 85%** of the total fishing effort and landings of the vessels allocated to the "DFN" fleet segment is done with nets gears *(GNS, GTR, GND, GNC & GTN)*. "Set gillnets" (GNS) and "Trammel nets" (GTR) are the main nets' gear used. Nevertheless, **"Netters / Potters"** *(~6% of the total fishing effort)* or **"Netters / Hooks métiers"** *(~5% of the total fishing effort)* constitute two major combined exploitation

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

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

Table 3.23*: Fishing days and landings for "Vessels using pots and/or traps" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for FPO fleet segment by fishing gear.*

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

Table 3.23 show that **more than 90%** of the total fishing effort and **more than 80%** of the total landings of the vessels allocated to the "FPO" fleet segment is done with pots & traps gears *(FPO, FPN & FYK)*. "Pots" (FPO) is the main fishing gear used. Nevertheless, **"Potters / Netters"** *(~5% of the total fishing effort)* or **"Potters / Hooks métiers"** *(~3% of the total fishing effort)* constitute two major combined exploitation strategy which could be used by these vessels. Furthermore, these vessels could combine their main activity of pots and/or traps with more than 15 other gears including active gears *("Dredges" (DRB) is the main active gear combined)*. 92

C10) Vessels using hooks (HOK)

Table 3.24*: Fishing days and landings for "Vessels using hooks" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for HOK fleet segment by fishing gear.*

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

Table 3.24 show that **around 90%** of the total fishing effort and **more than 80%** of the total landings of the vessels allocated to the "HOK" fleet segment is done with hooks gears *(LLS, LHP, LTL, LLD & LHM)*. "Set

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

C11) Vessels using other passive gears (PGO)

***Table 3.25**: Fishing days and landings for "Vessels using other passive gears" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PGO fleet segment by fishing gear.*

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

Table 3.25 show that the "Vessels using other passive gears" fleet segment regroup especially vessels practicing "**Diving**" *(DIV - 52% of the total fishing effort provided)*, **"Lift nets"** *(LN – 4% of the total fishing effort provided)* or "**Fishing on foot"** *(FOO –1% of the total fishing effort provided)* which combine these **"coastal activities"** with non-structuring gears like **"Glass eel fishing"** *(GES – 20% of the total fishing effort provided)* or "Miscellaneous gears" which correspond to a **"Seaweeds fishery"** practicing in France with large number of landings *(MIS – 95% of the total landings provided)*. These vessels could use other passive gears as nets, pots / traps or hooks métiers but not for the most part. "Dredges" *(DRB)* is the only other active gear combined which is relatively minor.

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

***Table 3.26**: Fishing days and landings for "Vessels using passive gears only for vessels <12m" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PG fleet segment by fishing gear.*

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

Table 3.26 show that the "Vessels using passive gears only for vessels <12m" fleet segment has been used mainly for vessels **combining "Set gillnets"** *(GNS)* and **"Fyke nets"** *(FYK)* with no-one of these two gears being used in the major part. The few fishing activities allocated to active gears should be an error.

C13) Vessels using polyvalent passive gears only (PGP)

Table 3.27: *Fishing days and landings for "Vessels using polyvalent passive gears" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PGP fleet segment by fishing gear.*

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

Table 3.27 show that the polyvalent passive fleet "Vessels using polyvalent passive gears only" fleet segment regroups vessels using a large variety of passive gears. These vessels especially **combine "Nets"** *(GNS & GTR)*, **"Hooks métiers"** *(LLS & LHP)* and **"Pots and/or traps"** *(FPO, FPN & FYK)* but with no-one of them being used in the major part. In all, these vessels used more than 20 different fishing gears. The few fishing activities allocated to active gears should be an error.

C14) Vessels using active and passive gears (PMP)

Table 3.28: *Fishing days and landings for "Vessels using active and passive gears" DCF fleet segment by fishing gear provided for the RDBES 2022 data call for 2021 data. The % Fishing Days and % Landings represent the percentage of the total effort/landings provided for PMP fleet segment by fishing gear.*

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

Finally, table 3.28 show that the polyvalent active/passive fleet "Vessels using active and passive gears" regroups vessels combining different fishing gears with no-one of them being used the major part. The main passive gears combined are **"Pots and/or traps"** *(FPO)*, **"Nets"** *(GTR, GNS & GND)* and **"Hooks métiers"** *(LLS & LHM)*. The main active gears combined are **"Dredges"** *(DRB)*, **"Demersal trawls or seines"** *(OTB & SDN)* and **"Beam trawls"** *(TBB)*.

Conclusion

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

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

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

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

A significant part of the real polyvalence of the fleets is hidden by this rule, an example being the **"Trawlers / Dredgers"** *(major combination observed)* which could belong to four different fleet segments *(DTS, DRB, MGP or PMP)* depending of the gear' intensity regarding the total fishing activity *(e.g. "trawlers / dredgers" will be allocated to DTS DCF fleet segment when demersal trawls métiers represent the majority, i.e. more than 50%, of their fishing activity)*. **"Mixed Trawlers"** *(using demersal and pelagic trawl gears)*, **"Netters /**

Potters" or **"Netters / Hooks métiers"** constitute other combined approaches exploitation strategy which seem to be shared by a number of vessels. The **polyvalent fleets** *(PGP, MGP & PMP – i.e., active, passive or active/passive)* of the current fleet segmentation highlight consequently only a minor part of the real polyvalence of the fleets and do not allow to distinguish inside them, one gear combination from another *(it constitutes **mix fleets** giving them **few meaning**)*.

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

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

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

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

ANNEX 3.3. RCG ISSG métier and transversal variables issues - Questionnaire Task 4&6 to evaluate the use of cross-validation methods in MS to combine data coming from different declarative sources and the use of the fecR package (calculating fishing effort)

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

Questionnaire Task 4 & 6

The questionnaire addresses the following tasks of the RCG ISSG:

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

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

Background

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

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

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

Main questions

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

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

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

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

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

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

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

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

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

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

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

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

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

ANNEX 3.4. Replies to questionnaire for the task on the fecR package for calculating fishing effort

A/ Replies to questionnaires compiled by question

Question 1 on data types available to assess fishing activity data

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

MS	1.1. Summary of data sources and availability	1.2. Are all data available for SSF? If not, short description of exemption	1.3 Weaknesses
FRA	Fishing fleet register is available since 1983 (vessel characteristics (length overall, kilowatt, gross tonnage, vessel' age). In European logbooks (over 10m' vessels) and national monthly declarative fishing forms (less 10m' vessels)is registred the fishing activity data by fishing trip or date/fishing sequence. Data available back to 2000. Data 'completeness differs by area/fishery (e.g. very few data are available for small-scale fisheries from other regions/outermost regions). Sales note data is from auction markets. Do not cover all the French landings as non-auction sales could occur. Data available back to 2000. Vessels geolocation data (longitude, latitude, course and speed) issued especially from VMS devices (hourly basis, mandatory under EU regulations for over 12m' vessels also under national requirements for several specific fisheries e.g. Seine bay' scallop dredgers) and available for some trial fisheries (e.g. in the context of the RECOPESCA research project). Fishing activity calendars using exhaustive survey (vessels registered in the fishing fleet register) data available since 2000 for Northeast Atlantic vessels, since 2002 for Mediterranean and 2007 for other regions/outermost regions. (exhaustively by vessels and month: active/inactive vessel and for active vessel: fishing area, metier(s), exploitation harbour, number of fishermen boarded, monthly fishing effort and fishing gear dimension (for a subsample).	Limited transversal data are available for small-scale fisheries from other regions/outermost regions. Limited spatial information for vessels under 12 m	Sales note data from auction markets only. Limited spatial information for vessels under 12 m
IRL	For vessels >12m available Logbooks and spatial data, for 10-12m- Logbooks data, for <10m: Sales notes. Other resorses of transvertial data for SSF (<15m vessels) : A sentinel fleet representing about 8% of the under 12m fleet provide effort and catch at daily resolution; a Skipper self-sampling programme started in 2021 where Skippers report effort, catch, landings, discards, biological data at operational level; observers at sea programme; port sampling programme for biological data on landings.Inshore VMS; high resolution spatial data are collected for some dredging fleets that provide effort and fishing distribution data.	Limited transversal data are available and no spatial data for small-scale fisheries.	No separation by fleet segments for sales note which may confuse the further conclusions
LTU	The landings declarations and logbooks data available for all vessel's segments since 2019. Until 31 December 2018 the vessel segment which length is <8 m and operated in the coastal area the monthly declarative form with summary of fishing activities. The sales notes are obligately for all fleet. All fleet registration events are available specifically by date. Geo-location data of VMS are available for the vessel segments which length is >15 m. Lithuania is not collecting AIS data.	No spatial data on vessls <12 m. Effort data on trip level since 2019	No spatial information for vessels under 12 m

RCG's Secretariat

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MS	1.1. Summary of data sources and availability	1.2. Are all data available for SSF? If not, short description of exemption	1.3 Weaknesses
LVA	For Capacity is using the Latvian Fleet Register; E-logbooks (ERS) for fisheries outside the coastal area (10-12m, 12-15m and >=15m) and the monthly logbooks for coastal areas activities (SSF - <10m and 10-12m). Central Statistical bureau, based on the questionnaire "1-Fishery" contains data on sales for all fleet segments		No spatial information
NLD	Geo-localisation dataavailable since 2005 for vessels > 15 m with frequency every 2 hours as since 2015 the interval was shortened to 30 minutes for some vessels. From 2012 all vessels longer than 12 meters are obliged to carry VMS. Since 2018 vessels smaller than 12m are obliged to report electronic logbooks (e-lite). However, receiving partially of those data. The logbook data is available for all other vessel lengths. The sales notes dataset includes the vessel ID, date, auction, landing harbour, species 3 alpha code, weight, auction size categories (including BMS) and value.	No spatial data and limited effort data on vessls <12 m.	No spatial data and limited effort data on vessls <12 m.
POL	Coastal logbooks, Sales notes and Fishing licences are sources for vessels below 10 meters length; Paper logbooks and sales note - sorces for fishing vessels 10-12 meters length; Electronic logbooks, Sales notes, VMS- sources for vessels over 12 meters length:	No spatial data on vessls <12 m.	No spatial data on vessls <12 m.
SWE	All vessels, 10 meters or more, are required to provide information in logbooks; vessels less than 10 meters fishing with trawls or seiners or land in another country than Sweden and vessels that are 8 meters or more and fish in ICES areas 22-28 and if the vessel has cod onboard that is caught in ICES areas 20-32 also. For other vessels Monthly journals are not obligatory. The Monthly jornal of vessel contains the days at sea, gears,catch of each species up to one month period. Vessels wich use logbooks are copleting the landing declaration. Sales note are exempted for fishing vessels of less than 10 metres' length overall or for quantities landed of fisheries products not exceeding 50 kg of live weight equivalent by species. No spatial information for vessels under 12 m in lenth	Vessel which lenght are less than 10 m and not involved in trawls or seiners fishing, not landing abroad or vessals 8-10 m length range catch cod in ICES areas 20-32, may complete Montly jornal with data on days at sea, gears and catches by species. No spatial information for vessels under 12 m in lenth. Sales note are exempted for fishing vessels of less than 10 metres' length overall	SSF is not covered with spatial data, for some cases mitght be no data for effort or catches. No consistency in use of weight by species: from logbooks or landings declaration

Question 2 on combination/cross-validation of data

MS	2.1. Summary of data sources and availability	2.2. Is there a cross-check/validation system in place? If yes, short description	2.3 Is there a procedure in place that combine several types of data? If yes, short description
DEU	The logbook and landings declaration data are joined by two shared fields, haul number and species. The resulting dataset, in its turn, is joined by trip number field to the trip and vessel registers. The final dataset is then aggregated to the trip level.	No	The logbook and landings declaration data are combined by trip number
DNK	Sales notes data by trip are used as the basis, giving the precise weight and value. Back to 2001, the allocation the weight and value to logbook was by logbook number, as for 1987-2000 period, the trip is defined as vessel-id and landing date in both logbooks and sales notes and used for combining the two data sources. As the sale notes only gives the information by trips, when the information is combined with the logbook information to achieve information on gear, fishing day, ICES rectangle etc., they are distributed out on logbook data relative to the weight of the species. If a species is available in the sales notes, but not in the logbook, the species is allocated to logbook information based on the distribution of the total landings. The fleet register is merged to the combined sales notes – logbook data by landing date.	No	The logbook data are combined by trip number/logbook number/combination of vessel-id and landing date to get the precise weight and value on trip level. The fleet register is merged to the combined sales notes – logbook data by landing date.
ESP	Spain cross-validates different types of data available using an ETL 'consumption algorithm'. The catches associated with the current log will be processed and a line will be generated for each of them in the "Consumption" table, establishing the initial values for the date and time of capture, species, area, country, weight caught and weight caught under size. Cross-checks are between dates of VMS and logbooks or landings.	Verification of the available information. Some cross-checks implemented are the following: - Port errors in declarations of departure, return or landing: These port errors are detected using VMS or previous trips (paper logbooks) in case VMS is not mandatory for these vessels. - Check catches messages that declares an EEZ of a country included in an agreement with active licenses for that vessel: It is checked if vessels have a license or an agreement with that country during that period. Catches whose division and country declared in the DEA do not match with VMS.	Merging information on fishing trip level from logbooks, landings declaration, sales note, information on fish retained on board, transfer information, distribution of weights among consumer lines, assignment of consumption lines to a stock if applicable. In the event that the processed trip had associated landings or declarations of fish retained on board referring to previous trips, this algorithm will be repeated recursively for each of the affected trips.

MS	2.1. Summary of data sources and availability	2.2. Is there a cross-check/validation system in place? If yes, short description	2.3 Is there a procedure in place that combine several types of data? If yes, short description
EST	The active and passive gear data come from different Governmental databases that are combined in R using in house scripts. However, no cross checking is done on a regular basis. Only occasionally misreporting is assessed by comparing the official logbook data to the data from national control authorities. Cleaning the raw data to remove illogical or clearly wrong data but this script is fairly lengthy and does fix only data that is clearly wrong with best guesses based on data of the same fisherman.	Ad-hoc system in case of misreporting	Combined the active and passive gear data which comes from different Governmental databases. Using R script to combine
FIN	Currently cheking the raw data quality from the monitoring point of view. Inaccurately reported data is corrected according to standardized guidelines. A manual error detection is performed to search for any inconsistencies in the raw fishing journal data. The value of landings is calculated by multiplying the average price and the reported amount of catch due to low coverage of the sales notes data. In a nutshell, not a formal cross-validation tool, but the data quality is ensured manually as a part of the production process of official statistics, and then compare the results of each data call against our statistical publications. Detailed information available on https://www.luke.fi/en/statistics/commercial-marine-fishery	Checks of row data quality and inaccurately reported data is corrected according to standardized guidelines.	No
FRA	SACROIS algorithms run by Ifremer (mandated by DGAMPA (French Directorate general for Maritime affairs, Fisheries and Aquaculture)) allow to combine the different declarative data sources based firstly on dates (fishing trip return date declared or estimated, fishing sequences date declared or estimated, landings date, sales date, …) and vessels. Species composition and landings weight associated are considered to assess/strengthen the links specially between fishermen declarative and sales notes data. Specific cases are considered in particular for vessels using fish ponds. The integration and cross-validation of the different data sources is done step by step in a modular manner. Each module integrates a new data sources linked with the fishing trips resulting from the previous steps. First step is to calculate the estimated fishing trips from the geolocation data, then they are combined with the fishermen declarative data and the fishing trips resulting are cross-validated with the vessels sales note data. Fishing activity calendars are considered to complete/enhance the data flow (e.g. to provide better spatial information for non-precise declaration). In the end, the application provides, on this basis, several quality indicators and evaluates the completeness of the final data flow of SACROIS fishing trips.	Each module integrates a new data sources linked with the fishing trips resulting from the previous steps. First step is to calculate the estimated fishing trips from the geolocation data, then they are combined with the fishermen declarative data and the fishing trips resulting are cross-validated with the vessels sales note data. Fishing activity calendars are considered to complete/enhance the data flow (e.g. to provide better spatial information for non-precise declaration). At the end, the application provides, on this basis, several quality indicators and evaluates the completeness of the final data flow of SACROIS fishing trips.	SACROIS algorithms allow to combine the different declarative data sources based firstly on dates (fishing trip return date declared or estimated, fishing sequences date declared or estimated, landings date, sales date, …) and vessels.

MS	2.1. Summary of data sources and availability	2.2. Is there a cross-check/validation system in place? If yes, short description	2.3 Is there a procedure in place that combine several types of data? If yes, short description
IRL	For each vessel length category, used only one data source: for <10m Sales notes; and for >=10m Logbooks. Only raising Daily Operational Estimates to End of Trip declarations to calculate totals per Statistical rectangle.	No	No
LTU	Tthe cross-validate is established for cross checks between the sales notes and logbooks volume of species. Obtained discrepancy causes are investigating and looking for the issue solving. In cases when the data of areas is missed in the logbooks, the geo-location data is using to fulfil gaps. Also there is in place the validation on primary fishing information gaps, such as EEZ, gears with their measurements. The main focuses of the cross-validation are on fixing the primary data.	The cross-validate is established for cross checks between the sales notes and logbooks volume of species. In cases when the data of areas is missed in the logbooks, the geo-location data is using to fulfil gaps. Also there is in place the validation on primary fishing information gaps, such as EEZ, gears with their measurements.	No
LVA	E-logbooks and coastal monthly logbooks are registered in Latvian Fisheries Integrated Control and Information System (LFICIS) which is synchronised with Latvian Fleet register. In the system many of cross-checks are implemented, like: comparison of registered coordinates with VMS data, difference in caught and landed amount by species and other. Sales notes are used to adjust the average price provided by CSB if it's necessary.	The data quality checks are implemented, like: comparison of registered coordinates with VMS data, difference in caught and landed amount by species and other. Sales notes are used to adjust the average price provided by CSB if it's necessary.	No
NLD	The logbook and sales note data sources are matched by vessel ID, date and harbour and if the conditions are met a trip number from the logbooks is assigned. To ensure the right trip number is assigned to each sales note the species composition, the total weight, and the weight by species is examined. When the conditions (quality thresholds) are not met the sale note does get assigned a trip number automatically and a manual examination of the data takes place. The methodology for cross checking the logbooks and VMS data is described in https://edepot.wur.nl/248628 (Appendix B).	The data quality checks established between logbook and sales notes	Combination between the logbook and sales note

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MS	2.1. Summary of data sources and availability	2.2. Is there a cross-check/validation system in place? If yes, short description	2.3 Is there a procedure in place that combine several types of data? If yes, short description
POL	Vessels below 10 m register their daily activity in coastal logbooks covering the information on fish species, catch weight, gear type, number of gears, area, fishing time, landings time and harbour. Vessels from 10 to 12 m register their activity in paper logbooks. Data from vessels under 12 m are validated with national reference lists, vessels' patterns and fishing licences. Vessels over 12 m register their activity in electronic logbooks. Data from vessels >=12m are validated with VMS data and national reference lists.	Data from vessels under 12 m are validated with national reference lists, vessels' patterns and fishing licences.	No
SWE	No cross validation across data sources. On some occasions information in landing declarations is merged in using trip identifiers supplied by SwAM in the data. In the case of monthly aggregated data (coastal journals information included in "Catch and effort file"), monthly days-at-sea are considered equivalent to monthly fishing trips. Monthly fishing trips are then split across gear/metier and geographical using a simple algorithm trip identifiers. Values by trip (for logbook data) are extracted from matching sales notes using trip identifiers supplied by SwAM. For trips (logbook data) and coastal journals without matching sales notes, values are assigned based on monthly averages supplied by SwAM or aggregated directly from sales note data.	Vessels over 12 m register their activity in electronic logbooks. Data from vessels >=12m are validated with VMS data and national reference lists.	Coastal journals information combines with logbooks data by merging the trip identifiers supplied by SwAM. The monthly days-at-sea are considered equivalent to monthly fishing trips

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

Question 2b on consolidation of species composition

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

MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
DEU	All value of landings are presented in the landings declaration.		Days at sea are calculated as a difference between arrival and departure time registered in the trip register. For the >=10m fleet segment, fishing days and fishing hours at sea are taken from the	No

MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
			logbook entries directly. For the <10m fleet segment, this information is obtained from monthly catch reports.	
DNK	All sales are recorded in the sales notes register. However, for BMS fish the information is received from the landing declaration.	The species composition is taken from the sales notes. Before April 2021, only the main species was indicated in the sales notes of the industrial fishery. The species composition was estimated based on samples of the fisheries, and estimated per fishery, year, month, area and ICES rectangle.	The vessel fishing effort is currently calculated from logbook data. For vessels without logbooks, the trips are defined from the sales notes vessel id+landing date, and the effort is set to 1 fishing day and 1 day at sea per trip.	For tasks where higher resolution effort is needed, position data are used (combination of VMS, AIS, BlackBox, EM data and interpolation) and a speed filter is applied to calculate the fishing hours.

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MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
ESP	Sales notes are the only available source of value data, so no data cross-validation/combination is needed.	Catches associated with logbooks will be processed and a line will be generated for each of them in the "Consumption" table, establishing the initial values for the date and time of capture, species, area, country, weight caught and weight caught under size. The data between logbook and sales notes are crossed, to identify inconsistencies between landing declarations and sales notes. Mainly, data being crossed are for "stock" species (TAC and quota species), but for the rest of species this cross-check is made too. With this information, it is possible to find differences and errors in species, declarations, etc. Furthermore, for some data calls, the information is aggregated: - Species composition of some congeneric species is estimated based on samples of the fisheries per metier, quarter/month and area. - Catches and length distribution of ray species are reported as SKA and for Sebastes spp. as RED in long distance fisheries. - In some data calls, where it is allowed by the instructions, error reporting in species is grouped in OTH. Percentage and total catches of this OTH related to total catches (all species) is negligible.	VMS system is used to consolidate the "vessel fishing effort", when this information is available. In bottom trawls, speed information is used to determine fishing effort (fishing days, fishing hours..). It is considered vessels are fishing, when speed is higher than zero and lower than five knots. For other gears, it is difficult to calculate fishing effort. Days at sea are calculated taking into account departure date and arrival date.	Yes, VMS data are used.

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MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
EST	Not done	Not done	Effort is calculated on the data provided with the highest precision possible. However, VMS data is not used for this and the effort is calculated according to the data provided by fisherman using the script provided in the report of 2nd DCF workshop on transversal variables (Nicosia, 2016)	No
FIN	Value of landings from quota species are assessed through sales notes. For non-quota species are estimated using external information, e.g. through a samle of 20-30 enterprices. An average based approaced is used.	The coverage of the sales notes data is not (at least not yet) good enough for merging each landing with its corresponding first-sale event. However, we made some experiments and calculated the value of landings for herring and sprat directly from sales notes at the last RDBES round. The initial results were promising. We think that, as the new sales notes data starts to cumulate, we could use a vessel-logbook combination and fetch the value of each reported landing directly from sales notes data.	Utilize the reported spatial information (e.g., statistical rectangle) given in the logbooks reported by fishermen.	No

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MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
FRA	SACROIS algorithms include a specific algorithm to estimate the value of landings by species based on existing sales note data (sometimes directly deducted from them) or on an average price' estimation. For some fleet segment, estimated price based on expert knowledges is also used. Algorithm main objective is to allocate a value in euro to each SACROIS landings issued from declarative data (European logbooks or national monthly declarative fishing forms, day by day catches and landings declaration) and/or from sales note data. Only sales note data include landings value information. For the landings sold in auction markets (available in sales note data), value or average price (when declarative landings' weight is retained) is directly deducted from sales note. For the other landings (non-auction market sales), an average price by commercial species is assessed from sales note data by "day * landings harbour * fleet segment" considering eventual (dependent of the available data) dynamic hierarchical aggregation: "day->Month->Quarter->Year" or "Landing Harbour -> Maritime district -> Region -> Seaboard" (up to consider the "Year * Seaboard" species' average price). When no sales for a specie during a year on a seaboard raised then estimated price based on expert knowledges are considered (e.g. for trawl freezer or tropical tuna fisheries …). For abroad landings, vessel maritime district registration (up to country registration in a dynamic hierarchical manner) could be considered in replacement of landings harbour.	SACROIS algorithms include a specific algorithm to consolidate, validate and adjust the SACROIS fishing trips total landings by species and to specify the faunal composition associated. The process considers landings (weight and faunal composition) from declarative data (European logbooks or national monthly declarative fishing forms) and/or from sales note data. Algorithm main objective is to allocate total landings in weight by species and faunal composition associated to each SACROIS fishing trip. Comparison of declarative data (estimated "day by day catches" and "landings declaration") and sales note data are done fishing trip by fishing trip for each species family landed (species aggregation especially developed to compare data at a similar level and, from that, specify the faunal composition associated in terms of commercial species landed at the most disaggregated level possible). The leading principles are the following: 1) "sales note data" and "landings declaration" are prioritized (almost +/-20%) against estimated "day by day catches" (weighting quantification are prioritized against estimated) ; 2) in case of major imbalance between data sources; maximum landings weight is considered up to 140%; beyond sales note data are prioritized and 3) the more precise faunal composition (in term of commercial species landed), available in the different data sources compared, is retained .	SACROIS algorithms include a specific algorithm to consolidate, validate and adjust the vessel' fishing effort data (days at sea, fishing days, hours at sea and fishing hours) associated to each SACROIS fishing trip. The process considers especially the existing geolocation data (e.g. issued from the VMS devices). This information is considered to cross-validate and control the fishing effort data available in declarative data (European logbooks or national monthly declarative fishing forms) and complete the information for SACROIS fishing trips not issued from declarative data (e.g. SACROIS fishing trips issued only from sales note data). Algorithm main objective is to refine/adjust and complete the items (Fishing trip' start and return date, day when fishing occurred and fishing hours associated) needed to calculate the vessel' fishing effort metrics (days at sea, fishing days, hours at sea and fishing hours) for each SACROIS fishing trip. Comparison of declarative data and estimated geolocation data' fishing trips items (e.g. issued from the VMS devices) are done fishing trip by fishing trip. The major leading principles is that estimated geolocation data' fishing trips items are prioritized (issued from a calculation algorithm and observed data) against declarative data. They are also used to complete information when no declarative data are available (e.g.	Comparison of declarative data and estimated geolocation data' fishing trips items *(e.g. issued from the VMS devices)* are done fishing trip by fishing trip.

MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
		Comparison are done step by step in live weight (declared landed weight or sale weight are converted into live weight regarding the fish presentation), first comparing "landings declaration" with "day by day catches" (issued from declarative data) and then comparing the achieved result with "sales note data".	SACROIS fishing trips issued only from sales note data) or in case of missing or outliers' declarative information. Common vessel practices (including the common fishing trip' total landings) could be also considered when neither declarative data either geolocation data are available. In case of no other information than sales note data available for the "vessel*year" considered then the hypothesis "1 Sales note = 1 Fishing trip = 1 Day at Sea = 1 Fishing Day" is retained and "fishing hours" & "hours at sea" are estimated regarding the vessel fleet segment' common practices.	
IRL	The national database system that is used to manage the logbooks information provides an estimated value for each declaration, based on average price per unit (€/kg) values for species and other parameters. The procedure for calculating these average values is hard-coded into the system and is not considered very accurate. This system of allocating values is currently being improved by the national control agency (SFPA) to better account for outliers and variability.	>=10m: We use the Landings Declaration from the Logbooks. If there is a species in the Daily Operational Estimates, but not in the End of Trip Declarations, we do not raise that species (we use only species that are present in the End of Trip Declarations). We do not use the Sales Notes here. <10m: We just use the Sales Notes.	>=10m: We use Logbooks. A daily operational record for each day that the vessel is fishing, including the number of minutes fishing (calculate fishing days and fishing hours). From the trip information we use the Days at sea. <10m: Sales Notes do not have any fishing effort data. For some very specific cases we have estimated fishing effort data, but it is not a very precise method.	No

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MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
LTU	Value of landings are based on the sale notes data. There is a link between fishing trip or declarative form and specific sales note. The discrepancy of value are showing in separate report and forward for fixing issue. The majority of sales declarations are submitted by electronic devices using validation tool for submitting. As such, mandatory fields must be completed. The average price per species calculated separately for coastal fisheries (vessel which length is <12 m), the Baltic Sea fleet (vessel which length is >12 m) and Other regions fleet (vessel which length is >24 m)	The species composition is obtaining from landings declaration which proportionally allocated to the catch data for each haul. Therefor spatial information which recorded in effort is used for reports.	The vessel fishing effort is currently calculated from logbook data using fecR package. For the declarative forms data used the algorithm one fishing days=one sea day=one trip.	No
LVA	In LFICIS system the Report of First Purchases is available where is possible to trace the sold fish up to the logbook.	Information from logbooks is used only.	Information from logbooks is used only.	No
NLD	Vessels are only allowed to sell to registered buyers at registered auctions.			
POL	Value of landings for economic data call is estimated based on averages, calculated taking into account: - year and month - port of landing - species - length group (<12 m and >12 m) Value of landings for RDB/RDBES and FDI data calls is estimated based on annual average price per species. Data on fish prices comes from sales notes.	Landings declaration is considered as a final (validated by control authorities) source of information for economic data call. For RDB/RDBES and FDI data calls information on species composition comes from catch data registered in logbooks, which is validated with landings declarations.	All vessels (including SSF) are subject to mandatory reporting of their activity. For vessels under 10 m, each fishing day is considered as one fishing trip lasting approximately 8 hours at sea. For vessels over 10 m, effort is estimated based on the information from logbooks. VMS is used to estimate fishing hours for vessels over 12 m.	VMS is used to estimate fishing hours for vessels over 12 m.

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MS	2.a. Value of landings	2.b. Species composition	2.c.1 Vessel fishing effort	2.c.2 Is position data considered for calculating vessel fishing effort?
SWE	SwAM: Sweden has 1st hand buyers (these are not necessarily only auctions). All sales that are required to be reported should be sent to SwAM regardless if it is an auction or a first hand buyer. Sales directly to consumers from the fishermen is not required to report, for landings without sales notes SwAM calculates the value using a price matrix. The price matrix estimate average prices using spatial, temporal and auxiliary information regarding the vessel. H-lab assumes all landings are reported in the landing declaration. When sales records do not exist for certain trips, the value is estimated based on an algorithm. Information from landing declaration and sales notes are merged and checked for inconsistencies. Values (by usage/treatment/size class for some species) from matching trips or matching vessel-months from unique subdivisions and gear types are aggregated and used to assign values to fishing events in hierarchical order; by vessel x month, by month x region x fleet, by quarter x region x fleet, by year x region x fleet and finally by year. For some species, typically those for which mainly roe is landed or wrasses sold live, fixed mean values are supplied by SwAM.	SwAM: See answer for question 1. SLU (H-lab) SLU does not cross-validate species composition across data sources, but an algorithm exists that consolidates ”Catch and effort file” with data from landing declarations to ensure all species are included (weights of species already existing in logbooks being split into finer taxonomic resolution but full weight not correct so it still adds to logbook totals. Some reallocations from reported BMS to LCS are carried for quota species without specified minimum legal or commercial size based on information available at SWAM.	SwAM: See answer for question 1. SLU (H-lab) H-lab does not consider geo-localization when producing vessel fishing effort (only ”Catch and effort file” is used)	No

Question 2d on assessing gear information and effort soaking time

Question 2e on spatial information

Question 2f on métier allocation

MS	2.d Methods to get gear information	2.e Methods to get spatial information	2.f Methods assess metier
DEU	No	For the >=10m fleet segment, the fishing effort and landings are distributed haul-wise on the basis of the logbook information. For the <10m fleet segment, the fishing effort is distributed via the landing events.	From 2021, the R-script developed by the ISSG on Métier and Transversal Variables Issues is applied to evaluate the fishing metier for the RDBES datacall.
DNK	Gear information including mesh size is given in the logbooks. Net length is available in the logbooks in some cases, net soaking time is very rarely available. Plan to work on using questionnaire data, EM data and AIS data to estimate soaking time and net length. For vessels without logbooks, the gear is estimated through the métiers, based on the script developed by the ISSG on metier and transversal variable issues.	Area: if available, the area reported in logbooks are used, otherwise, the area reported in sales notes are used. ICES rectangle: if available, the rectangle reported in the logbooks are used, otherwise, it is found from 1. position data if available 2. default from harbour. If mismatch between area and rectangle, position data are used.	The script developed by ISSG is used to assign the metier by haul if available, otherwise by vessel+fishing date. If logbook information are available by haul, the metier is assigned by haul, otherwise by fishing date.

MS	2.d Methods to get gear information	2.e Methods to get spatial information	2.f Methods assess metier
ESP	For gear mesh size, it is checked that data information provided for the fleet complies with the provisions of law. Gear dimension and soaking time, as they are variables not mandatory in the COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009, are not available for all trips	VMS is used to allocate the ICES statistical rectangles, FAO fishing areas and subareas, EEZ, etc, when it necessary to consolidate the information. When VMS information is not available (VMS is not mandatory for these vessels), landing port is used to allocate catches.	ICES area: Two successive concatenated methods are applied. In the first place, the metiers of direct assignment based on administrative criteria (census, license ...) and / or geographic. Next, the métiers that require the application of multivariate analysis on the capture profiles of their trips. For this, Clustering Large Application (CLARA) is used. Mediterranean area: SQL algorithm to identify the metier of each trip is used. The assignation of fishing metier is based on gear reported in the official data and species composition of the trip. East-central Atlantic fisheries: The identification of fisheries/metiers assessment is carried out on the basis of logbook information, from which fleets working in the same area and using the same gears can be identified. In some cases, the percentage of catches by fishing trip is calculated for the main species (standardised catch matrix). In others, the fleet itself is homogeneous and allows identification of the fishery/metier. Tuna and tuna-related fisheries: the logbooks records are introduced into a métier considering: fleet, area, seasonality and target species. Long distance fisheries: Vessel length > 40: Metier codes applied for each fishing area based on species and catches, gear code, mesh size provided in logbooks; also depth data in some fisheries when data are available.

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MS	2.d Methods to get gear information	2.e Methods to get spatial information	2.f Methods assess metier
EST	Use the data fishermen have provided.	We do not use the geolocalized data but rather trust the smallest spatial area fisherman have provided as it is considered that the exact catch location (lon, lat) in the provide data is not reported accurately by fishermen.	For active gear the metiers are clear for Estonian data as only SPF is fished in the Baltic. For passive gear previously the target was MIS but now the metier is assigned based on multiple logistic regression models of historical catches where model weights are landing weights. These models are done by ICES areas for each month and then the metier is assigned by looking at model predictions and confirmed by a panel of experts.
FIN	We perform the validation check described in the quality report of Commercial marine fishery statistics. For example, we consider is it possible to catch a certain specie with a certain trap from a certain sea area.	Utilize the reported spatial information (e.g., statistical rectangle) given in the logbooks reported by fishermen and making validation checks described in the quality report of commercial marine fishery statistics. In addition, it is checked, for instance that there's no fishing with fyke/trap net in the middle of sea. We also review possible recording errors, for example, if a vessel fishing in the Gulf of Finland suddenly reports catch in the Bay of Bothnia.	In some cases, we consult fish scientists if we doubt the correctness of the data-based inference of metier.

MS	2.d Methods to get gear information	2.e Methods to get spatial information	2.f Methods assess metier
FRA	At this stage of the SACROIS project, SACROIS algorithms do not include a specific algorithm to consolidate, validate and adjust the information related to the gear mesh size, dimension and fishing effort (i.e. soaking time). Declarative information; when available; (from European logbooks or national monthly declarative fishing forms) are provided for each SACROIS fishing trip without any cross-validation or addition. Nevertheless, a specific algorithm is currently under development to: 1) validate/control declarative information against reference framework in order to highlight possible outliers and 2) complete and cross-validate declarative information with information collected/available in the scientific census survey of annual fishing activity calendars especially for SACROIS fishing trips not issued from declarative data (e.g. SACROIS fishing trips issued only from sales note data) or in case of missing or outliers' declarative information. Furthermore, there is currently ongoing development to estimate/calculate these information from existing geolocation data with high temporal resolution in order they could enhance/complete information available and/or cross-validate it.	SACROIS algorithms include a specific algorithm to consolidate, validate and eventually adjust the spatial information of fishing effort and landings associated to each SACROIS fishing trip. The process considers especially the existing geolocation data (e.g. issued from the VMS devices) and the scientific census survey of annual fishing calendars. These information are considered to cross-validate, control and refine the spatial information available in declarative data (European logbooks or national monthly declarative fishing forms) and complete the information for SACROIS fishing trips not issued from declarative data (e.g. SACROIS fishing trips issued only from sales note data). Algorithm main objective is to allocate fishing effort and species landings by fishing area (including EEZ and regulatory boundaries information) with the aim to better spatialize the declarative spatial fishing activity data especially considering the existing geolocation data. Consolidation, validation and adjustment of the spatial information is done for each SACROIS fishing trip taking into consideration the different information available: a) Declarative data (European logbooks or national monthly declarative fishing forms), b) Estimated spatial information from existing geolocation data which allows to calculate high quality and accurate spatial information and c) monthly spatial information available in the scientific census survey of annual fishing activity calendars. The leading principles are the following: 1) Estimated geolocation data' spatial information is prioritized (issued from a calculation algorithm and observed data) to some extent against declarative data; 2) geolocation data' spatial information is also consider to complete spatial information when no declarative data are available (e.g. SACROIS fishing trips issued only from sales note data) or in case of missing, imprecise or outliers' declarative information and finally 3) fishing activity calendars' monthly spatial information (esp. considering the range of operation and/or, if available, the sub-rectangle level information, information not available in declarative data) is considered to complete	SACROIS algorithms include a specific algorithm to allocate one or several "fishing metier(s)" to each SACROIS fishing trip. The process considers the dominant landed specie (or group of species) in value, the scientific census survey of vessels annual fishing activity calendars and eventually the declared gear . Algorithm main objective is to allocate a single/unique "fishing metier", "fishing sequence" (i.e. by "day*gear*mesh size*dimension" meaning a new fishing sequence is considered when a vessel changes of "gear*mesh size*dimension" during a day or when the day changes) by "fishing sequence" for each SACROIS fishing trip. The process considers especially the vessels' fishing activity calendars and the dominant landed specie (or group of species, hierarchical species aggregation is used reflecting the possible target species or group of species of the vessels) in value. The methodology to determine the dominant landed specie (or group of species,) is based on the raw ordination of the landed species in value. The leading principles are the following: 1) the vessels' fishing activity calendars constitute the core list of potential metiers practiced by the vessel ("vessel*month") considered and 2) the dominant landed specie (or group of species) in value is prioritized in the metier allocation. Priority is given to the dominant landed specie (or group of species) as it has been proved that it is the most discriminant factor to define the metier, taking also advantage to have access to the common practices of the vessels outlined in the fishing activity calendars. Consequently, the declared fishing gear is only used in last step of the process also because imprecise or mis-reporting have been often observed. Algorithm is done step by step. For example, first step assigns "fishing metier" to fishing sequences when there is a match between the fishing sequence' dominant landed species (or group of species) and metiers core list issued from vessel' fishing activity calendar. Last step assigns directly

MS	2.d Methods to get gear information	2.e Methods to get spatial information	2.f Methods assess metier
		and refine data when neither geolocation data either declarative data (or when declarative information is missing, imprecise or outliers, e.g. fishing areas declared at the FAO fishing area level) are available. In some cases, and for precise EEZ or fishing area allocation, pro-rata (i.e. considering the percentage of the different precise fishing area into the global fishing area calculated) could be applied to estimate the spatial information at the level needed. In some other particular cases, declarative data can be prioritized to be compliant with annex X of the EU Commission Implementing Regulation regarding catch data reporting. Finally, almost all SACROIS fishing trips have spatial information allocated in part emphasized/adjusted considering existing geolocation data. This spatial information constitutes the best available information which could be provided regarding the available data. Based on that, it is also notified that the spread of the vessels' geolocation data (e.g. including less than 12m' vessels for VMS devices regulation) constitutes the best way forward to reach more accurate information on vessels' fishing area.	the metier surveyed in the vessel' fishing activity calendar for the month considered if there is only one without considering the declared fishing gear or dominant landed species (sometimes it could be missing information for the SACROIS fishing trip considered). Lowest and lowest quality is given to metiers when going down into the different steps applied. 'Metier' algorithm is thus extensively based on the fishing activity calendars providing an efficient tool to: 1) taking into account possible misreporting (fishing gear, species landed, ...), in particular to assess the reliability and, if necessary, re-evaluate or specify the declared fishing gear, 2) better reflect the fisher' fishing strategy assigning the good aggregating level of target species or assemblage of species and 3) limit the list of possible metiers practiced by each vessel to a validated/appraised frame of references avoiding multiplication of metiers when it is based mainly on a combination of the principal landed target species (or assemblage of species) and declared gear. Finally, 'Metier' algorithm applied is in line with the methodology and principles developed in the "RCG ISSG on Metier and transversal variables issues" (which has the objective to define standardised/harmonised methodologies between MS to allocate metier at DCF level6 to fishing trips/fishing sequences) and allows, in addition, to allocate "fishing metiers" at DCF level7 i.e. considering national needs and specificities. Furthermore, this procedure has the benefit to give priority to the metiers as given by the fishermen himself or appraised by the observers' network expertise which could differ from the observed final principal landed target species or assemblage of species. 'Metier' algorithm prioritized the target metiers/fishing strategy of the vessel' master and not the results of its implementation.

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MS	2.d Methods to get gear information	2.e Methods to get spatial information	2.f Methods assess metier
IRL	>=10m: We use Logbooks. Gear information is recorded in Logbooks. <10m: Sales Notes do not have any gear data. For some very specific cases we can allocate gear based on the species caught.	>=10m: In general, we use the Logbooks Statistical rectangle data. However, specifically for the Spatial Fisheries datacall we use the VMS data to allocate the spatial information. In this case we take the Daily Operational Estimates and allocate them to the VMS fishing positions for that day (using the vessel speed rule to determine if the vessel is fishing). We don't systematically compare the spatial information from Logbooks and VMS but we do it for some special situations. <10m: The Spatial information in the Sales Notes is very limited, so we assign the Spatial information based on the landing port	>=10m: We use Logbooks. Métier information is not recorded in Logbooks, but we have a complex algorithm to allocate métiers based on gear, species caught and expert knowledge. This algorithm contains a lot of manually coded exemptions (based on expert knowledge). Part of this coding is needed due to a lack of validation in the logbooks data entry system. <10m: Sales Notes do not have any métier data. For some very specific cases we can allocate métier based on the species caught.
LTU	Gear mesh size, gear dimension and gear fishing effort or soaking time are obtained from logbooks. The main focuses of the cross-validation are on fixing the primary data.	Allocation of the fishing effort and landings by fishing areas e.g. by ICES statistical rectangles, FAO fishing areas and subareas, EEZ are from logbooks. In case when spatial data is not available or incorrect the VMS data might be used. For vessel is under 12 m. length in overall one and the same ICES statistical rectangles, FAO fishing areas and subareas, EEZ is applied as SSF is operating only in that area.	The fishing metier assess based on trip and gear. When during trip used two and more gear types or gears with different mesh size might be allocated of two or more metiers to one trip.
LVA	Information from logbooks is used only.	Open Sea fishery (10-12m, 12-15m and >=15m): • Information from E-logbooks is used only (coordinates are provided). Coastal fishery (SSF - <10m and 10-12m): • According to the coastal fishermen licensing system, the fishing ground for them is limited by the borders of municipality issued the license. In the coastal logbooks information about ICES rectangle must be provided. Fishermen provide information about fishing start and end dates.	Open Sea fishery (10-12m, 12-15m and >=15m): • Information from E-logbooks is used only (gear and mesh size are provided). Coastal fishery (SSF - <10m and 10-12m): • Each municipality has a limited number of fishing gears (according to the Latvian fishing rules) which are divided between fishermen. In the Latvian fishing rules for each specific fishing gear allowed mesh size range is provided. Métier is defined based on information about the gear.
NLD			

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MS	2.d Methods to get gear information	2.e Methods to get spatial information	2.f Methods assess metier
POL	Not for economic data call. For other purposes, soaking time is estimated based on the information from logbooks. The methodology takes into account the gear type and the time intervals between consecutive fishing days. Mesh size is registered in logbooks from vessels over 10 m. For vessels under 10 m, mesh size is derived from the information on catch composition registered in coastal logbooks.	Spatial information from all fishing vessels is registered in FAO areas, ICES statistical rectangles and in the Baltic Sea in national rectangles which are sub-polygons of ICES rectangles. The consistency of different spatial levels is validated using national reference lists. VMS data is used to correct identified errors concerning vessels over 12m. For vessels under 12m, vessels' patterns are used to correct errors.	Not for economic data call. For other data calls, métier codes are assigned on a fishing sequence level based on the information from logbooks or coastal logbooks. The fishing sequence consist of fishing day, location and gear. The target assemblage is determined using the dominance criteria.
SWE	SwAM: See answer for question 1. SLU (H-lab) H-lab does not consolidate gear mesh size, gear dimension and gear fishing effort or soaking time. For the most, data in "Catch and effort file" is used directly, with the exception of fishing effort allocation to gears on coastal journals where an algorithm is used to split monthly aggregated values (days at sea) by gear and location (see above).	SwAM: See answer for question 1. SLU (H-lab) H-lab does not consolidate spatial information using geo-localisation data. Expert judgment is used during effort calculations to carry out minor consolidations of "Catch and effort file" itself (e.g., when rectangles do not match subdivisions, one of these needs to be corrected to pass consistency checks of FDI).	SwAM: Not applicable. SLU (H-lab) H-lab assigns the metiers based on information present in "Catch and effort file". When data comes from logbooks metiers are assigned by haul/set or fishing day, depending on whether the gear is active or passive, respectively. When data comes from coastal journals, monthly fishing effort (days at sea / fishing trips, see above) appears aggregated by month while catches are collected by gear*location so a splitting algorithm needs to be used. The algorithm consists of an even split of total days at sea / fishing trips by the gear*location reported for each month.

Question 2g on data completeness

Question 3 on other concerns regarding data combination methods

MS	2.g Completeness of data	3 Other comments regarding cross validation
DEU	All fishing trips are covered by the considered data sources.	

MS	2.g Completeness of data	3 Other comments regarding cross validation
DNK	In Denmark, we consider the sales notes covering the fishery completely. Vessels below 10 m (8 m in the Baltic) doesn't have logbooks. For these vessels, we join the sales notes with fleet register, and available position data. The métier codes are estimated based on the script developed by the ISSG on métier and transversal variables.	Onboard landings, when part of or all the landings are kept onboard on the next trip, or several trips, to be sold later causes a problem when combining logbooks and sales notes and can result in sales notes without matching logbooks. The onboard landings are marked in the logbooks as OB lines. A solution has been developed to handle the simple cases (looking through 3 last trips, and splitting sales notes where possible), but more complicated cases remain unsolved.
ESP	With the consumption algorithm, all mandatory variables, under COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009, are considered. In the event, that any data are missing, it is checked again, if that information is available or not.	No comments.
EST	We are not doing cross-validation.	No
FIN	The major issue relates to coastal fishing and the incompleteness of the CLB data. The naive approach for calculating the coastal effort is described in Q5. We are aware that our method is not optimal. We are currently working to tackle this issue.	Unfortunately, at least at the moment, we don't have any software-based validation tool in use.

MS	2.g Completeness of data	3 Other comments regarding cross validation
FRA	In the end, different type of SACROIS fishing trips are available in the data flow crossing more or less declarative data sources. SACROIS fishing trips cross-validating declarative data (European logbooks or national monthly declarative fishing forms), sales note data and geolocation data present more precise and higher quality features (most of the fishing trip' items have been cross-validated) than SACROIS fishing trips inferred from a unique "single" declarative data source (e.g. SACROIS fishing trip issued only from sales note data source). Following table detail and summarize the origin and eventual cross-validation applied; for the different type of SACROIS fishing trips; of the different fishing trip features (fishing time, fishing area, landings by species and gear/mesh size/dimension). Cross-validated features present better quality and are more precise than features issued from a unique declarative source. Furthermore, considering the information coming from the scientific census survey of vessels annual fishing activity calendars allows to complete/enhance fishing trips features. SACROIS fishing trips issued from a unique data sources are identified as "orphan". No landings are allocated to SACROIS fishing trips issued only from geolocation data. These fishing trips could highlight missing declarative information and should be close looked into. In addition, no fishing time are allocated to SACROIS fishing trips issued only from sales note data. Nevertheless, fishing effort metrics associated to such fishing trips are estimated in a next step to answer data calls. The estimates are calculated based on vessel common practices (if available) or, in a last step, considering the following hypothesis: "1 sale note = 1 fishing trip = 1 day at sea = 1 fishing day" and estimating hours at sea and fishing time regarding the common practices of the vessel fleet segment. Almost 2/3 of the total fishing trips evaluated for the more than 12m vessels, cross-validate all the declarative data sources i.e. declarative (European logbooks or national monthly declarative fishing forms), sales note and geolocation data ("marées completes"). The less than 12m vessels are generally not geolocated but ~50% of their total fishing trips evaluated cross-validate declarative and sales note data ("marées croisées hors marées complètes"). Around 10% of the SACROIS fishing trips are issued only from sales note data ("ventes orphelines") for more and less 12m vessels. Finally, around 40% of the SACROIS fishing trips for less than 12m vessels are issued only from declarative data ("marées déclarées orphelines") and SACROIS fishing trips issued only from geolocation data ("marées géoloc orphelines") represent less than 5% of the total SACROIS fishing trips. In the end, it is considered that the SACROIS cross-validation/combination algorithms are a useful tool to supplement/enhance and improve the completeness of the	In the end, the definition of all the fishing trips of the French fleet with their associated features (dates, fishing area incl. EEZ and regulatory boundaries, gear, gear dimension and mesh size, total weight and value of landings by species) result from the application of the SACROIS algorithms. The application verifies and controls different source of single-unit dataset, linking and comparing them. SACROIS algorithms do not correct the data but provide several quality indicators. They aim to build a dataset compiling the most accurate and complete information for each individual fishing

MS	2.g Completeness of data	3 Other comments regarding cross validation
	national fishing activity data providing the best use of each data source in order to build the reference fishing activity dataset . This way, SACROIS algorithms aims to answer the following questions: Who fishes? When? Where? How long? With which fishing gear/mesh size/dimension? Targeting which specie or group of species? With what vessel and gear fishing effort? What species are fished? In what quantity? And for what value? Finally, the scientific census survey of annual fishing activity calendars allows to assess the coverage and precision by fleet segment/region of the fishing activity data derived from declarative data (European logbooks or national monthly declarative fishing forms) combined/cross-validated with sales note data and geolocation data by the SACROIS cross-validation tool. When they are evaluated as insufficient/incomplete to meet the end-user's data needs (e.g. DCF requirements) and are judged defective and unreliable to estimate their fishing activity data then complementary data collection (e.g. catch assessment survey) are implemented or re-evaluation methodology based on fishing activity calendars. This is the case for the French fishing fleet less than 12 meters length operating in the Outermost regions (French Guiana, Guadeloupe and Martinique, La Réunion and Mayotte) and for the French fishing fleet less than 12 meters length operating in the supra-region Mediterranean	
IRL	Generally, we are not combining data sources (we only use Logbooks for >=10m and only Sales Notes for <10m). Because most datacalls are at the level of Statistical rectangle. For specific cases VMS data can be used to provide fine scale spatial information. Sales Notes data is hard to match to fishing trips and historically was incomplete, so it has not been used to validate Logbooks. We only started getting Sales Notes data for >=10m in 2019, and most of the datacalls were developed before this.	Any useful methodology that we could learn from other countries and apply it to our data will be welcome, for example: routinely cross-validate data sources information like Logbooks, VMS and Sales Notes. The Irish official statistics are provided based on Logbooks; if our datacall submissions are different from the official statistics there could be questions to be asked about the methodologies.
LTU	The logbooks, landing declaration and sales note are mandatory for all fleet segments. As such, the main focuses are on primary data quality.	No new methods have been developer to share.
LVA	All trips and fishing activities are registered in Latvian Fisheries Integrated Control and Information System (LFICIS).	No specific methods are used in Latvia for the fishery data cross-checking.

MS	2.g Completeness of data	3 Other comments regarding cross validation
NLD		
POL	EU logbooks and coastal logbooks are primary and exhaustive source of information on number and duration of trips.	No
SWE	SwAM: See answer for question 1. SLU (H-lab) H-lab does not generate additional fishing records relative to those it receives from SwAM	SwAM: Not applicable. SLU (H-lab) Data quality of price information and other information only present in the sales notes (such as usage and quality of landings) would greatly improve by a stronger coupling and bi-directionality in the reporting of sales transitions between vessel/trip and 1st hand buyers. At present consistency does not seem to be enforced with reporting in the landing declaration (by the fishermen) and reporting of the sale (by the buyer) being distinct processes, not completely connected, and prone to mismatches. Consistency between the two reports could improve the cross validation of sales and landing declarations happening at SWAM and would significantly help H-lab in its determinations of the value of Swedish fisheries.

Question 4 fecR and effort calculation

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

MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
DNK	The method to calculate fishing effort follows the Nicosia principles, but is programmed in SAS, as part of the scripts that combine the data, and the fishing effort measures are available in the DFAD data set. For vessels without logbooks, sales notes are available, and it is assumed that one sale (vessel and date) equals one trip, one day at sea and one fishing day. For tasks where higher resolution effort is needed, position data are used (combination of VMS, AIS, BlackBox, EM data and interpolation) and a speed filter is applied to calculate the fishing hours. (from Q2.c)	Yes	No, but can be adapted	-	For vessels without logbooks, sales notes are available Fleet register: available for all vessels back to 1987 (from Q1)	

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MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
ESP	Effort submitted to DCs is calculated according to the instructions therein. If no instructions are given: - FDI and Fleet Economic: FecR package; under 10m - sales notes info is used. - Mediterranean area: calculate days at sea (as the difference between end and start date) for all fleets (including SSF and passive gears). Most trips are one day trip. - West Africa: Effort (in days fished) is recorded from the logbooks (logbook or electronic logbook DEA), after métier assignment. - Canary islands SSF: polyvalent and multispecific fisheries; vessels with daily activity and no logbooks; can use multiple gears in the same trip; fishing effort is calculated based on the positive days to the métier, based on the occurrence of their target species in the daily catches declared in the sales notes. - Long distance fisheries: Vessel length > 40 (no SSF and passive gears). The fishing effort is calculated as Days-at-sea or Kw-Days depending on the end user requirements.	Yes - FDI and Fleet Economic DCs	Yes - FDI and Fleet Economic DCs		For vessels with no logbooks, sales notes information is used to estimate the effort	

MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
EST	Effort is calculated on the data provided with the highest precision possible. However, VMS data is not used for this and the effort is calculated according to the data provided by fisherman using the script provided in the report of 2nd DCF workshop on transversal variables (Nicosia, 2016) (from Q2c)	Yes	Partly. Using function adapted from Nicosia 2016 script	-	Fishing activity variables are obtained from Commercial fishing register, which includes the fishing vessel register and all needed data related to commercial fishing (logbooks, landings declaration, sales notes, geo-localisation data etc.). Fishermen are obliged by law to provide the requested information. (in Q1)	
FIN	Vessels under 10m - The number of days at sea is estimated to be equal to the number of fishing days. The number of fishing days is estimated to be the same as the number of soaking days, although we know that the fishermen does not visit the trap nets or nets daily.	Partly. SAS code used, was adapted to include guidelines for the effort calculation.	Started to use/test during the latest RDBES DC	The main reason for not applying fecR in previous years implies from the fact that EU-DCF reporting and the production of official statistics have walked hand-in-hand and the determined software in the latter process is SAS. Difficult to implemented under 10m. Crucial information, needed for the FecR, is lost when combining different sources of data to obtain the official statistics. Also coastal logbook data (CLB) is reported by month and lacks information at	For the CLB, we have been drafting an idea to try to create a single trip pseudo-ID and a pseudo departure and return times based on the soaking hours and/or days aiming to assess the coastal effort more accurately than before. To our knowledge, an implementation to tackle this type of challenge is not (yet) a part of FecR.	(a) Possibility to use FecR for coastal fisheries data in the future because of changes in the legislation.

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MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
				trip/haul level, that is needed for the FecR. (a) Despite the possibility to calculate the effort for CLBQ data via FecR, this has not been implemented yet. The reason is that when producing official statistics, the data is processed in such way that the CLB and CLBQ data is combined to avoid duplicate reporting in statistical publications. Therefore, we lose some of the crucial information needed in FecR.		

MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
FRA	(1 sales note) = 1 fishing trip = 1 day at sea = 1 fishing day".	Yes	No	An adapted R script has been developed based on the fishing activity data format issued from the SACROIS cross-validation tool especially because the R-script is not suitable for vessels without logbooks *(e.g. for national monthly declarative fishing forms where data are provided on a "day by day" basis)*	All the framework for effort calculation/validation, which uses different sources of data, is performed by SACROIS algorithms (developed by Ifremer)	

MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
IRL	Use a variety of fishing effort calculation methods for different datacalls	Yes, for FDI and RDBES DCs No, RDB and ICES DCs	Yes, FDI DC No, RDBES DC	RDBES DC: FecR does not use metier in its effort calculation (only gear and mesh); also needs effort partitioned by area, rect and metier.	Complementary data - Fishery dependent biological and transversal data on small scale coastal fisheries (SSCF, <15m vessels) are collected under a number of programmes: 1. A sentinel fleet representing about 8% of the under 12m fleet provide effort and catch at daily resolution 2. A Skipper self-sampling programme started in 2021 where Skippers report effort, catch, landings, discards, biological data at operational level 3. Observers at sea programme; provide the same data as in 2 above 4. Port sampling programme for biological data on landings 5. Inshore VMS; high resolution spatial data are collected for some dredging fleets that provide effort and fishing distribution data. (from Q1)	Improvements of the FecR were suggested: - Nationally we should standardize the way we calculate effort; this should be done with the package FecR - Get FecR back into CRAN; - Ensure FecR is suitable for RDBES effort calculations.

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MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
LTU	For vessels which provided the declarative forms it was assumed that one fishing day equals one trip, one day at sea and one fishing day. Since 2019 calculation for SSF are based on exact dates provided in logbooks.	(Yes)[a]	Used for vessels over 12 m overall length	-	There is a need for automatic check for overlapping similar gears effort. *(esp. when there are two records of the same gear types with slight difference of the mesh size. There is a risk to double fishing days count)*	[a] - Not stated by the MS in the questionnaire but, if FecR is used, then it's assumed that the procedure follows the Nicosia (2016) principles
LVA	Coastal fishery (SSF: < 10m and 10-12m): - Days at Sea are calculated for each boat (in one fishing activity many boats could be used, as licence is issued for the company and company can own many boats); - Fishing days are calculated for each fishing gear separately	(Yes)[a] - Open Sea fishery	Used for Open Sea fishery (> 10 m)	-	Costal fishery (SSF <10 and 10-12m): - Latvian Fleet Register (for Capacity) - Coastal monthly reports (for fishing effort and landings in weight) (from Q1)	[a] - Not stated by the MS in the questionnaire but, if FecR is used, then it's assumed that the procedure follows the Nicosia (2016) principles
NLD	The methodology for the calculation of fishing effort is in line with the methodology developed during the 2[nd] DCF workshop on transversal variables *(Nicosia, 2016)* for both passive and active gears	Yes	No			
POL	For vessels under 10 m, each fishing day is considered as one fishing trip lasting approximately 8 hours at sea. (from Q2c) Missing information on fishing trip duration for vessels < 8 meters. Based on known information, from vessels of 8-10 meters, it is assumed that average trip last 8 hours. Soaking time for SSF is available from coastal logbooks (<8 m)	Yes	For the RDB/RDBES and FDI DCs	-	- < 10m: Coastal logbooks; sales notes, fishing licenses; - 10-12m: paper logbooks, sales notes; - > 12m: electronic logbooks, sales notes, VMS (from Q1)	All vessels (including SSF) are subject to mandatory reporting of their activity (from Q2c)

MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
SWE	The estimation of fishing effort at H-lab for purposes of international deliveries related to SSF and passive gears comprises three broad categories: (- ICES spatial fisheries data call (VMS fleet; does not cover the SSF monthly journal data but some passive gear effort from logbooks is included calculations based on VMS records obtained from SwAM; end-user ICES WGSFD)) - less relevant for SSF **- ICES assessment groups, RDBES and FDI data calls (all fleet, calculations based on "Catch and effort file" obtained from SwAM, end-user ICES AWGs, STECF)** With regards to coastal journal data, H-lab also applies the methodology developed during the 2nd DCF workshop on transversal variables (Nicosia, 2016). However, the monthly format requires a previous splitting into "pseudo-trips" before the Nicosia principles and algorithms can be applied. As explained above, the non-existence of trip-level data, makes it require that gear*location combinations reported at monthly level are distributed by the monthly days-at-sea/trips via a splitting algorithm. The latter process necessarily implies some strong assumptions, one of them being that of unique gear*locations being used each trip. After that initial transformation Nicosia/FecR algorithms are followed just like	Yes, for ICES, FDI and RDBES DCs No, RDB DC	Yes, for ICES, FDI and RDBES DCs No, RDB DC	- The monthly aggregation of the coastal journals implies lack of trip-level data. - Days at sea are known but fishing trips need to be assumed similar to days at sea. - It is difficult to identify if gear*locations are fished in parallel or sequentially -> The splitting algorithm assumes they are fished sequentially -> likely leads to underestimation of total fishing days which, according to Nicosia principles may count double when two passive gears are used simultaneously, coming up effectively higher than days at sea. (*)	(*) To improve this situation, it would be important to have trip by trip information on SSF even if submitted at monthly intervals / in monthly journals. Current implementation of e-registration of Swedish monthly journals opens the possibility of achieving that in the future.	

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MS	4.1. Summary of methodology applied for fishing effort calculation especially for SSF and passive gears	4.2. Is it in line with 2nd DCF workshop on transversal variables (Nicosia, 2016)?	4.3. If yes, are you using the FecR package to calculate the metrics?	4.4. If not, what are the main concerns/difficulties to apply it?	4.5. Could you describe the different complementary scenarios (esp. when no logbooks data are available) and data sources (esp. for SSF) which have to be considered in the FecR package besides logbooks?	Observations/Other comments
	in the logbook case. **- RDB (all fleet, calculations based on "Catch and effort file", end-user RCG)** Historical data provision into RDB precedes the implementation of the Nicosia principles and to our knowledge Nicosia principles were never a requirement of that data submission. As such, to keep consistency in the time series, effort calculations have been kept the same. In brief, this involves direct calculations (in the case of logbooks) or implementation of a splitting algorithm (in the case of coastal journals, see details above).					

B/ Replies to questionnaires by country

Germany

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

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

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

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

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

a. to assess the value of landings especially for landings not sold at auctions? 134

All landings are presented in the landings declaration.

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

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

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

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

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

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

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

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

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

All fishing trips are covered by the considered data sources.

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

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

We didn't use the FecR package yet.

Denmark

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

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

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

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

The combined data are stored by year in a database called DFAD (Danish Fisheries Analysis Database) in SAS and R datasets.

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

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

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

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

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

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

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

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

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

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

Areas are assigned with the following procedure: i. If available, the area reported in the logbook is used. ii. Else, the area reported in the sales note is used. iii. If the area is reported as 3D: 1. If the rectangle is 34G4 and area is reported as 3D in the logbook, the area is detailed from the sales note. 2. If area is reported as 3D, the area is detailed from the ICES rectangles reported in logbooks. 3. If the area is still 3D, the area is detailed from the sales notes. 4. If the area is still 3D the dominant area from the vessel is used. ICES rectangles are assigned with the following procedure: i. If rectangle is available from the logbooks, it is used. ii. Else, the dominant rectangle by trip is found from position data (AIS/VMS/BlackBox) iii. If the rectangle is still missing, a default from the harbour is used. This is split between vessels larger than 12 m and vessels smaller than 12 m by harbour. iv. The area and ICES rectangle relation is checked with the ICES lookup table. If there is a mismatch between area and ICES rectangle following is done:

> 1. If it is 2005 or after, VMS data are checked, and if the VMS area equals the assigned area, the ICES rectangle is changed to what is indicated in the VMS data. If the VMS ICES rectangle equals the assigned ICES rectangle, the area is changed to what is indicated in the VMS data. If there is no VMS data available, the ICES rectangle is set to NA.
> 2. If it is before 2005, the ICES rectangle is set to NA.

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

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

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

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

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

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

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

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

Spain

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

These data are collected according to **COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy**, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006

SALES NOTES:

Sales notes provide data on fishing effort and data on weight and value.

- Sales notes are the only declaratory form of catches in vessels <10 m.
- Sales notes are the only declaratory form of value in all vessel length ranges.

LOGBOOKS:

For the rest of vessels length ranges, e-logbooks and paper logbooks are used to assess fishing activity data.

VMS:

Geo-localisation data are collected through Vessel Monitoring System.

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

Spain cross-validates different types of data available.

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

General scheme of process.

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

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

Some cross-checks implemented are the following:

- Port errors in declarations of departure, return or landing: These port errors are detected using VMS or previous trips (paper logbooks) in case VMS is not mandatory for these vessels.

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- Check catches messages that declares an EEZ of a country included in an agreement with active licenses for that vessel: It is checked if vessels have a license or an agreement with that country during that period.

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

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

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

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

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

As it is stated before, catches associated with logbooks will be processed and a line will be generated for each of them in the "Consumption" table, establishing the initial values for the date and time of capture, species, area, country, weight caught and weight caught under size.

The data between logbook and sales notes are crossed, to identify inconsistencies between landing declarations and sales notes. Mainly, data being crossed are for "stock" species (TAC and quota species), but for the rest of species this cross-check is made too. With this information, it is possible to find differences and errors in species, declarations, etc.

Furthermore, for some data calls, the information is aggregated:

- Species composition of some congeneric species is estimated based on samples of the fisheries per metier, quarter/month and area.
- Catches and length distribution of ray species are reported as SKA and for *Sebastes spp*. as RED in long distance fisheries.
- In some data calls, where it is allowed by the instructions, error reporting in species is grouped in OTH. Percentage and total catches of this OTH related to total catches (all species) is negligible.

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

VMS system is used to consolidate the "vessel fishing effort", when this information is available.

In bottom trawls, speed information is used to determine fishing effort (fishing days, fishing hours..). It is considered vessels are fishing, when speed is higher than zero and lower than five knots.

For other gears, it is difficult to calculate fishing effort.

Days at sea are calculated taking into account departure date and arrival date.

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

For gear mesh size, it is checked that data information provided for the fleet complies with the provisions of law.

Gear dimension and soaking time, as they are variables not mandatory in the COUNCIL REGULATION (EC) No 1224/2009 of 20 November 2009, are not available for all trips.

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

VMS is used to allocate the ICES statistical rectangles, FAO fishing areas and subareas, EEZ, etc, when it necessary to consolidate the information. When VMS information is not available (VMS is not mandatory for these vessels), landing port is used to allocate catches.

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

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

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

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

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

No comments.

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

Regarding data calls, effort is calculated according to data call instructions. If there is no specifications, effort is calculated as it is stated below: <u>FDI and Fleet Economic</u>: The effort is calculated according to Nicosia 2016 (FecR). For vessels < 10 m, information comes from sales notes.

For other data calls:

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

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

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

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

Estonia

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

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

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

The active and passive gear data come from different Governmental databases that are combined in R using in house scripts. However, no cross checking is done on a regular basis. Only occasionally misreporting is assessed by comparing the official logbook data to the data from national control authorities.

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

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

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

Not done

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

Not done

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

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

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

Use the data fishermen have provided.

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

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

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

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

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

We are not doing cross-validation.

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

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

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

Finland

1) Could you describe the different type of declarative data *(e.g. fishing fleet register, sales notes, landings declaration, logbooks, coastal logbooks, adapted declarative forms, geo-localisation data …)* and potential complementary data available in your country to calculate/assess fishing activity data *(capacity, fishing effort and*

landings in weight and in value). This should be done by vessels length ranges *(e.g. <10m, 10-12m, 12-15m and >=15m)* when data availability differs between them.

The monitoring, control, and surveillance (MCS) of fisheries carried out by the Centre for Economic Development, Transport and the Environment (ELY) forms the cornerstone of FIN fishing activity data. The ELY monitoring data has been made available to Finnish experts involved reporting in the context of EU-DCF. The required information depends on the scope of a particular data call, yet the essential content regarding transversal data consists of

- **Logbook (LB) data**: A fishing diary comprising the reported catches per trip for vessels over or 10 meters length.
- **Coastal Logbook (CLB) data**: Coastal catches of non-quota species per month for vessels under 10 meters length.
- **Coastal Logbook of quota species (CLBQ) data**: Coastal catches of quota species per trip for vessels under 10 meters length.
- **Sales Notes (SN) data**: Purchased catches reported by the first-sale buyers of fish. The data is mostly covered by the sales of the quota species only.
- **Vessel History and Capacity (VH) data**: Vessel register of active & passive vessels including information on vessel characteristics.
- **Discards and Incidental Bycatch (DIB) data** corresponding to landings data (LB, CLB, CLBQ) is constructed mainly by utilizing the equivalent fishing journals data.

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

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

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

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

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

Introductory comments to Q2 and its sub questions

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

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

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

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

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

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

The value assessment approach is described in Q1 & Q2.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

However, the history remains the same. We have discussed the potentiality of fecR against our current CLB data. We have identified that we lack a unique trip ID and the time and date of trip departure and return. As we have a monthly journal form containing all the hauls (per number of days/hours for a single vessel, specie, trap, rectangle etc.) reported together, we don't know exactly when the fishing operation took place. We have been drafting an idea to try to create a single trip pseudo-ID and a pseudo departure and return times based on the soaking hours and/or days aiming to assess the coastal effort more accurately than before. To our knowledge, an implementation to tackle this type of challenge is not (yet) a part of fecR. Finally, it must be stated that we have just recently started the work towards the introduction of harmonized effort definitions and are not yet familiarized ourselves with the Nicosia report content at a sufficient level.

RCG's Secretariat

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France

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

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

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

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

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

Geolocation data. Vessels geolocation data *(longitude, latitude, course and speed)* issued especially from VMS devices *(hourly basis, mandatory under EU regulation[3] for over 12m' vessels also under national requirements for several specific fisheries e.g. Seine bay' scallop dredgers)* and available for some trial fisheries *(e.g. in the context of the RECOPESCA research project[13])*.

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

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

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

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

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

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

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

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

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

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

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

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

SACROIS algorithms run by Ifremer *(mandated by DGAMPA (French Directorate general for Maritime affairs, Fisheries and Aquaculture))* allow to combine the different declarative data sources based firstly on dates (*fishing trip return date declared or estimated, fishing sequences date declared or estimated, landings date, sales date, …)* and vessels. The possibility to sell the landings of a fishing trip during several sales' operation *(sometimes not during the same day)* is considered also the contrary i.e. the possibility to sell during a day the landings of several fishing trips. Species composition and landings weight associated are considered to assess/strengthen the links specially between fishermen declarative and sales notes data. Specific cases are considered in particular for vessels using fish ponds. The integration and cross-validation of the different data sources is done step by step in a modular manner. Each module integrates a new data sources linked with the fishing trips resulting from the previous steps. First step is to calculate the estimated fishing trips from the geolocation data, then they are combined with the fishermen declarative data and the fishing trips resulting are cross-validated with the vessels sales note data. Fishing activity calendars are considered to complete/enhance the data flow *(e.g. to provide better spatial information for non-precise declaration)*. In the end, the application provides, on this basis, several quality indicators and evaluates the completeness of the final data flow of SACROIS fishing trips.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

'Metier' algorithm is thus extensively based on the fishing activity calendars providing an efficient tool to: 1) taking into account possible misreporting *(fishing gear, species landed, ...)*, in particular to assess the reliability and, if necessary, re-evaluate or specify the declared fishing gear, 2) better reflect the fisher'

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

[19] See detailed methodology explained in **Annex 3.4** *(as a working document)* of the report of: **DCF Metier Workshop: Sub-group of the RCGs - North Sea and Eastern Arctic and North Atlantic.** 22 - 26 January 2018. DTU Aqua, Lyngby, Denmark. https://datacollection.jrc.ec.europa.eu/docs/other-meetings?p_p_id=110_INSTANCE_YIiNT1qXsG0u&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col2&p_p_col_count=1&_110_INSTANCE_YIiNT1qXsG0u_version=1.0&_110_INSTANCE_YIiNT1qXsG0u_struts_action=%2Fdocument_library_display%2Fview_file_entry&_110_INSTANCE_YIiNT1qXsG0u_fileEntryId=1242949

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

fishing strategy assigning the good aggregating level of target species or assemblage of species[20] and 3) limit the list of possible metiers practiced by each vessel to a validated/appraised frame of references avoiding multiplication of metiers when it is based mainly on a combination of the principal landed target species *(or assemblage of species)* and declared gear.

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

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

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

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

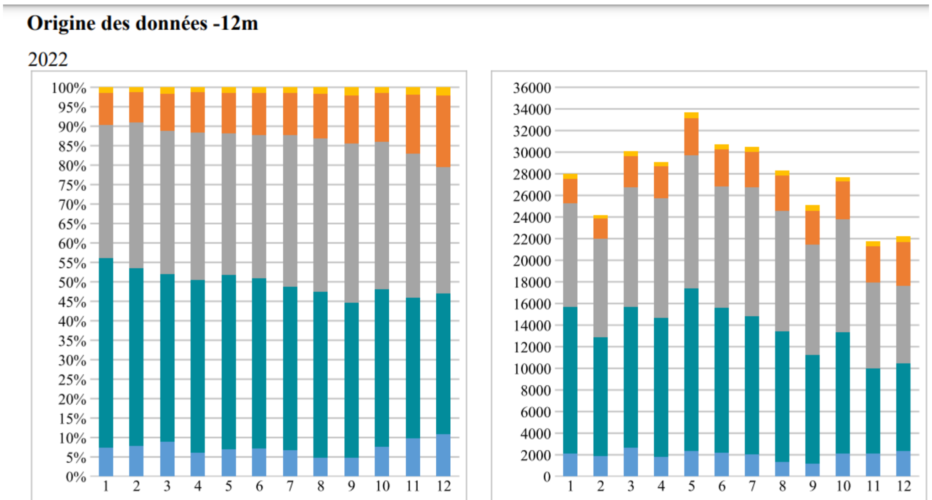
Following table detail and summarize the origin and eventual cross-validation applied; for the different type of SACROIS fishing trips; of the different fishing trip features *(fishing time, fishing area, landings by species and gear/mesh size/dimension)*. Cross-validated features present better quality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

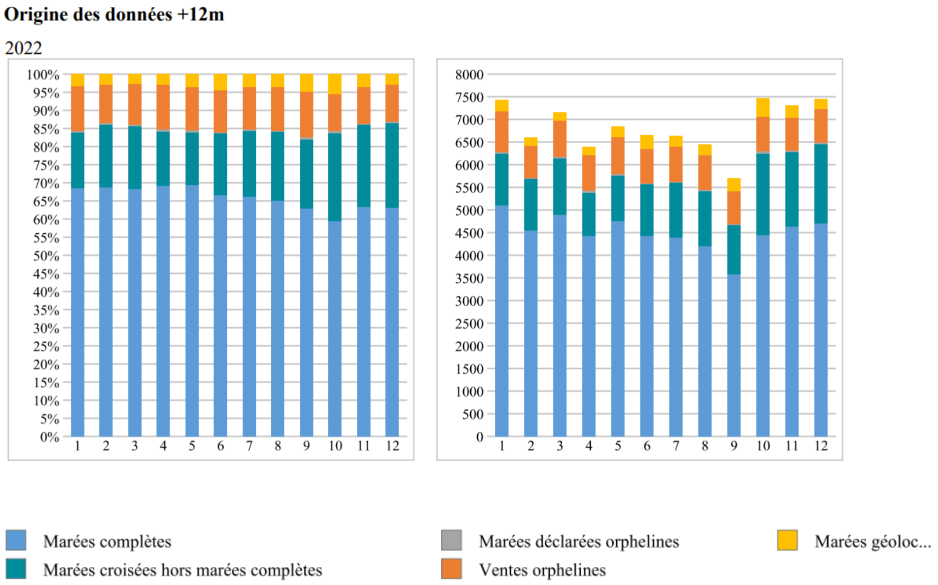
[20] For example, a vessel could have a very opportunistic fishing strategy targeting all the demersal fish species (DEF) when another could target specific demersal fish species as Anglerfish (MNZ).

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

GEOLOC = calculated fishing trips from geolocation data.
SALES = sales note data
LB-MdF = declarative data *(European logbooks or national monthly declarative fishing forms)*
SACROIS fishing trips issued from a unique data sources are identified as "orphan". No landings are allocated to SACROIS fishing trips issued only from geolocation data. These fishing trips could highlight missing declarative information and should be close looked into. In addition, no fishing time are allocated to SACROIS fishing trips issued only from sales note data. Nevertheless, fishing effort metrics associated to such fishing trips are estimated in a next step to answer data calls. The estimates are calculated based on vessel common practices *(if available)* or, in a last step, considering the following hypothesis: *"1 sale note = 1 fishing trip = 1 day at sea = 1 fishing day"* and estimating hours at sea and fishing time regarding the common practices of the vessel fleet segment. 152

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





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

In the end, it is considered that the SACROIS cross-validation/combination algorithms are a useful tool to supplement/enhance and improve the completeness of the national fishing activity data providing the best use of each data source in order to build the reference fishing activity dataset[21]. This way, SACROIS algorithms aims to answer the following questions: Who fishes? When? Where? How long? With which fishing gear/mesh size/dimension? Targeting which specie or group of species? With what vessel and gear fishing effort? What species are fished? In what quantity? And for what value?

Finally, the scientific census survey of annual fishing activity calendars allows to assess the coverage and precision by fleet segment/region of the fishing activity data derived from declarative data *(European logbooks or national monthly declarative fishing forms)* combined/cross-validated with sales note data and geolocation data by the SACROIS cross-validation tool. When they are evaluated as insufficient/incomplete to meet the end-user's data needs *(e.g. DCF requirements)* and are judged defective and unreliable to estimate their fishing activity data then complementary data collection *(e.g. catch assessment survey)* are implemented[22] or re-evaluation methodology based on fishing activity

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

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

calendars[23]. This is the case for the French fishing fleet less than 12 meters length operating in the Outermost regions *(French Guiana, Guadeloupe and Martinique, La Réunion and Mayotte)* and for the French fishing fleet less than 12 meters length operating in the supra-region Mediterranean[24].

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

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

Completeness *(evaluated against the exhaustive Ifremer activity survey)* and reliability of the fishing activity data calculated via the SACROIS cross-validation tool are qualified as good quality and sufficient to produce the reference fishing activity' estimates *(capacity, fishing effort and landings)* for the French fleet *(including small-scale fleets, less 12m' vessels)* belonging to the North Sea and North Atlantic regions and for French fishing fleet more than 12 meters length operating in the Outermost regions *(French Guiana, Guadeloupe and Martinique, La Réunion and Mayotte)* and in Mediterranean.

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

4) For fishing effort estimates calculation, summarise the methodology applied for their calculation especially for SSF and passive gears? Is it in line with the methodology developed during the 2nd DCF workshop on transversal

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

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

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

variables *(Nicosia, 2016)*? If yes, are you using the FecR package to calculate the metrics? If not, what are the main concern/difficulties you meet to apply it? Could you describe the different complementary scenarios *(esp. when no logbooks data are available)* and data sources *(esp. for SSF)* which have to be considered in the FecR package besides logbooks?

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

It should be notified that SACROIS cross-validation tool allows, in most cases, to provide needed information *(esp. considering fishing area or gear)* to apply the principles developed in common joint methodology *(Nicosia, 2016)*. Nevertheless, some methodology' adaptations have to be done especially when data are provided "day by day" *(for less than 10m vessels for which European logbooks are not required)* or for SACROIS fishing trips issued only from sales note data. Selected hypothesis are however in line with the relevant conclusions coming from the various groups[26] which have discussed the issue of effort calculation in the small-scale fishery in regard with the principles developed by the 2nd DCF workshop on transversal variables *(see last ISSG report[27] where the relevant conclusions from these different meetings have been summarised)*. Especially, methodology developed follows as far as possible the different principles elaborated during the 2nd workshop on DCF transversal variables but sometimes have to be adapted to take into consideration SSF' special features and ongoing data collection systems *(data available and the way to collect them)*. In particular, the following assumption *(agreed by lots of MS for SSF)* is applied as far as no other data contradicts the hypothesis: *"(1 sales note) = 1 fishing trip = 1 day at sea = 1 fishing day"*.

Ireland

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

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

[26] **Anon, 2017. Report on the PGECON subgroup DCF workshop on small scale fisheries.** 25-29 September, The Hague, Netherlands. https://datacollection.jrc.ec.europa.eu/documents/10213/1407628/2017_Workshop_PGECON+small-scale+fisheries.pdf/451907ac-184e-4df6-86a5-5435057a483d
ICES, 2017. Report of the Working Group on Commercial Catches (WGCATCH), 7-11 November 2016, Oostende, Belgium. ICES CM 2016/SSGIEOM:03. 141 pp. https://doi.org/10.17895/ices.pub.8658
ICES, 2018. Report of the Working Group on Commercial Catches (WGCATCH), 6-10 November 2017, Kavala, Greece. ICES CM 2017/SSGIEOM:09. 132 pp. https://doi.org/10.17895/ices.pub.8684
Scientific, Technical and Economic Committee for Fisheries (STECF) – Fisheries Dependent Information – FDI (STECF-21-12). EUR 28359 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-45887-6, doi:10.2760/3742, JRC127727. https://stecf.jrc.ec.europa.eu/documents/43805/3895664/STECF+21-12+-+FDI+-+Fisheries+Dependent+Information.pdf/975abf56-385f-45de-ac58-984146f803ca
ICES. 2022. Workshop on Geo-Spatial Data for Small-Scale Fisheries (WKSSFGEO). ICES Scientific Reports. 4: 10. 60 pp. http://doi.org/10.17895/ices.pub.10032.
[27] https://github.com/ices-eg/RCGs/blob/master/Metiers/Reports/ISSG_2022_Metier and transversal variable issues Report.pdf

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

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

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

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

In Logbooks we have:

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

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

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

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

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

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

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

<10m:
We just use the Sales Notes.

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

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

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

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

>=10m: We use Logbooks. Gear information is recorded in Logbooks. <10m: Sales Notes do not have any gear data. For some very specific cases we can allocate gear based on the species caught.

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

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

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

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

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

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

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity

data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

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

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

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

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

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

Potential improvements:

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

Lithuania

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

For calculation/assess fishing activity data the landings declarations and logbooks have been used for all vessel's segments since 2019. Until 31 December 2018 the vessel segment which length is <8 m and operated in the coastal area the monthly declarative form was used as sours of data. The sales notes are obligately for all fleet and even if catch is one kilo of any species. National Fisheries Data Information System (FDIS) automatically crosscheck landing declarations (before 1 January 2019 data from declarative form as well) with the sale notes species volume. The obtained discrepancy causes are investigating and looking for issue solving. FDIS contains all primary data. As such, all fleet registration events are available specifically by data and no need to use fishing fleet register officially published on European Commission website. Geo-location data of VMS are available for the vessel segments which length is >15 m. However, there is restriction that data can be stored for last 3 years in relevant system. Therefore, for earlier years geo-location data is available only on VMS data call level. In cases when the data of areas is missed in the logbooks, the geo-location data is using to fulfil gaps. Lithuania is not collecting AIS data.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

No new methods has been developed to share.

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

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

Latvia

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

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

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

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

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

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

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

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

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

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

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

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

Information from logbooks is used only.

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

Information from logbooks is used only.

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

Information from logbooks is used only.

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

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

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

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

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

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

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

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

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

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

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

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

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity

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data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

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

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

> Open Sea fishery (10-12m, 12-15m and >=15m):
>
> - FecR package is used.
>
> Coastal fishery (SSF - <10m and 10-12m):
>
> - Days at Sea are calculated for each boat (in one fishing activity many boats could be used, as licence is issued for the company and company can own many boats).
> - Fishing days are calculated for each fishing gear separately.

The Netherlands

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

> VMS, logbook data and sales notes are received from the RVO and stored in a local database at Wageningen Marine Research Institute.
>
> - Geo-localisation data
>
> Since 2005 all vessels longer than 15 m are equipped with a Vessel Monitoring System (VMS) which sends a signal every 2 hours to a satellite providing information on the vessel's ID, position, time, date, direction and speed. Since 2015 the interval was shortened to 30 minutes for some vessels. From 2012 all vessels longer than 12 meters are obliged to carry VMS.
>
> - Logbooks
>
> Since 2018 vessels smaller than 12m are obliged to report electronic logbooks (e-lite). Due to a data provision issue WMR has only been receiving partially these data from RVO. The logbook dataset follows the standard format and is considered completed for all other vessel lengths. This is the main source of landed value and what is used for all data provisions.
>
> - Sales notes
>
> The sales notes dataset includes the vessel ID, date, auction, landing harbour, species 3 alpha code, weight, auction size categories (including BMS) and value.

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

> - Logbooks and sales notes data

The two data sources are matched by vessel ID, date and harbour and if the conditions are met a trip number from the logbooks is assigned. To ensure the right trip number is assigned to each sales note the species composition, the total weight, and the weight by species is examined. When the conditions (quality thresholds) are not met the sale note does get assigned a trip number automatically and a manual examination of the data takes place. These quality checks are in place for internal use and the sales notes are not used for any data provision. - Logbooks and VMS The methodology for cross checking the logbooks and VMS data is described in https://edepot.wur.nl/248628 (Appendix B).

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

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

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

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

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

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

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

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

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

3) In the end, have you any other concerns to share with the group regarding the data "cross-validation/cross-checking/combination" method/tool actually in place in your country to asses/evaluate fishing activity variables? Please add anything you think valuable to consider to develop best practices guidelines regarding fishing activity

data cross-validation tools. Provide also any references and time period of implementation *(since when the algorithm applied?)*.

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

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

Poland

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Missing information on fishing trip duration for vessels < 8 meters. Based on known information, from vessels of 8-10 meters, it is assumed that average trip last 8 hours. Soaking time for SSF is available from coastal logbooks (<8 m) or EU logbooks (>8 m). For RDB/RDBES and FDI data calls, fishing effort calculations follow the principles specified during the 2nd DCF workshop on transversal variables (Nicosia, 2016) and implemented in the fecR package.

Sweden

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

SwAM:

SwAM collects data according to the legislation set by the EU (logbooks, landing declarations, sales notes, VMS etc).

Logbooks: All vessels, 10 meters or more, are required to provide information in logbooks for all fishing activities in the sea. Vessels less than 10 meters fishing with trawls or seiners or land in another country than Sweden and vessels that are 8 meters or more and fish in ICES areas 22-28 and if the vessel has cod onboard that is caught in ICES areas 20-32 also Have to fill in logbooks. Other vessels are obliged to fill in monthly costal journals. The logbooks contain information on time for departure and arrival from and to port, gear, minimum mesh size and size of the gear, time and position for the fishing activity, effective fishing time, position given in latitude and longitude and quantity per species in live weight. The logbooks further give information about vessels that Have participated in the fishing activity and information on all arrivals to port for those cases the stay in port is a short stop which does not include landing or transhipment. The logbook shall be sent or left to the SwAM no later than 48 hours after the landing has been completed.

Monthly journals: A monthly coastal journal shall be filled in for professional fisheries in the sea when the obligation to fill in logbook does not exist. The monthly journals contain information about the vessel (name, signal code and district name), fishing period (one period may not exceed one calendar month), number of days at sea, catch in kilogram live weight for each species, gear and catch area. The monthly journals shall be sent or left to the SwAM no later than two calendar days from the end of the month of the fishing activity.
Landings declarations: All vessels that fill in logbooks shall after landing of fish fill in a landings declaration. Only one landing may be accounted for per landing declaration. The landings declarations give information on weight per species in kilogram regardless of quantity, for salmon, trout and lobster the number of individuals shall also be specified. Signal code shall indicate which quantities that concerns own catch and which concerns transhipment in case one landing includes catches from transhipment from another vessel. Signal code should also be given to indicate what quantities that shall be counted to respective vessel for joint fisheries. ICES area of the catch shall also be indicated. If fishing activities Have been conducted in several ICES areas each area should be given.

Sales notes: Sales notes shall be filled in by a registered first hand buyer after a sale has been closed. Except for the information stated in article 64 in regulation (EG) no 1224/2009 a sales note should also include a unique number for the first hand buyer, the first hand byers designated code, signal code of the vessel who has landed the product, the social security number of the vessel license holder, manufacturing, purpose of use.
All of the documents above and VMS information is combined with a unique identifier (trip id). For vessels under 12 meters in length no VMS-information is available.
The fishing database performs different cross checks/validations using the different documents/data.

SLU:

SLU is a main data provider of fishing activity information for ICES and STECF work. Within SLU there are different departments and divisions. SLU AQUA is the main data provider in terms of fisheries activity within SLU. With AQUA, the Institute of Marine Research in Lysekil (H-lab) is a main data provider on marine fisheries managed internationally (which we assume to be the focus of this questionnaire), including small scale fisheries

The main end-users using data provided by H-lab are ICES and STECF expert groups. Data is also supplied to databases dealing with commercial catch data (e.g., RDB/RDBES, FDI, InterCatch). These requests frequently involve some sort of fleet segmentation into vessel size classes. For the most, H-lab answers requests that involve the biology of catches which data collection it is responsible for. Direct requests related to capacity, effort, quantities landed and their value are sometimes issued by ICES EGs or STECF groups dealing with commercial catches (e.g., WGCATCH). H-Lab generally answers these if not they are not related to management or economic aspects of the fleet (in which case SwAM is generally requested to handle them). In parallel, H-lab also carries out data analysis involving vessel size classes in answer SwAMs own requests, but that aspect is deemed of less relevance for ISSG work and not covered here.

To answer end-user needs, SLU regularly receives datasets on sales notes, landing declaration, VMS, and a combined logbook and monthly coastal journal file from Ha. In this questionnaire the combined file is referred to as “Catch and effort file”. These datasets all contain vessel information and trip identifier that SLU uses to combine them. The handling of the data does not significantly differ between length classes, with the “Catch and effort file” (see above) being the basis of most data provision made by SLU (to ICES and STECF purposes). In a limited number of cases the EU fleet register and landing declaration are also used (e.g., when full species composition is needed). Sales information is frequently less complete and for the most used only in the computation of values or to assign usage/treatment/size classes, (not for weights or activity).

Capacity

- Auxiliary information on number of vessels, their power and/or their tonnage associated to catches or value is frequently requested by expert groups within ICES or STECF. When so, it is generally compiled from the processed “Catch and effort file”. In some situations, information in the “Catch and effort file” is combined with a processed version of the EU fishing fleet register (made unique on CFRs that operated during a calendar year).

Fishing effort

- Days at sea, number of trips, KWdays, fishing days, etc., are compiled from the “Catch and effort file” for all fleet segments. In some cases, information from the EU fleet register is added in analysis. Within the “Catch and effort file”, different procedures are used when dealing with logbook data (haul-based) and coastal journal data (monthly). With regards to the latter, number of monthly trips is assumed equal to monthly days at sea and a redistribution algorithm is used to allocate gears to days at sea carried out each month.

Weight

- Weight is generally provided based on the “Catch and effort file”. In some cases, Landing declarations are used. When discards are requested, estimates produced by H-Lab from DCF sampling programmes are used. Coverage of SSF in DCF programmes has generally been limited, with a few exceptions (e.g., nephrops fishery with pots; some gillnet fisheries; past eel fishery).

Value

- Value is generally computed by an algorithm that matches sales, Statistics Sweden (SCB) data, etc, with “Catch and effort file” and landing declarations.

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

> SwAM:
>
> See answer for question 1.
>
> SLU (H-lab)
>
> In general H-lab does not do any cross validation across data sources. Capacity, fishing effort and weight are, for the most, directly derived from logbook data present in “Catch and effort file”. On some occasions information in landing declarations is merged in using trip identifiers supplied by SWAM in the data. With regards to coastal journal data (also in “Catch and effort file”) where individual trips are not readily identified some special procedures are in place to determine capacity, fishing effort and weight. Special procedures are also in use to associate sales data to “Catch and effort file”. and obtain final values. These are described below.
>
> Effort (coastal journals)
>
> In the case of monthly aggregated data (coastal journals information included in “Catch and effort file”), monthly days-at-sea are considered equivalent to monthly fishing trips. Monthly fishing trips are then split across gear/metier and geographical using a simple algorithm (more info below).
>
> Catches (coastal journals)
>
> In the case of monthly aggregated data (coastal journals information included in ”Catch and effort file”, catches are already discriminated by gear/metier and geographical position, no further processing being necessary.
>
> Value (logbooks and (coastal journals)
>
> Values by trip (for logbook data) are extracted from matching sales notes using trip identifiers supplied by SwAM. For trips (logbook data) and coastal journals without matching sales notes, values are assigned based on monthly averages supplied by SwAM or aggregated directly from sales note data (more extensive description below).

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

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

> SwAM:
>
> Sweden has 1st hand buyers (these are not necessarily only auctions). All sales that are required to be reported should be sent to SwAM regardless if it is an auction or a first hand buyer.
>
> Sales directly to consumers from the fishermen is not required to report, for landings without sales notes SwAM calculates the value using a price matrix. The price matrix estimate average prices using spatial, temporal and auxiliary information regarding the vessel.
>
> H-lab assumes all landings are reported in the landing declaration. When sales records do not exist for certain trips, the value is estimated based on an algorithm. Information from landing declaration and sales notes are merged and checked for inconsistencies. Values (by usage/treatment/size class for some species) from matching trips or matching vessel-months from unique subdivisions and gear types are aggregated and used to assign values to fishing events in hierarchical order; by vessel x month, by month x region x fleet, by quarter x region x fleet, by year x region x fleet and finally by year. For some species, typically those for which mainly roe is landed or wrasses sold live, fixed mean values are supplied by SwAM.

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

SwAM: See answer for question 1. SLU (H-lab) SLU does not cross-validate species composition across data sources, but an algorithm exists that consolidates ”Catch and effort file” with data from landing declarations to ensure all species are included (weights of species already existing in logbooks being split into finer taxonomic resolution but full weight not correct so it still adds to logbook totals. Some reallocations from reported BMS to LCS are carried for quota species without specified minimum legal or commercial size based on information available at SWAM.

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

SwAM: See answer for question 1. SLU (H-lab) H-lab does not consider geo-localization when producing vessel fishing effort (only ”Catch and effort file” is used)

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

SwAM: See answer for question 1. SLU (H-lab) H-lab does not consolidate gear mesh size, gear dimension and gear fishing effort or soaking time. For the most, data in “Catch and effort file” is used directly, with the exception of fishing effort allocation to gears on coastal journals where an algorithm is used to split monthly aggregated values (days at sea) by gear and location (see above).

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

SwAM: See answer for question 1. SLU (H-lab) H-lab does not consolidate spatial information using geo-localisation data. Expert judgment is used during effort calculations to carry out minor consolidations of “Catch and effort file” itself (e.g., when rectangles do not match subdivisions, one of these needs to be corrected to pass consistency checks of FDI).

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

SwAM: Not applicable. SLU (H-lab) H-lab assigns the metiers based on information present in “Catch and effort file”. When data comes from logbooks metiers are assigned by haul/set or fishing day, depending on whether the gear is active or passive, respectively. When data comes from coastal journals, monthly fishing effort (days at sea / fishing trips, see above) appears aggregated by month while catches are collected by gear*location so a splitting algorithm needs to be used. The algorithm consists of an even split of total days at sea / fishing trips by the gear*location reported for each month.

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

SwAM:
See answer for question 1.

SLU (H-lab)
H-lab does not generate additional fishing records relative to those it receives from SwAM.

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

SwAM:

Not applicable.

SLU (H-lab)

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

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

SwAM:

Not applicable.

SLU (H-lab)

The estimation of fishing effort at H-lab for purposes of international deliveries related to SSF and passive gears comprises three broad categories:

- ICES spatial fisheries data call (VMS fleet; does not cover the SSF monthly journal data but some passive gear effort from logbooks is included calculations based on VMS records obtained from SwAM; end-user ICES WGSFD)
- ICES assessment groups, RDBES and FDI data calls (all fleet, calculations based on "Catch and effort file" obtained from SwAM, end-user ICES AWGs, STECF)
- RDB (all fleet, calculations based on "Catch and effort file", end-user RCG)

We focus our answer on the 2nd and 3rd categories since it they are ones most related to effort of SSF and passive gears (most VMS will be on larger vessels fishing with active gears).

ICES assessment groups, RDBES and FDI data calls: Nicosia/FecR principles used

The "Catch and effort file" aggregated two sources of information – logbooks and coastal journals – aggregated into a common format but with different characteristics, namely with regards to temporal resolution.

With regards to logbooks data, H-lab applies the methodology developed during the 2nd DCF workshop on transversal variables (Nicosia, 2016). The calculations used are the same as those used in the FecR package, but implemented outside the package, directly on a national format. The reason for this was first historical (the national code was developed during the development of the fecR package) and later pragmatic (calculations were already implemented, there was no need to convert national data to a different format just for sake of using the package itself).

With regards to coastal journal data, H-lab also applies the methodology developed during the 2nd DCF workshop on transversal variables (Nicosia, 2016). However, the monthly format requires a previous splitting into "pseudo-trips" before the Nicosia principles and algorithms can be applied. As explained above, the non-existence of trip-level data, makes it require that gear*location combinations reported at monthly level are distributed by the monthly days-at-sea/trips via a splitting algorithm. The latter process necessarily implies some strong assumptions, one of them being that of unique gear*locations being used each trip. After that initial transformation Nicosia/FecR algorithms are followed just like in the logbook case.

Depending on the end-user, effort data calculated with the Nicosia algorithm is then (dis)aggregated into RDBES Metiers, InterCatch Metiers or FDI metiers in a way that keeps the Nicosia totals constant (they are just partitioned into subcategories and then re-aggregated to meet end-user needs).

RDB: Nicosia/FecR principles not used

Historical data provision into RDB precedes the implementation of the Nicosia principles and to our knowledge Nicosia principles were never a requirement of that data submission. As such, to keep consistency in the time series, effort calculations have been kept the same. In brief, this involves direct calculations (in the case of logbooks) or implementation of a splitting algorithm (in the case of coastal journals, see details above).

Main difficulties with applying the Nicosia/FecR principles to SSF

The monthly aggregation of the coastal journals implies lack of trip-level data. Days at sea are known but fishing trips need to be assumed similar to days at sea. In our opinion this is a reasonable assumption for the gears involved. However, it is difficult to identify if gear*locations are fished in parallel or sequentially. The splitting algorithm used to generate pseudo-trips out of monthly data, implicitly assumes they are fished sequentially. The latter likely leads to underestimation of total fishing days which, according to Nicosia principles may count double when two passive gears are used simultaneously, coming up effectively higher than days at sea. To improve this situation, it would be important to have trip by trip information on SSF even if submitted at monthly intervals / in monthly journals. Current implementation of e-registration of Swedish monthly journals opens the possibility of achieving that in the future.

4 ISSG Electronic Monitoring Technologies

4.1 Background

The ISSG EMT (Electronic Monitoring Technologies) was created in 2021. The ISSG was formed in response to the rapid growth of electronic monitoring technologies (EMT) in recent years in the field of fisheries monitoring. The goal of this ISSG is to cast a light on the initiatives taking place in nearly all EU MS in relation to EMT, highlight the most promising technologies, gather knowledge and share it with MS and, where possible, promote new collaborations between MS. These EMT include e.g. video acquisition systems coupled with position trackers and gear sensors (EM – Electronic Monitoring) that can monitor the entire fishing activity of vessels over extended periods (to collect data on fishing activity data and biological data on catches), electronic measuring boards (to collect biological data) used by scientific observers, mobile phone apps that facilitate reporting of catches by fishers, as well as genetics tools – such as environmental DNA (eDNA) to monitor species presence and abundance, and other genetics tools to define stocks, assign individuals to stock in mixed stock situations, detect hybrids, and estimate spawning stock biomass. In addition, a lot of work is ongoing in different MS to automatise the identification of catches from annotated video/images using machine learning algorithms (i.e. computer vision). Such models require a large amount of training data to reach acceptable levels of accuracy and the cost to produce such massive training datasets may be prohibitive for individual MS. This ISSG could constitute the appropriate platform to promote a future development of a shared database of annotated data between participating MS that respects intellectual property rights, and which would allow the rapid development of ML models tailored to the monitoring of fisheries.

The ISSG EMT was originally chaired by Jørgen Dalskov since 2021 and, since 2022, Gildas Glemarec joined as a co-chair. Jørgen Dalskov is retiring in April 2023, thus stepping down from his chairing role.

4.2 Work-plan

The Terms of Reference for the year 2022-2023 were defined as:

1. Initiate the development of an inventory on already used data collection technologies by different member states: e.g., electronic monitoring (EM), Machine Learning development, electronic measuring boards, eDNA, etc.
2. Examine possibilities for a shared machine learning database (pictures or video footage of fish and shellfish) to be made available for participating MS for development of machine learning algorithms for species identification.
3. Examine a possible pilot study with the Pelagic Advisory Council on genetic stock identification.

4.3 Progress during 2022/2023

The work of the ISSG EMT in 2022/2023 consisted of intersessional work to gather information from the MS and address points 1 and 2 of the ToR (Table 4.12 and Table 4.13), and of one online meeting that took place in mid-April 2023 to discuss the current state of progress of the ToR and the future directions this ISSG should take.

4.3.1 Task 1 of the ToR: EMT inventory

During the online meeting in April 2023, the group discussed the state of EMT usage in the EU and generally agreed that compiling the initiatives happening in the different MS was important. A spreadsheet summarising the information on EMT at national level was sent to all the MS representatives prior to the meeting. Out of 14 MS relevant to this ISSG, 3 countries did not have any representatives in this subgroup (LV, LT, and FR), and information from 8 out the remaining 11 MS was received on time to be incorporated to this report. Table 4.12 collates the answers from the respondents. Although it may not cover the entirety of the national initiatives going on in each country in terms of EMT usage for fisheries monitoring, this table shows that EMT are already largely adopted in the EU to collect data on the fishing activities and catches/discards of the commercial fleets and in some cases recreational fleets. Several initiatives are mature enough to have been fully integrated to DCF programmes, while a number of other are still experimental or listed as pilot projects.

It is noteworthy that we also considered here as EMT some monitoring methods based on the analysis of environmental DNA (eDNA). In short, living organisms release naturally biological material in the marine environment (e.g. cells, scales, mucus), which be filtered from water samples, and genetic material can then be extracted from filtered water samples, which can be then sequenced and compared against reference databases to determine e.g. which species are present in the environment. eDNA is currently being tested as an alternative or a complement to other monitoring approaches for determination of species presence and abundance, not only in the context of surveys but also of bycatch and discards from the commercial field. Moreover, other genetic tools are being developed and used, e.g. to define stocks, assign individuals to stock in mixed stock situations, detect hybrids and estimate spawning stock biomass. DNA-based monitoring methods were included among the initial ambitions of this ISSG, but the pertinence of this was discussed during the ISSG meeting in April 2023, as these methods are out of the expertise of most group members and may be out of scope for the ISSG EMT.

Table 4.12: Inventory of EMT usage for data fisheries collection from the responding Member States

MS	Area	EMT	Monitoring programme	Purpose of monitoring	Year start	Year end	Vessel size (m)	Vessels	DAS	Trips	Metier L3	Metier L4	Comments
FI	27.3	EM Video System	Pilot study within the scope of DCF	Bycatch monitoring onboard	2023	ongoing	To be decided						Pilot study starting, details to be decided
FI	27.3 ~ Finish inland waters	Mobile device App	Citizen-science monitoring programme	OmaKala: "Electronic logbook" for recreational anglers	2022	ongoing		~4000 people contributing with data		~6000 reported trips with catches	L3LH	LHM	https://omakala.fi/
FI	27.3	Electronic measuring board	DCF	Fish sampling: e.g. herring and sprat measurements	2010	ongoing	All	NA	NA	NA	L3GN, L3PT, L3FIX	FYK ~ GNS ~ OTB ~ OTM ~ PTB ~ PTM	Rufco measuring boards in fish sampling at ports and on a research vessel.
FI	Rivers (flowing into 27.3 & 27.1.b)	Multibeam sonar (with UW cameras)	DCF	Monitoring of migratory fish species (Atlantic salmon, European eel) in rivers	2009	ongoing	NA	Currently 4 river locations	NA	NA	NA	NA	Stationary in-river multibeam (Soundmetrics ARIS and DIDSON) sonar + in some locations, underwater cameras for species identification. Monitoring in four rivers and approximately from May to October each year; exact days depending on the location
FI	27.3	Sonar surveys	DCF	Baltic International Acoustic Survey (BIAS): herring and sprat survey	2007	ongoing	VL40XX (survey vessel)	1 (survey vessel)	~14 annually	1 annually	L3PT ~L3TB (survey vessel)	OTM ~ OTB (survey vessel)	Annual surveys on the Baltic Sea.
DK	27.3 ~ 27.4.a ~ 27.4.b	EM Video System	Pilot study	PETS bycatch monitoring	2010	2020	VL0608 ~ VL1518	17			L3GN	GNS ~ GTR	https://www.aqua.dtu.dk/-/media/institutter/aqua/publikationer/rapporter-352-400/389-2021-bycatch-of-marine-mammals-and-seabirds.pdf

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MS	Area	EMT	Monitoring programme	Purpose of monitoring	Year start	Year end	Vessel size (m)	Vessels	DAS	Trips	Metier L3	Metier L4	Comments
DK	27.3 ~ 27.4.a ~ 27.4.b	EM Video System	DCF	PETS bycatch monitoring	2021	ongoing	VL0608 ~ VL1518	9			L3GN	GNS ~ GTR	https://dcf-denmark.dk/
DK	27.3 ~ 27.4.a	EM Sensor System	Compliance	Compliance of bivalves dredging in Denmark	2012	ongoing	All	<50			L3DR	DRB	https://doi.org/10.1016/j.marpol.2020.104357
DK	27.3 ~ 27.4	DNA sampling	Pilot study	Quantitative bycatch estimation in herring in the North Sea and sprat fishery in the Baltic Sea	2020	ongoing	VL40XX	5			L3PT ~ L3TB	OTM ~ OTB	Method is still in development Industrial pelagic fishery: 4 vessels, consumption fishery : 1 vessel https://doi.org/10.1002/edn3.377 https://doi.org/10.1093/icesjms/fsad027
DK	27.3 ~ 27.4.a	Mobile device App	Citizen-science monitoring programme	Fangstjournalen: "Electronic logbook" for recreational anglers	2016	ongoing		~3600 people contributing with data		~53000 since 2016	L3LH	LHP	Volunteering participants; Recreational anglers; Mostly freshwater; >15000 registered users https://fangstjournalen.dtu.dk/ https://orbit.dtu.dk/files/266144532/Casper_Gundelund_J_rgensen_thesis.pdf Additional papers that might be relevant ICES opinion paper about the current and future use of angler apps in fisheries management 10.1093/icesjms/fsaa243 Angler citizen science: evaluation of method

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MS	Area	EMT	Monitoring programme	Purpose of monitoring	Year start	Year end	Vessel size (m)	Vessels	DAS	Trips	Metier L3	Metier L4	Comments
													https://orbit.dtu.dk/en/publications/evaluation-of-a-citizen-science-platform-for-collecting-fisheries https://orbit.dtu.dk/en/publications/insights-into-the-users-of-a-citizen-science-platform-for-collect Angler citizen science: Covid, Catch and release, Angler behaviour and satisfaction https://orbit.dtu.dk/en/publications/catch-and-release-angling-for-sea-trout-explored-by-citizen-scien https://orbit.dtu.dk/en/publications/investigating-angler-satisfaction-the-relevance-of-catch-motives- https://orbit.dtu.dk/en/publications/changes-in-angler-demography-and-angling-patterns-during-the-covi
DE	27.3.c.22 ~ 27.3.d.24	Mobile device App	Compliance	Monitor German commercial fishing vessels during the Western Baltic cod spawning closure from 01.02.-31.03.2018	2018	2018	VL0006 ~ VL1012	107	not applicable	1600	L3GN ~ L3TB	GNS ~ GTR ~ OTB	Meyer et al. 2022, https://doi.org/10.1016/j.ocecoaman.2022.106186 Ongoing experience within the scope of several smaller pilot studies in Germany using the Mofi app
DE	27.4	eDNA sampling	EU Tender project (FishGenome)	FishGenome: Quantification of cod biomass	2019	2021	research vessel	1		1	L3TB	OTB	The FishGenome project report will be available during the 2nd half of 2023 https://www.thuenen.de/en/cross-

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MS	Area	EMT	Monitoring programme	Purpose of monitoring	Year start	Year end	Vessel size (m)	Vessels	DAS	Trips	Metier L3	Metier L4	Comments
													institutional-projects/fishgenome-fish-stock-surveys-using-genetic-methods/
DE	all	Electronic measuring board	DCF	openSMB (open Scientific Measurement Board) for data sampling onboard commercial and research vessels	2017	ongoing	all	all	all	all	all	all	http://opensmb.net/
NL	27.4b ~ 27.4c	EM video system + AI catch monitoring device for discard registration	Pilot study	Discard registration	2019	ongoing	VL2440	8	>200 DAS per vessel per year	> 30 trips per vessel per year		TBB	Plan is to include OTB and SSC in the next project period.
IE	27.6.a ~ 27.7.a ~ 27.7.b ~ 27.7.j ~27.7.g	iVMS (Inshore Vessel Monitoring System)	Compliance	Compliance of bivalves dredging in Ireland	2014	ongoing	VL0012	100+			L3DR	DRB	https://inshoreforums.ie/wp-content/uploads/2021/01/Inshore-VMS-Pilot-Project_Marine-Institute.pdf
IE	27.6.a ~ 27.7.a ~ 27.7.b ~ 27.7.j ~ 27.7.g	Mobile device App	Citizen-science monitoring programme	IMREC Diary: "Electronic Logbook" for recreational anglers	2021	ongoing					L3LH	LX	https://www.fisheriesireland.ie/what-we-do/research/marine-recreational-fishery-in-ireland-mrec To use the App the angler must fill in this form via the website https://www.fisheriesireland.ie/imrec-diary-sign-up?referral=182

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MS	Area	EMT	Monitoring programme	Purpose of monitoring	Year start	Year end	Vessel size (m)	Vessels	DAS	Trips	Metier L3	Metier L4	Comments
IE	27.6 ~ 27.7	EM Video System	Pilot Study	Bycatch and Catch Monitoring	2023		VL1218 ~ VL1824~ VL2440				L3PT	OTM ~OTB	https://www.sfpa.ie/Who-We-Are/News/Details/sea-fisheries-protection-authority-seek-participants-for-pilot-remote-electronic-monitoring-project
ES	FAO area 51 and 57 ~ FAO areas 47 and 34	EM Video System	Voluntary fleet-driven program	Verification of the correct bycatch handling and FAD (Fishing Aggregating Device) design.	2017	ongoing	VL40XX	~22			L3PS	PS	Documents that might be relevant: https://iotc.org/documents/WGEMS/01/04
ES	FAO area 27	EM Video System	Voluntary fleet-driven program	PETS bycatch monitoring	2021	ongoing	VL2440	6			L3LH	LHP ~LTL	Documents that might be relevant: https://iotc.org/documents/WGEMS/01/04
ES	FAO areas 47 and 34 ~ FAO area 77 and 87	EM Video System	Voluntary fleet-driven program	DCF and RFMO data requirements	2018	ongoing	VL2440	14			L3LL	LLD	Documents that might be relevant: https://iotc.org/documents/WGEMS/01/04
ES	27.8bc	EM Video System	Voluntary fleet-driven program	Pingers effectiveness testing and monitoring for PETS bycatch reduction	2021	ongoing	VL2440	4 (2 pairs)	>600 days		L3TB	PTB	EU additional request on mitigation measures to reduce bycatches of common dolphin (Delphinus delphis) in the Bay of Biscay and Iberian Coast https://ices-library.figshare.com/articles/report/EU_additional_request_on_mitigation_measures_to_reduce_bycatches_of_common_dolphin_Delphinus_delphis_in_the_Bay_of_Biscay_and_Iberian_Coast/21946634

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MS	Area	EMT	Monitoring programme	Purpose of monitoring	Year start	Year end	Vessel size (m)	Vessels	DAS	Trips	Metier L3	Metier L4	Comments
ES	27.8.bc	AIS B	Voluntary fleet-driven program	Effort data	2017	ongoing	VL0815	50	100-150 per vessel/ year	100-150 per vessel/ year	L3GN~L3LL	GNS ~ GTR & LLS	These devices are used to monitor the Basque SSF. Mostly fishing with nets and longlines, although they can also use other gears.
ES	27.8.bc	Tablet	Voluntary fleet-driven program	Effort and catch data	2017	ongoing	VL0815	10	100-150 per vessel/ year	100-150 per vessel/ year	L3GN~L3LL	GNS ~ GTR & LLS	These devices are used to monitor the Basque SSF. Mostly fishing with nets and longlines, although they can also use other gears.
ES	27.8.bc	Mobile device App	Voluntary driven program	Recreational Catch, effort, and fishers profile data	2023	ongoing					REC	REC	This app is going to be used to collect marine recreational fisheries data. The app has been developed and the plan is to start using it in summer 2023.
ES	27.8abdc ~ 27.9a ~ 27.5b ~ 27.6 ~ 27.7	EM Video System	Voluntary fleet-driven program	PETS bycatch monitoring	2022	ongoing	VL2440 ~ VL40XX	16 (2 pairs)	727		L3TB ~ L3LL ~ L3GN	OTB ~ PTB ~ LLS ~ GNS	Report to Spanish secretariat, not accessible online.
ES	27.8	eDNA sampling	BIOMAN/JUVENA surveys	fish diversity monitoring; anchovy/sardine /*Maurolicus spp.* biomass quantification	2017	ongoing	research vessel	2	~30				
PT	27.9.a	EM Picture System	Pilot study within the scope of DCF	Species identification and length sampling of landings at fishing ports	2019	2021							Subcontract of IPMA to company "Fishmetrics"

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MS	Area	EMT	Monitoring programme	Purpose of monitoring	Year start	Year end	Vessel size (m)	Vessels	DAS	Trips	Metier L3	Metier L4	Comments
PT	27.9.a	EM Picture System	Pilot study within the scope of DCF	Species identification and length sampling of landings at fishing ports	2022	2023							Subcontract of IPMA to company "Fishmetrics"
PT	27.9.a	EM Video System + EM Sensor system + Electronic reporting	Pilot study not within the scope of DCF	Bycatch monitoring onboard	2021	2023	E	2	195		L3TB	OTB	2 vessels: 1 commercial fishing vessel operating bottom otter trawl targeting crustaceans, 1 research vessel. Project funded by EEA Grants "The development of Electronic Monitoring and Reporting (EMR) technology for fisheries in Portugal (EMREP)", with the collaboration of OLSPS International, University of Algarve, Imenco AS, IPMA. https://eeagrants.org/archive/2014-2021/projects/PT-INNOVATION-0007
All	27	Image Analysis Software	Quality assurance platform	SmartDots: Calibration of biological parameters for improving data for stock assessments	2017	ongoing							SmartDots is a set of software tools supports the user in managing all data of ICES biological reading (like age, maturity, larvae identification) workshops and exchanges, which development is guided by the ICES working group on SmartDots Governance (WGSMART) https://www.ices.dk/data/tools/Pages/smartdots.aspx

4.3.2 Task II of the ToR: Elaboration of a shared database intended to train computer vision models

A questionnaire was sent to the participants in the ISSG EMT to answer questions related to "examine [the] possibilities for a shared machine learning database (…) for [the] development of machine learning algorithms for species identification" (ToR 2 of the 2022/2023 workplan). Table 4.13 collates the answers received from the participants.

Table 4.13: Responses to the questionnaire on current state of development of image/video recognition models in relation to monitoring of fisheries. Only the MS which supplied answers are listed below, implying that more annotated data and ML development may exist in other MS that is not reported here.

MS	Does your MS own image data (pictures and/or videos) from e.g., electronic monitoring, onboard observers, etc., that can be used for training an identification/classification model?	If yes to the previous question:			
		Are these data annotated and which classes are used?	How much annotated vs. non-annotated data does this represent (number of pictures or hours of video)?	Are these data shareable? If yes, under which conditions? If no, what makes it not possible?	If these data are already used for training ML models for species identification/classification, can you summarise the methods you used and the results you obtained (type of model, level of accuracy, etc.)?
FI	Currently no, other than some non-systematically collected data. We are planning on testing onboard camera systems this year. We can analyse it using a method that would benefit the common database approach. We also develop computer vision for other use (e.g., monitoring migratory fish in rivers using underwater cameras and sonar systems).	We have underwater video data of different fish species (mostly Atlantic salmon) in rivers. Some of it already annotated.	N/A	Overall, we support sharing the data in the future, as long as it is not protected due to other reasons (e.g., GDPR or permission from vessel owners).	N/A
PL	Yes, but their usage strongly depends on current law (RODO).	No	Two cameras installed in two different harbours collect data routinely. Six months of records in each location (November-May). Cameras record from 4AM to 6PM.	None	N/A
DE	No	N/A	N/A	N/A	N/A
DK	Yes. There have been two independent projects in 2022 to identify PETS bycatch species from EM video data (one in collaboration with SLU), giving a relatively good accuracy given the effort that was allocated to it. DTU is	Yes. For the projects on identification/classification of PETS bycatch, there is a variable number of classes, from 3 (human; target	For the projects on identification/classification of PETS bycatch, ~10000 currently, but increasing using data augmentation techniques	No, not currently. We want to make the data 1. anonymous (blurring, etc.), and 2. find partners that are willing to share their data to create	Detection/classification models based on different versions of YOLO or R-CNN. Accuracy is variable but below 0.9 at this point Blurring

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MS	Does your MS own image data (pictures and/or videos) from e.g., electronic monitoring, onboard observers, etc., that can be used for training an identification/classification model?	If yes to the previous question:			
		Are these data annotated and which classes are used?	How much annotated vs. non-annotated data does this represent (number of pictures or hours of video)?	Are these data shareable? If yes, under which conditions? If no, what makes it not possible?	If these data are already used for training ML models for species identification/classification, can you summarise the methods you used and the results you obtained (type of model, level of accuracy, etc.)?
	developing another model from the annotated data from EM on GN vessels, with results planned in Q4 2023. Other projects are designed for image recognition of target catches onboard large vessels with a conveyor belt or directly inside the gear (trawl)	catch; bycatch) to ~20 (spp)		a common pool of data usable for training models	and anonymisation models based on YOLO.
NL	Yes. Images from AI catch monitoring device.	Yes. Labelled at species level (> 15 species)	Currently around 2000 annotated images.	Currently not. Project consortium agreement.	Neural networks (different YOLO versions). Statistical Machine learning techniques to compute catch volume. Combining different algorithms to investigate possibilities of active learning.
IE	No	N/A	N/A	N/A	N/A
ES	Yes. Images from EM systems installed onboard.	Yes. Approximately 1000 images of individual segmented fish. 500 of these are labelled as YFT/SKJ/BET (Yellowfin tuna, skipjack & bigeye tuna. The three main target tropical tuna species). New bycatch species will be included soon.	Around half of the manually segmented individuals are labelled. But this represents a very small fraction of the total raw data (images) collected since 2017.	No. Images are owned by the ship owners, so their use outside of certain projects is not permitted.	Details of the first trained model can be found at https://www.sciencedirect.com/science/article/pii/S1574954121002867

MS	Does your MS own image data (pictures and/or videos) from e.g., electronic monitoring, onboard observers, etc., that can be used for training an identification/classification model?	If yes to the previous question:			
		Are these data annotated and which classes are used?	How much annotated vs. non-annotated data does this represent (number of pictures or hours of video)?	Are these data shareable? If yes, under which conditions? If no, what makes it not possible?	If these data are already used for training ML models for species identification/classification, can you summarise the methods you used and the results you obtained (type of model, level of accuracy, etc.)?
PT	Yes, from electronic monitoring onshore (fishing port). IPMA is running a pilot project in several fishing ports with a company called Fishmetrics that has a patented hardware/software system that collects images of boxes landed and that allows to measure individuals in the boxes (images and measurements in a website).	Yes, at the fishing port each box is assigned a species by the fisher/company that runs the auction. But the species is not always correct. Observers from IPMA select certain boxes (i.e. images of boxes) for length sampling, and in each box selected for sampling, observers measure as many individuals as possible and if needed assign a species (if the one originally assigned at the fishing port was incorrect).	The second pilot ran for 1 year in 3 ports, during 2019-2020, and the third pilot project is running for 1 year in 1 port (in its two conveyor belts used in the auction) in 2022-2023. Only a small fraction of boxes is annotated in each pilot project. The numbers can be calculated.	In the case of these two pilot studies no, as this was not anticipated, and the work is still under development.	This is planned for this second pilot project, but not started and defined yet.

The answers received from the MS reveal that in the countries where EM data are already collected, some level of automation of the EM data analysing process using machine learning models is already underway. However, these projects are currently generally limited due to the relative lack of data usable for model training. The meeting participants were in overall agreement that the pooling of annotated data in a common shared database would be beneficial to all, but several people raised concerns on the ownership rights and privacy issues related to the use of video monitoring data that currently limits or prohibits such sharing (involving institutions, as well as technological or fishing companies). Moreover, and as raised by the ICES WGLEARN working group, a possible obstacle for this matter is the conflict of interests, where sharing data might be perceived by the institutions or companies owning annotated data as giving up a strategic edge (ICES, 2022). Nonetheless, most agreed that continuing to explore this task is valuable, but no concrete plan to do so was decided at this point. Other participants noted that there are some techniques like federated learning that allow to train models using annotated data from different locations without ever sharing these data with the different providers. This type of approach nonetheless requires setting up a relatively complex network architecture that limits its direct applicability in the near future.

Using an EM system on one or several of the research vessels conducting regular surveys in EU waters seems to be a promising way forward to create a large dataset of annotated images of capture species. Simply put, the routine work taking place onboard RV consisting of collecting and measuring catch samples could potentially be coupled with the recording and labelling of video/image data (automatically "on-the-go" or manually afterward) using a tailored EM system. It would nonetheless imply the adaptation of survey sampling protocols and procedures onboard, and such adaptations need to be developed with MS institutions implementing the surveys and with the ICES WG that coordinates those surveys (when that is the case). The obvious advantage of using imagery data from national and international surveys is that the privacy and ownership issues become less important than for data collected onboard commercial vessels, although a proper legal set up is still needed (as institutions and technological companies are still involved). Provided this approach is standardised between MS, and that the needed adaptations to the survey sampling protocols and procedures onboard are feasible, a dataset of annotated data usable for model training could be available to all, within a legal set up is found that satisfies all involved. ICES, which was represented at the meeting by Neil Holdsworth and Mehdi Abbasi, could help linking this ISSG to the relevant groups working in this field and may be a trustworthy institution where such data could potentially be stored.

4.3.3 Task 3 of the ToR: Pilot study on genetic stock ID

The third point in the ToR ("Examine a possible pilot study with the Pelagic Advisory Council (PelAC) on genetic stock identification") was discussed intersessionally between the chairs and during the April meeting, but no significant progress on this topic was made during the 2022/2023 period.

The meeting was however an opportunity for the EMT subgroup to hear a presentation given by Naiara Rodríguez-Ezpeleta (AZTI, Spain) on how genetics approaches are used in fisheries science. Specifically, the presenter distinguished different usage of genetics, such as: environmental DNA based approaches that may be employed to inventorying or even quantifying the species present in a given environment; and other genetics based methods used to analyse the evolutionary relationships within a particular species (or stock), for instance to look at population connectivity and stock identification, identify stock of individuals in a mixed stock situation, detect hybrids, estimate spawning stock biomass. The presentation showed concrete examples of the work done recently.

The group then debated whether the ISSG EMT was the best ISSG within the RCG to integrate this topic, as many if not most members of the ISSG EMT do not have sufficient technical background in this field. Several members suggested that genetics-related topics would probably be better suited in a separate ISSG with people that have a higher expertise on the subject. It was also recommended that this should be discussed in plenary to decide if a new ISSG should be created for this topic, if the topic should be integrated in another existing ISSG, or if it should remain in ISSG EMT (this last possibility receiving the least support from the ISSG EMT).

4.4 Roadmap/follow-up

The EMT ISSG discussed the needs for future work. These are:

1. to continue to fill out an inventory of the EMT in usage in the different MS.
2. to explore possibilities aiming at building a shared annotated image and video dataset to train ML identification/classification models.

Keeping the work on genetic tools within the ISSG EMT remains an open question. Even though the ISSG EMT finds that this topic is likely not well suited for this subgroup, genetic tools are still seen as a relevant topic for the RCG in general. Therefore, the ISSG EMT proposes that this is discussed in plenary in the next meetings happening in May and June 2023.

Moreover, the group noted that some MS do not have any representative at this time, which can hopefully be solved in the coming year.

Based on the above, the next steps in intersessional work for the ISSG EMT in the year 2023/2024 are to:

1. Continue the inventory of data collection technologies used in different member states: e.g., electronic monitoring (EM), Machine Learning development, electronic measuring boards.
2. Start the discussion on the elaboration of a methodology to collect and annotate pictures and/or video footage of catches (fish, shellfish, and other organisms) onboard research vessels that may be used for the development of machine learning algorithms for species identification/classification. Such a methodology would need to be developed in collaboration with the MS institutions implementing research surveys and ICES WG coordinating those surveys (when applicable).
3. Start the discussion and Examination of the possibilities that these annotated data are shared between Member States without breaching privacy and ownership concerns.

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4.6 References

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5 ISSG Surveys

5.1 Background

The RCG NANSEA & Baltic 2020 specified the scope of the RCGs regarding surveys as follows: *"Given the expectation that survey designs, planning and task-sharing might change in the foreseeable future, RCGs are expected to play a more substantial role in the decision making process when it comes to budget and/or national implications. The scope of the RCG will continue to focus on the budgetary aspects and national obligations in relation to proposed changes to a survey. It may be needed to rubberstamp and approve the current survey effort by MS to act as a baseline to measure and evaluate future modifications against. RCG mandates are described in the respective RoPs and these cover survey subjects as well."*

Following this scope, the ISSG on surveys aimed to underpin the more substantial role of the RCGs in the future.

Current chairs of the ISSG on Surveys are Sieto Verver (NLD) and Christoph Stransky (DEU).

5.2 Work-plan

ToRs and work plan (specific tasks) for 2022-2023:

1. Renew the multilateral agreements on cost-sharing of the International Ecosystem Survey in the Nordic Seas (IESNS=ASH) and International Blue Whiting Survey (IBWSS).
2. Identify candidate surveys for future cost-sharing, based on the Gothenburg 2022 meeting.
3. Monitor implications (COVID-19, Ukraine war etc.) on surveys from a DCF perspective and react when appropriate and requested.
4. Monitor the regionalisation process within ICES (e.g. WKPilot NS-FIRMOG) and act as focal point for RCG contact.
5. Review proposed substantial changes to the design, set-up or other aspects of the survey having an impact on MS's Work Plan, effort and/or budget allocation, or obligations. Consider requirements to facilitate future review processes.
6. Work on WP/AR Table and Text Box 2.6 (surveys)
7. Discuss new challenges in fishery-independent data collection due to usage and protection of marine areas

5.3 Progress during 2022 - 2023

The ISSG on Surveys met online 7 Nov 2022, 1 Dec 2022 and 7 Dec 2022 and had a physical half-day meeting in Copenhagen/hybrid on 16 Jan 2023.

The 2023 cost-sharing agreements for the ASH and WHB surveys (**ToR 1**) were agreed and finalised in Nov 2022.

Regarding **ToR 2**, an improved input dataset was received from the Fishn'Co project in spring 2023 that will be included in a new version of the basic tables for discussing cost-sharing, as part of the further ISSG work.

Under **ToR 3**, the ISSG discussed the effect of the high fuel prices for running the research vessels, which caused some cuts of survey days already. This situation makes a consideration of the effectiveness of surveys in the given time/financial frame even more important than in the past (see also below, ToR 4).

ToR 4: At the Copenhagen meeting, the main outcome of ICES WKPilot NS-FIRMOG was presented. The main idea is that a group called NETSEA should coordinate regional work on fisheries-independent data and help the process of developing regional ecosystem advice. This step is seen as necessary progress to become more efficient in terms of survey effort distribution etc.. Examples are 1) the mackerel egg survey (fuel efficiency) and 2) the IBTS/BTS plaice sampling and otolith preparation/reading (lab work).

On the wider scope of **ToR 5**, the group started to discuss animal welfare aspects on surveys, e.g. guidance for handling specimens onboard, good practice and legal aspects (e.g. applications for using 'test animals'). This work will be continued under the 2023/2024 ISSG work plan.

The collation of Table 2.6 for the Regional Work Plans (**ToR 6**) has progressed well under the Fishn'Co project. Cost-sharing agreements for surveys are now stored on the RCG web site, which serves as reference for National Work Plans. Moreover, the group started looking at possibilities for the production survey effort maps, using existing data sets and tools. This work will be continued in the ISSG.

ToR 7: During the last couple of years, an increased demand and use of the sea has made it more complicated to conduct mandatory DCF surveys-at-sea, as access to areas has been more restricted. This can be caused by areas closed for many different reasons, such as Natura 2000 sites, offshore wind farms, energy pipelines etc.

In 2020, the EU committed to protecting 30% of its seas by 2030, including 10% under strict protection for areas of high biodiversity value. The target to protect 30% of the world's marine habitats by 2030 can only be reached if sustainable fishing practices are put in place and Marine Protected Areas are truly protected and properly managed. However, there is no indication on how these areas should be monitored or if scientific surveys, with another aim than investigating the closed area, are still allowed to be conducted within the given area.

To conduct an international survey will often mean that station allocations have been internationally selected to achieve that the stations are spatially randomly distributed. However, when a MS applies for permission to conduct a survey within a given country's EEZ, MS do not seem to have a common way of allowing scientific vessels to carry out mandatory scientific surveys on fishing stations within these areas, which is an increased challenge for the survey results.

An alternative direction could be to conduct the mandatory surveys with no or low impact on the closed area. For example, if a given area is closed to protect the bottom habitat, a pelagic survey could still be allowed. It could also be a down-scaling of a similar survey (to be able to enter a windfarm area) or that MS / ICES / RCGs come up with alternative survey measures (cameras etc.) within these areas.

The ISSG would like the RCG to have a discussion on what would be appropriate solutions to this challenge and maybe come up with a suggestion for an additional paragraph in the EU-MAP regarding access for scientific surveys appearing in the (EU) Decision 2021/1168 Table 1.

5.4 Roadmap/follow-up

As all present ToRs of this ISSG are still to be continued, the work plan for 2023/2024 is very similar to the previous one:

1. Renew the multilateral agreements on cost-sharing of the International Ecosystem Survey in the Nordic Seas (IESNS=ASH) and International Blue Whiting Survey (IBWSS).
2. Identify candidate surveys for future cost-sharing, based on the Gothenburg 2022 meeting.

3. Monitor implications (COVID-19, Ukraine war etc.) on surveys from a DCF perspective and react when appropriate and requested.
4. Monitor the regionalisation process within ICES (e.g. WKPilot NS-FIRMOG) and act as focal point for RCG contact.
5. Review proposed substantial changes to the design, set-up or other aspects of the survey having an impact on MS's Work Plan, effort and/or budget allocation, or obligations. Consider requirements to facilitate future review processes.
6. Work on WP/AR Table and Text Box 2.6 for Regional Work Plans
7. Discuss new challenges in fishery-independent data collection due to usage and protection of marine areas

At least one physical/hybrid meeting is foreseen early 2024 to progress with the abovementioned tasks.

5.5 SG Participants

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6 ISSG on Development of Regional Work Plan

6.1 Background

During the 2022 RCG Baltic and NANSEA and NC Decision meeting, it was agreed to revive the ISSG on the Development of Regional Workplan (ISSG/RWP) during the period 2022/23. The ISSG/RWP was given the mandate to develop Draft Regional Work Plan taking over the Fishn'Co project and then follow-up on the RWP development in 2023 onward. It was also recommended that the status of the ISSG/RWP was pan-regional.

The RWPs to be dealt with within the ISSG RWP are RWP NANSEA, RWP Baltic and RWP Large Pelagics (all developed through Fishn´Co project). Discussion is ongoing in the RCG Med&BS to include formally the development of RWP Med & BS (developed through Streamline project) or any other form of alignment with ISSG/RWP. Alessandro Ligas was given the responsibility to follow-up the RWP Med&BS proposed by STREAMLINE and, as such, was invited to participate to the ISSG/RWP first meeting. It is to be noted that RWP socioeconomics developed in Fishn'Co has already been discussed and approved in RCG ECON and its formalisation will be dealt with during RCG ECON 2023.

Additionally, following the recommendation from 2022 RCG NANSEA and RCG Baltic technical meeting, all ISSGs chairs were added to the participants list for this group. Following the EU-NC meeting in March 2023, where the four EU grants (including Fishn'Co and Streamline) were presented and discussed, all NCs were invited also to the first ISSG/RWP meeting.

The chairs of ISSG/RWP are Maria Hansson (Sweden) and Joël Vigneau (France).

6.2 Work plan

The ISSG/RWP had no specific ToRs but only one mandate to take over the Fishn'Co project with the aim of presenting to the RCG TM 2023 the most updated version of RWP 2025-2027 .

The work plan of the ISSG was as follows

1. Take over the Fishn'Co RWPs to circulate them to each MS for their feedbacks
2. Consider the MS feedbacks and amend the RWPs as needed
3. Prepare and stir the discussion in RCG TM 2023 for reaching agreements and consensus on the RWP contents
4. Consider RCG TM feedbacks and amend the RWPs as needed for the MS Decision Meeting

6.3 Progress during 2022/2023

6.3.1 Setting the scene

During the Fishn'Co project, each Thematic Focus Areas, linked to as many RCG/ISSGs, proposed elements of RWPs, and/or took the opportunity to address some blocking points. The idea was to allow ISSG/RWP to circulate the proposed RWPs to all NCs for feedback and comments in order to prepare the discussion in RCGs TM 2023.

The lessons learned from Fishn'Co were that coordination may take a variety of forms and types, depending on the thematic and the related needs; this was not deemed an issue, but given to complexify the readability of the proposals. Work on consistencies of approach and naming has been done in Fishn'Co (Infographics) but ISSG/RWP decided to push the concept further and worked on simplifying and clarifying all textboxes of the RWPs.

During the first ISSG RWP meeting, the RWP Baltic, NANSEA and Large Pelagics 2025-2027 proposed by Fishn'Co have been thoroughly reviewed. Some editorial modifications and amendments were agreed and some tasks were distributed in order to ensure the completeness of the proposals to be circulated to NCs.

For easing the NC feedback on the proposed RWPs, a template, specific to each RWP was developed by ISSG/RWP. The RWP for the Baltic and NANSEA regions and RCG Large pelagics were sent to RCG chairs for circulation during one month to all NCs on the 28th of April 2023.

Early May (4th May), ISSG RWP met for the 2nd meeting to consider all feedbacks and comments received. It is noted that less than 50% of the NCs responded to the consultation (5/13 for NANSEA, 4/8 for Baltic). ISSG/RWP addressed key issues raised by NCs like the importance that **key messages are given in the general textbox** of each of the RWPs and elaborated further on this, with the aim of giving any reader clear information on the RWP concept. The fate of the textbox 1B was also discussed. Indeed, although the 'kitchen' concept was agreed, i.e. displaying elements of coordination which are outstanding, it was confusing to see only some initiatives detailed in this textbox and not a full view. ISSG RWP suggested that this could be a strategic discussion in RCG on which are the areas where there should be increase collaboration with clear priorities set up,

Eventually, during the meeting on the 23rd of May, the ISSG elaborated a new template for structuring the information in the specific textboxes. It was asked to all ISSG chairs to review their text and amend the structure as follows:

- A first paragraph on the name of ISSG and the nature of the coordination achieved and proposed in the textbox
- A short description of the coordinated activities in 2 or 3 sentences
- A clear list of points agreed and actions expected from each relevant MSs
- A last section on elements to be discussed at RCG TM 2023

Regarding the tables of the RWPs, the ISSG coordinated their completeness with key experts.

- Table 3.1 - on bi and multilateral agreements was given a special attention. Indeed, Fishn'Co, in coordination with SECWEB, developed a repository on the RCG webpage to host all original signed versions of agreements. The discussion in ISSG/RWP made it clear that this was an important proposal for better structuring the agreements in the future, making use of both the RCG website and the RWP and that NCs should carefully review the existing agreements in view of the finalisation of the RWPs 2025-2027.
- Table 2.1 – on the list of species/stock: Mathieu de Petris (France) gave an update on the work done during Fishn'Co on modifying the script used for the test run 2022. The idea was to develop a R library-like structure on a ICES github thanks to ICES TAF team who agreed to host the github page. This feature will enable tracking of update, transparency and easiness of implementation. The tool was reviewed in the ISSG and remaining work was agreed with Mathieu and Kirsten Birch Hakansson (DTU-AQUA) leading the development. An update with the reference years 2020-2022 is being prepared for the RCG Technical Meetings in June 2023, and the option to continue updating with the reference years 2021-2023 may be proposed for discussion during the RCG TM 2023, given the easiness of implementation of the new tool.
- Table 2.5 on regional sampling plan were not amended
- Table 2.6 on Research survey at sea were not amended

- Table 4.1 on stomach sampling was completed by the chairs of the ISSG on Stomach sampling, in order to consider every species to sample during the 3 year period of the RWP. It is to be noted that no feedbacks were received on the details of the number of samples which could be analysed and/or sent to other MS, but the chairs of the ISSG on stomach sampling informed that they received enough information from different countries to elaborate a plan to be presented during the RCG TM 2023.

The status of all RWPs reviewed by ISSG RWP is as follows

- RWP NANSEA
  - Version 1:Text and tables received from Fishn'Co
  - Version 2: Text: modifications from feedbacks received from MS; Table: Additions made to tables 2.6 and 4.1
  - Version 3: Text: modifications from ISSG RWP meeting; Table: Inclusion of Table 2.1, modifications in Table 2.6 and 4.1
  - Version 4: Text: finalisation after 2nd meeting ISSG RWP and coherence with all other RWP texts; Table : inclusion of Table 2.1
- RWP Baltic
  - Version 1:Text and tables received from Fishn'Co
  - Version 2: Text: modifications from feedbacks received from MS
  - Version 3: Text: modifications from ISSG RWP meeting
  - Version 4: Text: finalisation after 2nd meeting ISSG RWP and coherence with all other RWP texts; Table: Inclusion of Table2.1
- RWP Large Pelagics
  - Version 1: Text and Tables received from Fishn'Co
  - Version 2: Text and tables no changes from Version 1 after feedbacks received from MS
  - Version 3: Text and tables no changes from Version 1 after first ISSG meeting
  - Version 4: Text : finalisation after 2nd meeting ISSG RWP and coherence with all other RWP texts; Table: Addition of Table 2.1
- RCG ECON
  - Version 1: Text received from Fishn'Co (no set of tables)
  - Version 2: No changes in the text from Version 1 after feedbacks received from MS
  - Version 3: No changes in the text from Version 1 after first ISSG meeting
  - Version 4: Text : finalisation after 2nd meeting ISSG RWP and coherence with all other RWP texts

RWP Large Pelagics and ECON Version 4 were sent to the relevant RCG chairs for consideration in their upcoming meetings.

6.4 Plan forward

The Decision-making process, as proposed by Fishn'Co was used to fine tune the next stages for proposing the RWPs 2025-2027 in 2023. Taking the same numbering, ISSG RWP did fulfill the hand-over proposed RWPs from Fishn'Co with its first meeting (21/03/2023), sent RWPs to RCG chairs for NC consultation, received feedbacks from MS and compiled comments by ISSG/RWP to be presented to RCG/TM.

It remains the following for ISSG on RWP:

1. Present the RWPs concept and contents to RCG TM 2023

2. Fine tune the RCG proposal and recommendations, in any, to be presented to NC/DM
3. Revision of the RWP, by ISSG/RWP, after STECF and Commission comments, if any
4. Agreement of the RWPs by the NCs, and RWPs ready for the preparation of the NWP 2025-27 by October 2024

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7 ISSG Optimized and Operational Regional Sampling Plans (Umbrella Group)

7.1 Background

The aim of the ISSG Optimized and Operational Regional Sampling Plans, also referred to as the 'Umbrella Group', is to develop guidance for the development of optimized and operational regional sampling plans (RSPs) and collate 'theoretical gaps' and new developments in simulation tools relevant for the development of RSPs.

The overarching 'Umbrella group' was initiated during the RCG NANSEA & Baltic meeting in 2020, with the aim to support the development of Regional Sampling Plans (RSPs) through different case studies. At first, participants of the ISSGs representing three case studies in the NANSEA and Baltic were involved, namely the case studies on (i) fisheries for small pelagics in the Baltic, (ii) trawl fishery in Iberian waters, and (iii) freezer trawler fleet exploiting pelagic fisheries in the Northeast Atlantic. During the RCG NANSEA & Baltic meeting in 2022 a more regional approach was discussed, resulting in the suggestion for the 'Umbrella Group' to reach out to the Large Pelagic case study on Tropical Tunas and Purse Seine.

7.2 Work-plan

ToRs and work plan (specific tasks) for 2022 -2023:

1. Include LP case study on Tropical Tunas in Purse Seine through questionnaire that was sent to the other case studies in 2020-2021.

Tasks from 2021-2022 transferred to 2022-2023, if needed by case studies:

2. Provide guidance on operational Regional Sampling Plans (RSPs) • Organize the guidance • Continue the development of guidance based on examples / lessons learned from the RSPs. This work will be based on a questionnaire to the RSPs
3. Provide guidance on optimized Regional Sampling Plans (RSPs) • Keep the overview of existing optimization tools updated, summarise the optimizations done in the RSPs, and summarise the 'theoretical gaps' encountered in the RSPs. This work will be based on a questionnaire to the RSPs.

7.3 Progress during 2022 - 2023

For Task 1, the questionnaire that explores some aspects of the development of the RSP was sent out by the Umbrella group chairs to the chairs of the RCG Large Pelagics, in order to obtain feedback concerning the case study on Tropical Tunas in Purse Seine. Unfortunately, the questionnaire was sent out only in April 2023 and it was not possible to incorporate a response from Large Pelagic ISSG in time for the report.

In 2022-2023 the chairs of three ISSGs for RSP case studies (concerning NANSEA and Baltic) - Iberian trawlers, Freezer trawlers and Baltic small pelagic, were questioned by the Umbrella group chairs whether any support was needed from the 'Umbrella Group'. As the case studies indicated that no support was needed from the 'Umbrella Group', neither in the form of direct support or providing a forum for discussion with the other case studies, Tasks 2 and 3 from the Work-plan were not executed.

7.4 Roadmap/follow-up

As the related ISSGs for RSP case studies have indicated for two years that no support was needed from the 'Umbrella Group', it is suggested to put the 'Umbrella Group' on hold until more case studies emerge and/or relevant optimization tools are further developed.

7.5 SG Participants

The list of participants is below, even though the intersessional activities in 2022-2023 involved only the chairs.

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8 ISSG Case Study of Fisheries for Small Pelagics in the Baltic

8.1 Aim of the sub group

RCG Baltic agreed to use the fisheries for **small pelagic species** as a **case study** for the development of a regional sampling programme in the Baltic Sea. It was agreed to establish a subgroup for in-depth analyses how a regional sampling programme for small pelagics can be established and suggest how it can be implemented. The pelagic fisheries target western Baltic herring, central Baltic herring, herring in Gulf of Bothnia, herring in Gulf of Riga and sprat.

8.2 ToRs

The long-term tasks for the ISSG on small pelagics in the Baltic Sea were agreed in 2017. The ISSG work on a selection of the tasks and/or tasks that have been agreed during the previous year (see year specific workplan).

Chairs: Marie Storr-Paulsen, Katja Ringdahl

I) Description of the fisheries.

II) Generate description of present national sampling programmes, including overviews of sampling protocol and sampling intensities. Partly done. An overview was produced in the RCG Baltic 2019 meeting. However needs to be refined. A description on where (at-sea, harbor) and how (self, inspectors, sci-obs) the samples are taken and how easy is it to get access to the samples

III) Generate overview of data that is collected on the regional level. An overview table was conducted during the RCG Baltic

IV) Identify what commercial data ICES AWG need for these stocks. If relevant meet up with relevant stock coordinators and assessors at appropriate meeting

V) Compare data presently collected with data needed by the AWG. Identify gaps and data presently collected but not used

VI) Suggest common sampling protocol (Harbour and self-sampling) – difference between HC and I sampling

VII) Suggest proper sampling sizes for age, weight and length

VIII) Suggest if and when maturity data need to be collected from commercial samples (end-user needs) will be at WGBFAS 2020

IX) Suggest if other types of data (e.g. scales, genetics, parasites) shall be collected (end-user needs) will be at WGBFAS 2020

X) Suggest how data (samples and transversal data) shall be stored and exchanged

XI) How to raise the different sampling programs (work-shop 2019)

XII) Simulations of the sampling plans that demonstrate the efficiency of the new regional programme relative to present programmes.

8.3 Workplan 2022 - 2023

The workplan for 2022 - 2023 was

1. Continue the pilot / or as a full regional program
    - To have a more overarching sampling program, but less detailed for all MS – not only as a pilot.

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- Larger trawlers.
- Vessels random selected probabilistic.
- Refusals -> Non-responses (e.g., refusals).
- Upload with a common sampling name in RDBES.
- Use a common sampling protocol (5 kg / 50 fish).
- Participation in reguler age reading WS.

2. Work on WP/AR Table and Textbox 2.5 (biological sampling)
3. Set a deadline for MS to investigate species misreporting between herring and sprat in a historic context. Either by using Danish control data or another data source.
4. Participation in the workshop on estimation and optimal sampling size.

Due to time constrains, the ISSG during the 2022/2023 primarily worked on point 1-3.

8.4 Overview of 2022 - 2023 subgroup work

8.4.1 Background

Implementation of regional schemes frequently gets bogged down by single alternatives, or is stopped because of national interest not being prioritized in the regional context. However, this group sees regionalization is a process that can have several outcomes, and it is not necessary the final goal to have a 100% common approach (same vessel platform etc.) for a regionalization to be fulfilled.

The subgroup considers regionalization as involving 4 general steps located along a gradient that goes from "no coordination" to "common monitoring strategy" and "joint data collection" (Figure 9.1). This gradient naturally entails a different capability of sampling to meet the needs of national and regional end-users. To supplement the sampling needs of specific end-users (e.g., specific end-uses), part of the program can be left for planning on a national scale. That part can still be coordinated (e.g., have common protocols) but does not necessarily require the higher level of regional coordination involved in full regional sampling plans (Figure 8.1).

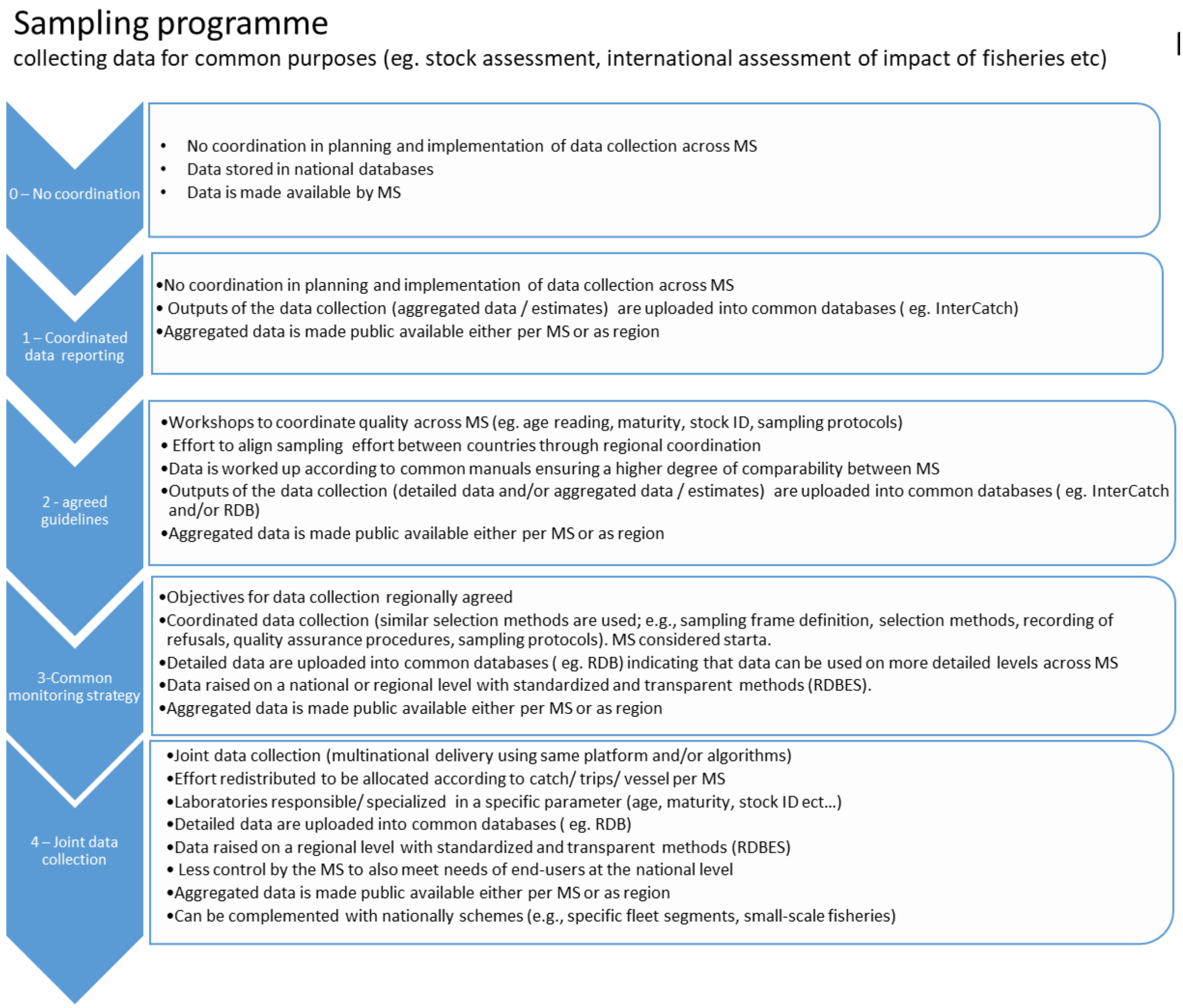

Figure 8.1 Flow chart of the steps involved in a regional coordination. The objectives can be different from a regional and national point.

8.4.2 Case study – regional sampling plan of small pelagics in Baltic

In the 2021 decision meeting (**D06**) 5 MS (Germany, Denmark, Poland, Lithuania, Sweden) agreed to participate in the Baltic small pelagic Regional Sampling Plan (RSP) and take part of the non-binding Regional Work Plan for 2022. 3 MS (Finland, Estonia, Latvia) agreed to participate in Baltic small pelagic Regional Sampling Plan (RSP), but would reflect it only in their National Work Plan.

In the 2022 decision meeting (D04): NCs agreed on the development of a binding RWP 2025-2027 for NANSEA and Baltic region without formal adoption. (DE, DK, EE, ES, FI, LT, LV, PL, SE)

8.4.3 Work on WP/AR Table and Textbox 2.5 (biological sampling)

The ISSG have, following this decision, worked to understand the documentation needed to frame such a RSP into tables. The Fishn´Co project did a lot of the development on the table 2.5, the text box 2.5 and the annex 1.1, but in the end, it was important that all MS in the region agreed and participated in developing the common understanding of the columns and agreed on how a regional table 2.5 would look like. We worked on how to fill in and understand table 2.5 through several online meetings. It was apparent that different MS interoperated the columns in slightly different ways, and we therefore prioritized to spent several meeting discussions all the variables until all participating MS had a common understanding of columns.

Within the regional workplans are the details of the sampling schemes expressed in a textfile (annex 1.1). It is also access to those details that will allow the ISSG to work towards to goals for the ambition level (see annex 8.6). Summarizing the information from the different countries in annex 1.1 into a regional document has resulted in a substantial document. All headings in the national annex 1.1 might not be relevant for the regional sampling plan as the content of the plan will be dependent on which agreements that are made, these have been left empty after agreement in Fishn'Co.

8.4.4 To analyse species misreporting between herring and sprat in a historic context

In the 2021 decision meeting **(D07)** 8 MS (Germany, Denmark, Finland, Poland, Lithuania, Estonia, Latvia, Sweden) agreed to:
Each MS with trawlers fishing small pelagics decided to look into the potential "historical" misreporting of the proportion of herring and sprat in their national data. The commitment included to perform an analysis, to present it at the ISSG small pelagics in the Baltic and to decide if historical catch data should be corrected on the basis of the analysis. The aim was to feed in the benchmark process of Baltic herring stocks and sprat 2023."

Two meetings have been conducted in 2022/2023 (15 September, 15-18 November data compilation WS)
In the first meeting we had an update from all MS on the progress in the analysis and it was decided about the format to fill out. In the second meeting at the data compilation workshop all MS had conducted some kind of analysis (see annex 8.2)

- Document present WGBFAS time series in respect to corrections.
    - Fill in a template about corrections done (or not done) in connection to historic misreporting based on template in annex 8.3.
- Analyze if it is possible for MS's to use some quality indicators to check if there has been inconsistency between official numbers in catch composition and data from alternative sources (national control data, Danish control data, observer trips, scientific surveys)
- Collate quota shares by year and country

ANNEX 8.1 Minutes from September 2022 meeting and data compilation meeting 15-17 November 2022

Figure 7.3 Late in the afternoon at yet another online meeting ☺

Participating to small pelagic species correction meeting the 15/9 2022

Participant list

Name	Institute	email
Marie Storr-Paulsen (co-chair)	DTU Aqua (Denmark)	msp@aqua.dtu.dk
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Nicolas Goñi	Luke (Finland)	
Remigijus Sakas	MRI (Lithuania)	remigijus.sakas@ku.lt
Annelie Hilvarsson	SLU (Sweden)	
Eros Quesada	SLU (Sweden)	
Sarvamaa Petri	Luke (Finland)	

Poland did not participate in the meeting.

All countries presented the work done on species correction until now.

Sweden: Have implemented a model

Finland: Priliminary results indicate that there are now reason to conduct species corrections. Finland will therefore not upload a new time series.

Estonia: Presented some very nice plot and analysis were comparisons were made between Estonia control samples and the sale notes from the fisherman. There were a large agreement between the 2 data sources. There seems to be control data available conducted on other nations as well (Mainly finish). Krstiina will ask if it would be possible to share this information with Finland. The main outcome indicate that there will be no need to conduct species correction back in time in the Estonia samples.

Denmark: In historic Danish landings it was allowed to write the total mixed catch on the target species on the sale notes. This needs to be corrected with the control data for the historic data set. Therefor Denmark will make an updated time series (back to 1991) for both herring and sprat.

Germany: Do not have access to German control data, but have had a look at the Danish private company data. They are very similar to the logbook data. This indicates that when a German vessel is landing in Denmark the species information from the private company is transferred to the sale notes in the flag country.

Latvia: Last years comparison between the Danish control data and logbook data showed very high degree of similarity. Latvia has compared Latvian control samples with the logbook and the result is very similar. Maybe because the fishermen is writing the same figure in the logbook as the result of the control sample. An idea could be to compare the species composition between a trip controlled with a trip not controlled.

Lithuania: There is very few landings of Lithuania pelagic with in Lithuania. The new private company data from Denmark has been provided to Lithuania for comparison.

Katja will draw a template for a data description by country to be used as a common working document for the data compilation workshop.

We need more information on the data call for the central Baltic herring.

ANNEX 8.2 RWP table 2.5, text box 2.5 and annex 1.1

Annex 1.1 for Baltic SPF regional pilot

MS: DNK, DEU, EST, FIN, LVA, LTU, POL, SWE
Region: Baltic Sea
Sampling scheme identifier: Baltic SPF regional
Sampling scheme type: Commercial fishing trip
Observation type: Not coordinated
Time period of validity: 2024 (test year)
Short description: This is a regional sampling program to collect length and age samples from the mixed sprat and herring fishery conducted by commercial trawlers operating in the Baltic Sea (ICES subdivisions 27.3.d.22 to 27.3.d.29 and 27.3.d.32) using self-sampling, observer sampling or sampling on shore. The aim is to estimate length-and age composition of catches and mean weight of fish by length and age, caught by commercial trawlers by quarter and subdivision. The sampling program is still a trial to test what and how much it is possible to standardize regional sampling. Therefore in most countries it will run in parallel to national sampling programs covering the other parts of the stocks At the moment the some aspects of the sampling (e.g., observation type, sample selection method, sampling frequency) vary between countries, mainly due to practicalities; but the countries have agreed on standardized protocols for the sub-sampling of biological parameters and a substantial number of other aspects (e.g., coordinated estimation, upload to RDBES, etc).
Description of the population
Population targeted: Pelagic trawlers participating in the herring and sprat fisheries of Subareas 27.3 – the sampling area is the Baltic Sea from ICES subdivision 22 to subdivision 29 and 32. All herring and sprat commercially caught in the Baltic Sea for which estimates of length or age composition are required **Population sampled:** The scheme samples fishing trips from the most important trawlers participating in the small-pelagic fisheries for herring and sprat in the Baltic. In principle several herring stocks and the one sprat stock in the Baltic can be sampled in this sampling program. However, in reality not all MS fleets are covering all the areas, as is indicated in figure 1 and 2.

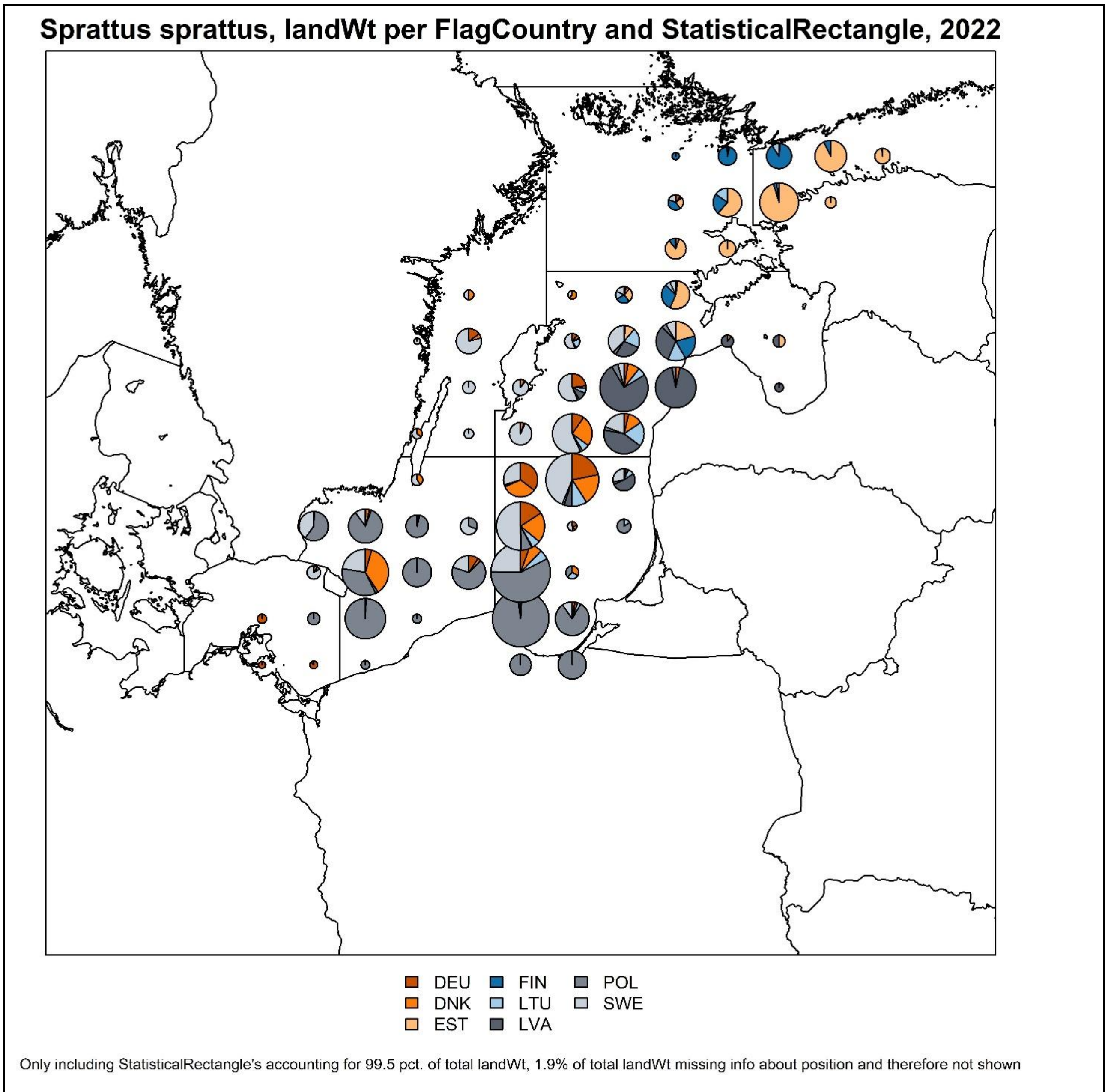

Fig. 1.Catch of sprat in the Baltic in 2022 by MS. Data uploaded to RDB in 2023

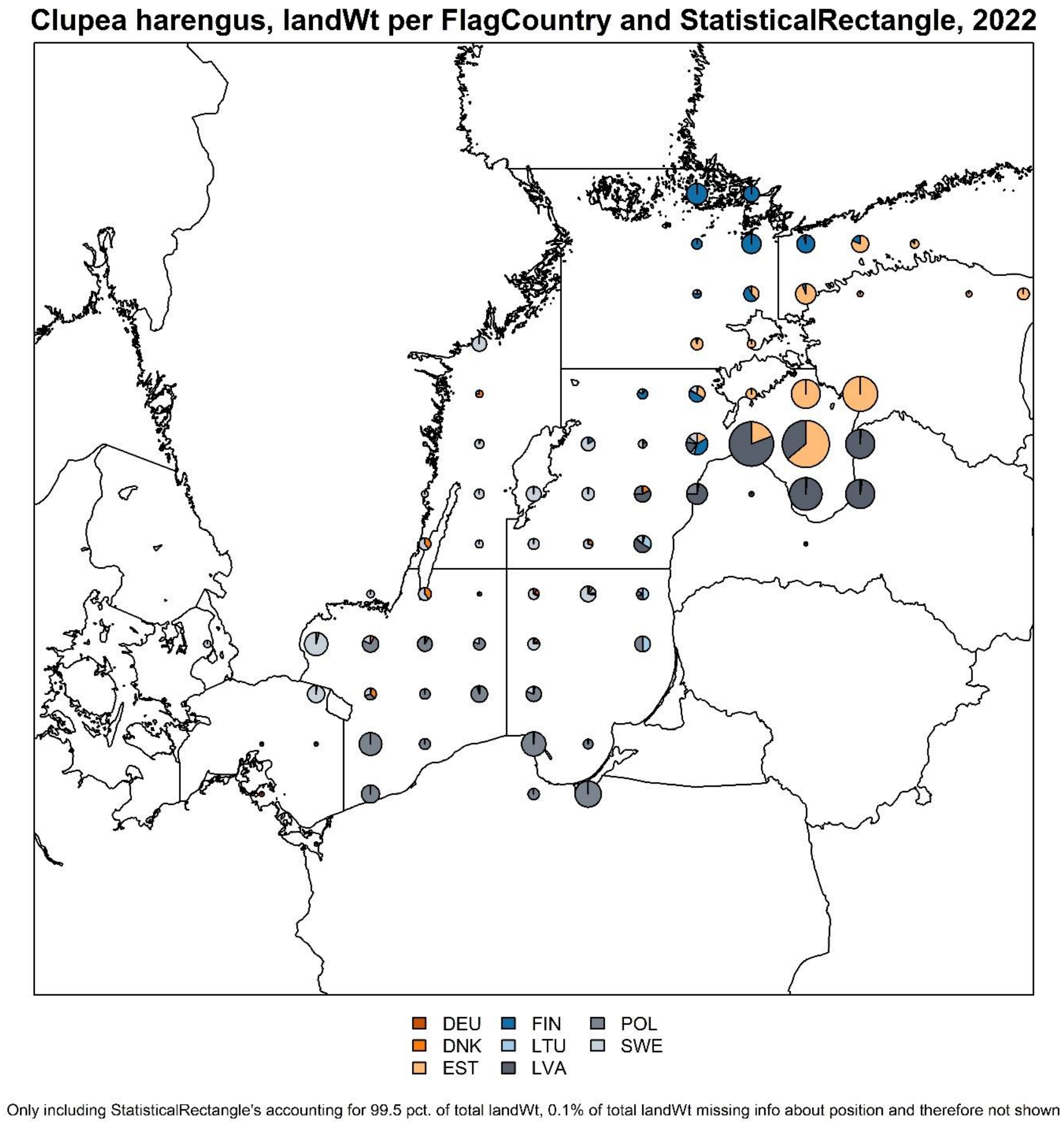

Fig. 2. Catch of herring in the Baltic in 2022 by MS. Data uploaded to RDB in 2023

Stocks covered by MS participating in the Baltic SPF regional program:

Stock	MS
her.27.20-24	DEU/DNK/POL/SWE
her.27.25-2932	DNK/EST/FIN/ LTU/LVA/POL/SWE
her.27.28.1	EST/LVA
spr.27.22-32	DNK/EST/FIN/LTU/LVA/POL/SWE

Russia is presently fishing 15% of the total sprat catch. However, there are no information on sampling strategy and no data is delivered to ICES.

With some national adaptations, the vessel included in 2022 were trawlers fishing for sprat and herring in the Baltic:

Country	**Number of vessels included in the sampling frame**
DEU	17
DNK	6
EST	24
FIN	16
LTU	13 (5 landing in LVA)
LVA	40
POL	59
SWE	15

In general (with some national adaptations), vessels having low contribution to herring and sprat landings are not covered by this regional programme. These include some small trawlers, gillnetters landing herring or vessels with a very mixed fishery that should be covered by national sampling programs. The following table gives their identifiers in the 2022-2024 national sampling programmes – details can be found in the relevant national workplan https://datacollection.jrc.ec.europa.eu/wp-np-ar

MS	**Sampling scheme identifier**	**Sampling frame identifier**
DEU	DEU_Baltic_SPR	Baltic Sprat
DEU	DEU_Baltic_HER	Baltic herring passive 2224
DEU	DEU_Baltic_HER	Baltic herring active 2224
DNK	DNK industrial sampling	Sprat
EST		
EST		
FIN		
LTU	Scientific observer on shore commercial landings selected species (SO-SHORE-COM-SS)*	Small scale gillnetters (BS-SSF-GN)
LTU		Small scale trap-netters (BS-SSF-TN)
LVA		
LVA		
LVA		
LVA		
POL	Baltic at sea	BAL VL0010
		BAL VL1012
		BAL VL1218
		BAL VL1824
		BAL VL2440
	Baltic on shore	BAL VL0010
		BAL VL1012
		BAL VL1218
		BAL VL1824
		BAL VL2440

SWE	CommSelfAtSea - Selected species/stocks	Passive SmallPelagics HER - 27.3.b-d.23-24
		Passive SmallPelagics HER - 27.3.d.25-29

Based on 2022 national data the following table gives an overview of the volumes of herring and sprat landings of by MS that are covered by the present regional sampling plan and those that are not covered by it, i.e., they are to be covered by the national plans.

	In regional plan (tons)	**Outside regional plan (tons)**	**% in plan**
DEU	15153	192	99%
DNK	23650	4515	84%
EST	46059	6806	87%
FIN			
LTU	49.5	108.2	31%
LVA			
POL	71538	27235	72%
SWE	55703	13133	81%
TOTAL			

Table Weight of catches (herring and sprat combined) in 2022 by MS.

Stratification:

The program is stratified into national lists of vessels. The use of national stratification aims to achieve good spatial coverage over the broad geographical range of the fisheries as well as adequate number of samples and representation of the vast majority of commercial landings. Detailed information on strata by MS can be found in table 2.5. Presently there is no consensus with regards to possible changes to effort allocation.

Sampling design and protocols

Regional level of ambition: 3 - "*Common monitoring strategy*"

Present regional level: 1 - "*Coordinated data reporting*"

Sampling design description:

Brief description of the sampling design

- Stratified multi-stage cluster sampling design
- Active trawlers targeting the sprat/herring fishery.
- The sampling frame is stratified into national vessel lists
- Sampling units
  - Primary sampling unit (PSU): vessel
  - Secondary sampling unit (SSU): trips
  - Tertiary sampling unit (TSU): Nation specific (landing events/ haul)
- Implementation varies by MS with regards to observation type, sample selection method and frequency but in general:
  - Minimum sampling size (3kg)

- Minimum number of fish per sample for biological analysis (50/ species)
- Vessels outside the regional program are covered by national program

See here a more detailed description.

Biological sampling protocols:

- Minimum 3 kg random sample is provided from a trip with information on the given haul the sample has been taken from.
- Sample is sorted into species (mainly herring and sprat but other species can be present).
- Random sample of approximately 50 individuals by species is selected for length, weight and age analysis. In some countries, the selection is conducted by measuring the weight of 10 individuals and add fish until the weight of the 10 individuals x 5 has been reach. The length is measured in semi-centimetre.
- The same individuals selected for length are selected for weight measurement. The weight is measured non-stratified and in grams.
- The same individuals selected for length are selected for age measurement (also non-stratified)
- It is not mandatory in the regional sampling program to collect other biological parameters than, length, weight and age. However some MS collect information on sex, maturity, stomach fullness, parasites and genetics of individuals.

Is the sampling design compliant with the 4S principle?

Yes, although this varies by MS

Regional coordination:

Yes

Link to sampling design documentation:

(Add link to WGCATCH sampling template.)

Some additional information:

Danish sampling program was before 2020 an ad hoc sampling program where control agency sampled vessels based on a quota system to cover the main part of the landings. As the main part of the Danish landings in the Baltic are conducted in a few but very large trips this was not the optimal ways of sampling. Since 2020 Denmark has sampled the small pelagic in the Baltic according to the new regional design. This indicates that all larger trawlers >= 24 meters are included if they have more than 95% sprat/herring landings. These vessels are all asked to take 1 sample per trip. Further, an additional on-shore sampling program has been sat in place covering all vessel length. Not all sampling sites are cooperating and refusal rates on landing sites are therefor included. Further species misreporting has occurred back in time, mainly with over reporting of herring and underreporting of sprat. This has been partly compensated for in the data delivery for stock assessment as Denmark for some years used corrected data based on control samples used by month and area on the fleet. It has however not been done systematically back in time. In April 2020 a new and very detailed control system has been emplaced for all industrial landings in Denmark with a very large sampling intensity conducted on every landing, this has improved the quality of the data.

Latvia sampling program. Each year the Fisheries department of the Latvian Ministry of Agriculture prepares the list of vessels and companies that have the fishing permit in the Baltic Sea and the Gulf of Riga. The vessel list consists of information on vessel name, fish species and fishing subdivisions. The vessel list is sorted by fishing type and subdivision to create three segments:

- Pelagic fishery in the Central Baltic (34 vessels in 2021);
- Pelagic fishery in the Gulf of Riga (22 vessels in 2021);
- Demersal fishery (31 vessels in 2021).

Each vessel can be included in one or several segments. Not all vessels that have fishing rights participate in the actual fishery. In the pelagic fishery, six biological samples are collected each month – three samples from the pelagic fishery in the Central Baltic and three samples from the pelagic fishery in the Gulf of Riga. For each segment, fishing vessels are randomly selected from the initial vessel list using Simple Random Sampling Without Replacement (SRSWOR). After the vessel selection, it is checked whether the vessel is active and participates in the fishery of interest. If the vessel is active (according to electronic logbooks), a call is made to the company owner or other contact person to arrange the biological sample or observer participation for the next trip. If the vessel doesn't participate in the fishery of interest or doesn't fish for other reasons, the next vessel is selected according to the same principles. In case when the random selection of vessels shows the vessel that was already selected in a given quarter, this vessel is ignored and the procedure is repeated. The vessel selection process is documented to ensure the traceability of the process.

The Swedish sampling program was before 2020 a sampling program that relied on quota sample to obtain samples from each subdivision, quarter and fishery type (consumption, industrial). Samples were obtained from control and market sources. The lack of scientific control over the sampling and uncertainty in the raising totals (possible bias in species position of fleet level totals; possible bias in totals considered as consumption and industrial), increased the risk of bias and imprecision of final estimates. Since 2020 Sweden has sampled the small pelagic in the Baltic according to the new regional design that is based on probabilistic vessel and trip selection and self-sampling. The pre 2020 sampling design remains in place but is only used as a last-resort (back-up) strategy to secure data if industry refusals happen to threaten data collection.

Estonia sampling. Can be considered as an ad hoc sampling program until 2021 which aims to collect samples from all active trawlers from each subdivision during active fishing period. During the pilot program in 2020 and 2021 probabilistic sampling scheme was tried (probabilistic selection of vessel), however due to the nuance rich fisheries behavior it was difficult to guarantee that all subdivisions were covered with enough samples. The difficulty laid in the fact that it was hard to predict which vessels were going to fish in which area/stock, especially as subdivision 28.1 (Gulf of Riga) comprises of a separate herring stock. Same vessels can fish both in open sea or in Gulf of Riga, and the fishing location is determined by many variables. To achieving probabilistic vessel selection, the vessel selection is done when the sampling day is chosen and known, which also allowed the knowledge on the vessel that are active that time. Therefore, the probabilistic vessel selection works on a smaller vessel list (vessels active during selected sampling day), which achieves that all SD-s are sampled (especially Gulf of Riga).

German sampling program. The declining number of vessels in the German pelagic fishing fleets and more automated catch handling processes onboard led to a switch from observer trips to self-sampling in the last few years. Fishermen are providing mixed catch samples following an agreed sampling protocol onboard. Germany is collecting around 20-25 catch samples per year from the relevant fleets, where one sample contains around 50kg of fish. Neither the vessels nor the sampling time however are chosen randomly. Sprat samples are provided by 1-2 trawler, herring is provided by less than 10 trawler that are usually pair-trawling in the main herring distribution areas, thus missing smaller herring populations and fishing areas. Sampling times are fixed to two times per week, but extra samples might be added opportunistically.

Polish sampling program. The sampling scheme is aiming to collect sprat and herring to estimate length-composition, numbers at age, and mean weight at age of commercial catches. The target population consists of vessels which were active at least once in the period January-March in 2021, were using OTM, had total landings 10t minimum, were targeting sprat or herring (over 95%) and have length above 17.5m. The primary sampling unit applied in the sampling program is vessel*trip. The list of vessels is used as a proxy to select a trip, because the list of trips is not known in advance. In total 30 vessels will be selected for 3 months case study (10 per 1 month). This vessels' list is a proxy for selecting the PSUs. A coordinator calls to the contact persons from the 10 selected vessels during the first 3 working days of the month (to check if the boat is willing to cooperate). During this time a coordinator can ask for the sample from first 1-2 vessels from the list which was willing to cooperate if they go for fishing in the next couple of days. In the next days of the month, a coordinator calls to the contact person from the selected vessel, maximum five times per week. The calls are to be made when the weather forecast is good, and when the staff is available to pick up the sample from the harbour. All contacts are recorded including refusals. The vessel which is definitely not willing to cooperate is blacklisted for a period of 1 year. A coordinator askes for a sample from the next trip. The sample should be taken from unsorted catch from the first haul.

Lithuania sampling program. Selection procedure: direct contact with vessel owner to discuss possibility of accepting of observer. 0 (zero) landings in Lithuania, so only sampling at sea possible. Embarking and disembarking of observer in the ports out of Lithuania, therefore logistics (observers travelling) was main limitation for conducting the sampling. Due to travel restrictions in 2020 none of the vessel was selected for sampling. Number of vessels fishing for small pelagic is very small (in 2021 only 13 and only 5 of them have made landings in Lithuania). It makes sampling probability very unequal. Most sprat is landed in Demark, so samples were collected by Danish observers according to the agreement. Since 2021 this agreement started to be replaced by coordinated actions in the framework of this pilot study.

Only landings of herring and sprat for human consumption are sampled in Lithuania. These samples were from trawls with mesh size more than 32 mm. However, most majority of sprat and significant part of herring are landing for industrial purposes out of Lithuania. These landings are from trawls with mesh size 16 -20 mm. Due to it, data on length distribution collected from landings in Lithuania may be different from average total.

Target population is midwater trawlers targeting spart and/or herring. The sampling scheme for herring caught by small scale coastal fleet is running in parallel.

Finnish sampling program. Finnish sampling is based on on-shore sampling program targeting pelagic trawl fishery of herring and sprat. The stocks for sampling are Central Baltic Herring (SD 25-29, 32)and Gulf of Bothnia herring (Bothnian Sea Herring (SD 30) and Bothnian Bay Herring (SD 31)) – the latter two have always belonged to same management unit and to same assessment unit since 2017 as well as the Baltic Sprat stock. Biological data are collected mostly from sampling of commercial trawl fisheries (OTM_SPF and PTM_SPF). Sampling of Herring (and sprat) is based on length stratified sub-sampling scheme, where target number of specimen for biological data is 1/ 0.5 cm length-class/sampled trip (the number of specimens is increased for maturity sampling in spring before spawning time). The herring stock-related biological data (i.e. age-length relation) is used also with the trap-net length distributions – and vice versa.

Finland has started the statistically sound sampling scheme (4S) from the trawl fisheries targeting herring and sprat, where it has been in force from the beginning of year 2019. The selection of PSU for herring (and sprat) is to do random sampling from a draw list, where probability of a fishing unit to be selected for sampling in certain SD and quarter is weighted by its previous years' combined catch of herring and sprat in the same SD and Q. During each quarter the sampling personnel go through the draw list in free order, recording all relevant info (sampling, refusal, out of area, etc.) of the interaction into our sampling database SUOMU, which also has the lottery function needed in the process. Additional lottery draw of PSU's will be done to reach the sampling target if there is a deficit.

Risks and mitigations for the regional sampling program

Different local issues have been presented from different MS.

For Lithuania landing sites are often abroad and not easily accessible for observers, this has given some challenges in respect to receive the samples. Further it has not been possible to ask the fishermen to bring the sample back to the home harbour.

In Finland the self-sampling was not possible due to the storing issues onboard the vessels which cause the sample quality to be very poor. Therefore, the Finnish sampling program has been slightly changed to have a similar selection procedure but the sample is taken from the unsorted landings on shore.

In Estonia the self-sampling is also not possible due to storing issues onboard the vessels and harbors. In addition, some vessel frequently use abroad landings sites from where it's a challenge to receive a sample.

In Sweden an initial reduction in sampling of catches for consumption was observed when the regional program was first implemented. This reduction partially related to the sampling frame being dominated by large vessels that fished essentially for industrial purposes. In 2022-2024 national strata were added to improve coverage of smaller vessels in the target area that fish for consumption. Sweden also has available in its national plan back-up ad-hoc strata that can be activate if needed (e.g., in case of industrial refusals).

In Poland in some cases landings take place abroad, and it is impossible to collect the sample from these landings.

A brief summary of the existing time-series:

Time period	Description Denmark
1994 - 2019	Ad Hoc Sampling (NPAH)
2020 – present	Simple Random Sampling Without Replacement (SRSWOR)
	Description Estonia
- 2021	Ad Hoc Sampling (NPAH)
2022 -present	Simple Random Sampling With Replacement (SRSWR)
	Description Latvia
-2016	Ad Hoc Sampling (NPAH)
2017-present	Simple Random Sampling Without Replacement (SRSWOR)
	Description Finland
1974-1997	Simple random sampling on ad hoc basis
1998-2019	Length-stratified random(quota-) sampling on ad hoc basis
2019-2020	Length-stratified random(quota-) sampling on probabilistic basis
2021-present	Simple random sampling on probabilistic basis
	Description Germany
1992 - present	Non-Probabilistic Judgement Sampling (NPJS)

	Description Lithuania
2004-2016	Ad Hoc Sampling (NPAH)
2017-present	Simple Random Sampling With Replacement (SRSWR)*
	Description Poland
2004-2016	Ad Hoc Sampling (NPAH)
2017-present	Simple Random Sampling With Replacement (SRSWR)
Time period	**Description Sweden (**more details in ICES WKBBALTPEL report, 2023)
– 1976	Documentation not yet available
1977 – 2000	Ad Hoc Sampling (NPAH) (length stratified, sorted landings)
2001 – 2019	Ad Hoc Sampling (NPAH) (not length stratified, unsorted landings)
2020 – present	Simple Random Sampling Without Replacement (SRSWOR)

Further information

More information on this regional sampling program can be found in the 2021 and 2022 RCG reports:

RCG NANSEA RCG Baltic 2022. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2022. Part I Report, 101 pgs. Part II Decisions and Recommendations, 13 pgs. Part III, Intersessional Subgroup (ISSG) 2021-2022 Reports, 159 pgs. (https://datacollection.jrc.ec.europa.eu/docs/rcg)

RCG NA NS&EA RCG Baltic 2021. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2021. Part I Report, 78 pgs. Part II Decisions and Recommendations, 16 pgs. Part III, Intersessional Subgroup (ISSG) 2020-2021 Reports, 350 pgs. (https://datacollection.jrc.ec.europa.eu/docs/rcg)

Compliance with international recommendations:

Yes

Link to sampling protocol documentation:

Online documentation accessible to public will be prepared during 2024.

Some additional information:

RCG NANSEA RCG Baltic 2022. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2022. Part I Report, 101 pgs. Part II Decisions and Recommendations, 13 pgs. Part III, Intersessional Subgroup (ISSG) 2021-2022 Reports, 159 pgs. (https://datacollection.jrc.ec.europa.eu/docs/rcg)

RCG NA NS&EA RCG Baltic 2021. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2021. Part I Report, 78 pgs. Part II Decisions and Recommendations, 16 pgs. Part III, Intersessional Subgroup (ISSG) 2020-2021 Reports, 350 pgs. (https://datacollection.jrc.ec.europa.eu/docs/rcg)

Compliance with international recommendations:

Yes

Co-funded by
the European Maritime
and Fisheries Fund

Sampling implementation
Regional level of ambition: 3 - "*Common monitoring strategy*" **Present regional level:** 1 - "*Coordinated data reporting*" **Recording of refusal rate:** Yes Refusals and other types of non-responses are recorded at vessel level **Monitoring of sampling progress within the sampling year:** Routine follow-up meetings between MS are organized minimum twice a year. At these meetings the sampling protocols, age reading workshop, species misreporting etc. are discussed.
Data capture
Regional level of ambition: 1 - "*Coordinated data reporting*" **Present regional level:** 0 - "*No coordination or not relevant*" **Means of data capture:** Presently not regionally coordinated **Data capture documentation:** Presently not regionally coordinated **Quality checks documentation:** Presently not coordinated, however is planned to be part of the coordination. The BioDataQualityTFA could be used as a common documentation. Regular international age reading workshops are held but presently no other international data checks are conducted.

Data storage
Regional level of ambition: 4 - "*Joint data collection*"

Present regional level: 2 - "*Agreed guidelines*"

National database:

Database name	Location (e.g. host institute)	Format (database / spreadsheet)	Years of data stored
Fiskeline	DTU Aqua	database	1990-present
Fiskdata 2	SLU Aqua	database	1985-present
NPZDR	NMFRI (MIR)	database	2004-present
DMAR-01	Thünen-OF	database	2002-present
SPMAFI (sprat) HeMaFI (herring)	Thünen-OF	database	2001-1992
BIODATA	BIOR	database	2003-present
SUOMU	LUKE	database	2009-present
	EMI-UT	database	
ZDIS	Fisheries Service (LTU)	database	2010- present (effort and landings)
KOPGALIS DRP	KU MRI (LTU)	CSV and Rdata	2017 – present (samples of biological data)

International database:

Small pelagic scheme targeting the herring and sprat fisheries: RDB/RDBES at ICES uploaded as common name "Baltic SPF regional" to the RDBES

Database name	Location (e.g. host institute)	Format (database / spreadsheet)	Years of data stored
RDBES	ICES	database	2021-present

(*) database is undergoing final tests with data deletions occurring before updates

Quality checks and data validation documentation:

Common documentation and agreement on relevant national data checks based on RDBES format. (RCG/ FishnCo/ ICES) will be developed

Sample storage

Regional level of ambition: 0 - "*No coordination or not relevant*"

Present regional level: 0 - "*No coordination or not relevant*"

RCG's Secretariat

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Storage description:

Presently not regionally coordinated

Sample analysis:

Presently not regionally coordinated

Additional information:

Data processing

Regional level of ambition: 4 - "*Joint data collection*"

Present regional level: 1 - "*Coordinated data reporting*"

Evaluation of data accuracy (bias and precision):

Scripts will be developed based on the RDBES data format that make use of common functions being developed by groups such as the ICES WGRDBES-EST.

Age reading comparison. It has been agreed to quality ensure the age reading on a regional level regular and as a minimum before benchmarks. Dates for last regional age reading exercise via SmartDots are indicated in the table per stock

Stock	year	MS
her.27.20-24	2018	Reported in WGBIOP 2018, Annex 3, p 46-47
her.27.25-2932	2022	DNK, POL, SWE, GER, LVA, LTU, EST & FIN
her.27.28	2015	WGBIOP 2017 Report, Annex 5, p 75
her.27.3031	2019	SWE, FIN
spr.27.22-32	2022	DNK, POL, SWE, GER, LVA, LTU, EST

Editing and imputation methods:

A design-based estimator is under development. Documentation will be available in RDBES scripts and outputs when that system is in production.

Quality document associated to a dataset:

Documentation will be available in RDBES scripts and outputs when that system is in production.

Link to estimation documentation;

Documentation on estimation will be made available after it has been coordinated.

Validation of the final dataset:

Final validation takes place when data is compiled at ICES stock coordination level.

Text Box 2.5: Sampling plan description for biological data

General Comment: This text box fulfils Article 5 (2)(a) and (b), Article 6 (3)(a), (b) and (c) of Regulation (EU) 2017/1004 and Chapter 2, point 2.1(a) and 4.1 of the EU MAP Delegated Decision annex. This text box complements Table 2.5.

Regional coordination for sampling Small Pelagic in the Baltic

The regional coordination for sampling Small Pelagic in the Baltic is under development in the RCG BA ISSG on Small Pelagics. Additional information on sampling schemes: annex 1.1 on Baltic SPF regional.

The regional coordination on small pelagic in the Baltic improves the coordination of sampling on different aspects. It aims to:

- Have a common sampling program where active trawlers targeting small pelagic are probabilistic selected for sampling of the unsorted catches including documentation of refusal and non-responses.
- Have a common protocol defining the minimum amount (3 kg / 50 fish) per sample, minimum 50 fish per species selected for ages and length measured (in scm).
- Ensure a comparable age reading method and quality insurance for sprat and herring in the Baltic. An age reading inter-calibration has been conducted in 2022 and will be conducted at least every 3 years.
- Upload data to the RDBES under a common sampling program “Baltic SPF regional”.
- Use common estimation algorithms developed within the RCG ISSG so as to enable comparison of estimates. The algorithm is built on design based estimation functions developed in ICES WGRDBES-EST.
- Investigate the quality of the landings data in the mixed fisheries, by analysing control data, observer samples or other alternative sources of information.
- On an annual basis evaluate national contributions to the regional sampling program and discuss improvements on how the landings of all MS can be sampled.
- Documentate historical sampling designs used by the MS.
- Collaborate to meet end-users needs (e.g., prior to ICES benchmark Workshops).

(One text box (max. 1 000 words) per region/RFMO/RFO/IO)

Table 2.5 in regional WP

Table 2.5. Sampling plan description for biological data

MS	Reference period	Implementation Year	Region	RFMO/RFO/IO	Observation type	Sampling scheme type	Species coverage	Sampling scheme identifier	Sampling frame identifier	Sampling frame description	Sampling frame spatial coverage	Frequency	PSU type	Method of PSU selection	Catch fraction	Average number of PSUs during the reference period. Annual Fishing trips	Annual Fishing trips. Planned number of PSUs	PETS observation covered within the sampling scheme	Does the sampling protocol allow for the quantification of PETS observation effort?	Regional work plan name	WP Comments
MasterCodeList 'MS'		*2024*	*MasterCodeList 'Regions'*	*MasterCodeList 'RFMO/RFO/IO'*	*MasterCodeList 'Observation type'*	*MasterCodeList 'Sampling scheme type'*	*MasterCodeList 'Species coverage'*	*see WP guidance for Table 2.5*	*see WP guidance for Table 2.5*	*see WP guidance for Table 2.5*	*see WP guidance for Table 2.5*	*MasterCodeList 'Frequency'*	*see WP guidance for Table 2.5*	*MasterCodeList 'PSU Selection'*	*MasterCodeList 'Catch fraction'*	*see WP guidance for Table 2.5*	*see WP guidance for Table 2.5*	*idance for*	*WP guidance for Table*	*idance for*	*see WP guidance for Table 2.5*
DEU	2020-2022	*2024*	Baltic Sea	ICES	SelfAtSea	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	DEU_Trawler_HER_SPR	DEU trawlers fishing for small pelagic's	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Annual	Fishing vessel	SRSWOR	Landings (All fractions)	138	20	N	NA	Baltic SPF	17 vessel participated in the fishery, 3 of them are planned to be sampled for sprat. Restrictions in fishing opportunities in area 22-24 led to a stop of trawling fisheries for herring and no samples could be achieved in 2022. The current stock condition will not allow to rsume to normal fishing activtivies in the near future and sampling opportunities will be rare.
DNK	2020-2022	*2024*	Baltic Sea	ICES	SelfAtSea	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	DNK_Trawler_HER_SPR	DNK trawlers vessels fishing for small pelagic's	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Annual	Fishing vessel	SRSWR	Landings (All fractions)	29	15	N	NA	Baltic SPF	On average 6 vessels participated in the fishery.
EST	2020-2022	*2024*	Baltic Sea	ICES	SciObsOnShore	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	EST_Trawler_HER_SPR	EST trawlers vessels fishing for small pelagic's	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Other	Fishing vessel	SRSWR	Landings (All fractions)	2380	62	N	NA	Baltic SPF	In column Q write annual numbers of fishing trips in this comment write number of vessels selected on list, should also describe the "other" in frequency
FIN	2020-2022	*2024*	Baltic Sea	ICES	SciObsOnShore	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	FIN_Trawler_HER_SPR	FIN trawlers vessels fishing for small pelagic's	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Quarter	Fishing vessel	UPSWR	Landings (All fractions)	828	88	N	NA	Baltic SPF	In column Q write annual numbers of fishing trips in this comment write number of vessels selected on list, should also describe the "other" in frequency
LTU	2020-2022	*2024*	Baltic Sea	ICES	SelfAtSea	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	LTU_Trawler_HER_SPR	LTU trawlers vessels fishing for small pelagic's	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Annual	Fishing vessel	SRSWR	Landings (All fractions)	431	3	N	NA	Baltic SPF	In column Q write annual numbers of fishing trips in this comment write number of vessels selected on list, should also describe the "other" in frequency
LVA	2020-2022	*2024*	Baltic Sea	ICES	SelfAtSea	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	LVA_Trawler_HER_SPR	LVA trawlers vessels fishing for small pelagic's	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Annual	Fishing vessel	SRSWR	Landings (All fractions)	4493	69	N	NA	Baltic SPF	35 vessels
POL	2020-2022	*2024*	Baltic Sea	ICES	SelfAtSea	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	POL_Trawler_HER_SPR	POL trawlers fishing for small pelagic	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Annual	Fishing vessel	SRSWR	Landings (All fractions)	1626	30	N	NA	Baltic SPF	59 vessels
SWE	2020-2022	*2024*	Baltic Sea	ICES	SelfAtSea	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	SWE_Trawler_HER_SPR_EAST	SWE trawlers fishing for small pelagics with main catches in 27.3.b,c,d.22-29,32	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Other	Fishing vessel	UPSWOR	Landings (All fractions)	414	60	N	NA	Baltic SPF	n=11 vessels (two of them pair-trawlers) all of them are planned to be sampled; Frequency is "other" because vessels are sampled on a weekly basis. The two vessels that pair-trawl enter weekly sampling as one vessel. To compensate double weight is given to that vessel during the sampling. Planned number of trips estimated based on simulations of 2022 data and assuming 80% response rate.
SWE	2020-2022	*2024*	Baltic Sea	ICES	SelfAtSea	Commercial fishing trip	Selected species/stocks	Baltic SPF regional	SWE_Trawler_HER_SPR_EASTandWEST_BALTIC	SWE trawlers fishing for small pelagics with main catches in 27.3.b,c,d.22-29,32 (and 27.3.a and 27.4)	27.3.c.22, 27.3.b.23, 27.3.d.24-29+32	Other	Fishing vessel	CENSUS	Landings (All fractions)	28	22	N	NA	Baltic SPF	n=4 vessels all of them are planned to be sampled; Frequency is "other" because vessels are sampled on a weekly basis. These vessels also fish herring and sprat in 27.3.a and 27.4 and are sampled by the Swedish National Work-Plan when they fish there. Numbers present in column Q are restricted to the area of the RSP (i.e., subdivs 22-29+32). Planned number of trips estimated using 2022 data and assuming an 80% response rate.
		is 2024 testing year ?? Question to the RCG meeting							**out of frame**	**handled in the national programs**	**Should we look into if 30+31 should be included**					finalize by 8/05	finalize by 8/05				see national programs

ANNEX 8.3 Working document on potential corrections of national catch data of Baltic data of Baltic sprat and central Baltic herring

Authors: All participants in the ISSG

• Background

Issue list from AWG, long standing discussion on species misreporting of herring and sprat, other types of errors that the national catch data might be associated with.

• Approach taken by the ISSG Small Pelagic Fisheries Baltic

In the 2021 RCG decision meeting (D07), 8 member states (MS) (Germany, Denmark, Finland, Poland, Lithuania, Estonia, Latvia, Sweden) agreed to :
Each MS with trawlers fishing small pelagics in the Baltic need to decide if they can commit to an analysis of potential “historical” misreporting of the proportion of herring and sprat in their national data. The commitment includes to perform an analysis, to present it at the ISSG small pelagics in the Baltic and to decide if historical catch data should be corrected on the basis of the analysis. Deadline for the analysis is October 2022. The aim is to feed in the overall outcome to the benchmark process of central Baltic herring and sprat 2023.”

Two meetings have been conducted in 2022 (18-19 January and 10 May)
In the first meeting the stock assessors for the sprat and herring stock were invited to the meeting to get the end-users perspective. It was decided during the meeting to:

- Document present WGBFAS time series in respect to corrections.
    - Fill in a template about corrections done (or not done) in connection to historic misrapporting.
- Analyze if it is possible for MS’s to use some quality indicators to check if there has been inconsistency between official numbers in catch composition and data from alternative sources (national control data, Danish control data, observer trips, scientific surveys)
- Collate quota shares by year and country

• Country specific chapters on potential corrections

(each country have the same headers)

3.1. Denmark

The Danish fishery for sprat and herring in the Baltic is mainly used for industrial purpose, see figure 1. Denmark has a relatively small part (<3%) of the CBH EU quota and for Baltic sprat Denmark has 10% of the quota and landings (figure 2).

There are two different types of Danish fleets conducting the fishing. Some fewer relatively large vessels >25 meters fishing in many ICES squares and some smaller local fishermen fishing very close to the Island of Bornholm fishing mainly in SD 25.

The relative Danish quota share has changed over time and in 2021 79% of the total sprat and herring landings were sprat.

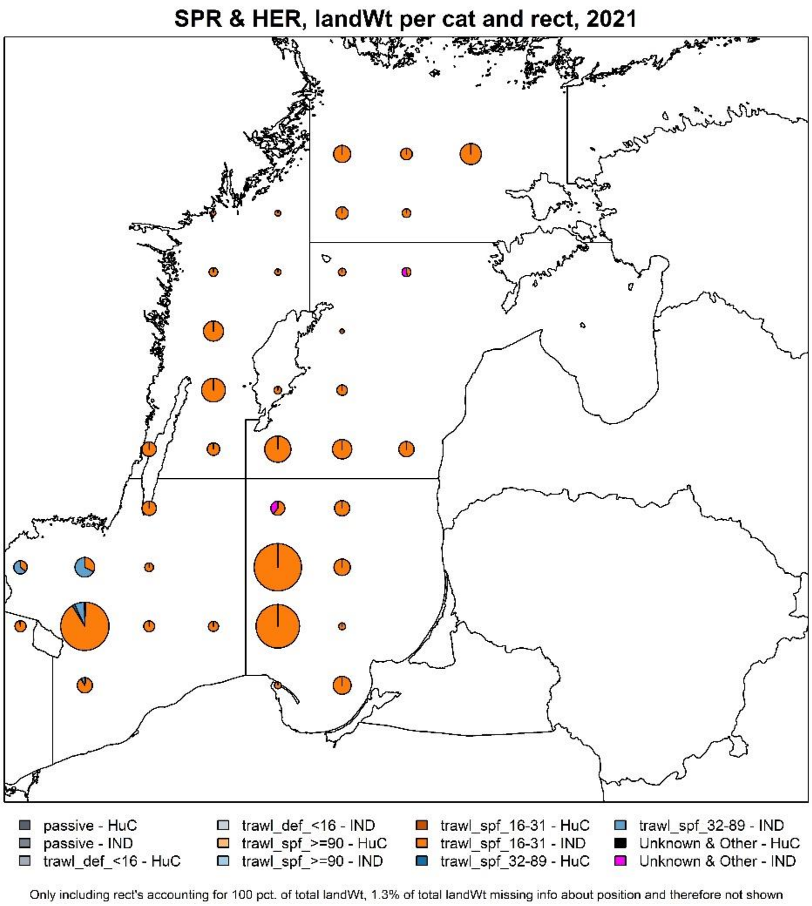

Figure 4 Landings in 2021 from Danish vessels by métier and purpose (Human consumption/ Industry)

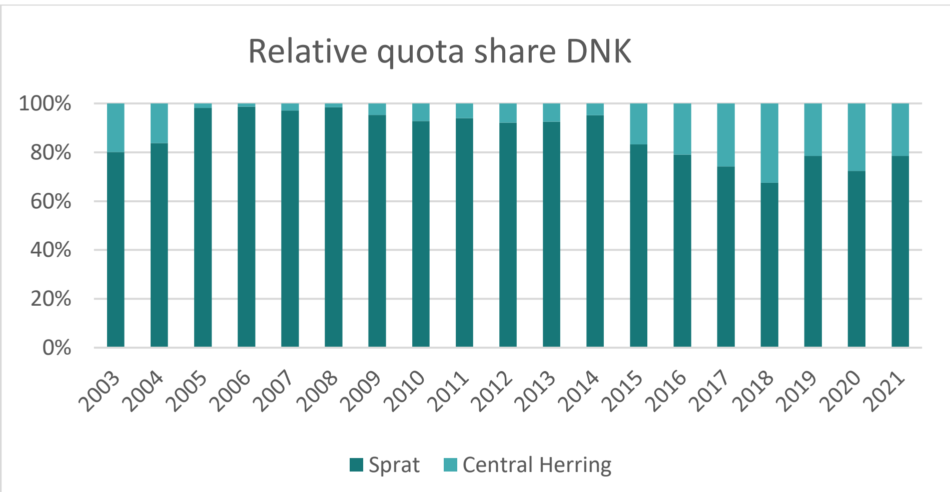

Figure 5 The relative share of sprat (blue) and central herring quota in the Danish Baltic fishery.

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Approach taken to analyze if there are errors in the time series of catch data due to inadequate reporting of species and/or other reasons

Reporting of species

In Denmark sale notes are used to subtract quota and delivering data for ICES for all fisheries, but fisheries for reduction.

In the fisheries for reduction a species composition is estimated, either with the 9-square method, sub-sampling of all landings or by the fisherman (license 1205) and the results are reported to ICES, see table 1 for an overview of where and when the different methods have been used. In respect to quotas subtraction the estimated species composition is only used for license 1205 and herring with a by-catch quota, herring in the North Sea, Skagerrak and Kattegat, all other species are subtracted at the level of the target species (at least this is true for the time after 2000). Therefore, the total amount caught are often only reported for the target species in the sales notes, see figure 3.

Since 1991, the Danish control has sub-sampled a certain percentage of the landings for reduction, number of landings sampled depends on year and fishery. These samples have been used to estimate the official species composition with the 9-square method. Looking at the species composition in these samples it is evident that the sprat fishery in the Baltic is very rarely a clean sprat fishery, see figure 4. Therefore, it makes sense to correct the species composition reported in the sale slips.

Since the methods for estimating the species composition before 2012 was not official, DTU Aqua is uncertain on how this was handled in the past and a comparison was made between the uploaded historic time series to ICES WGBFAS and the information we presently could find in the sale slips. From this exercise it was evident that especially the historic data on herring were much higher in the WGBFAS report than can be documented from the sale slips available, see figure 5, which indicate that some kind of species composition has been estimated in most year in the past.

Handling of spatial information

Presently DTU Aqua use the area and rectangle declared in the logbooks for assigning spatial information, in more recent years VMS and AIS is use when no information exists or a mismatch in declared area and square is found. For vessels without logbook, the area from the sale notes is used.

In the past landings from the Eastern Baltic was not always declared by subdivision, but only as 27.3.d, so it is needed to assign a subdivision to these based on other information available. In most cases it is possible to find a subdivision based on rectangle, see figure 6.

It is unknown how missing and too coarse spatial information was handled in the past, but the methodology for handling this has been developed and refined over the years.

Main outcomes of the analysis done

By-catch of herring in the fisheries for reduction

Since it is unknown how the species compositing was handled in the past, it was decided to implement the 9-square method for the sprat fishery for all years in the Baltic with a standard method for imputations. The only samples we have available for this is the samples from the Danish control.

The results are compared with the present ICES WGBFAS timeseries in figure 7.

Handling of spatial information

Since it is unknown how missing and too coarse spatial information was handled in the past, it was decided to use the present methodology to assign subdivision to landings back to 1987.

As can be seen in figure 8, then distribution between subdivisions is quite different in the two time series, especially in the years before 1997, where all landings were assign to 27.3.d.25 in the old ICES WGBFAS time series.

Advice to the benchmark

Use the new time series, where the methodology is known and documented.

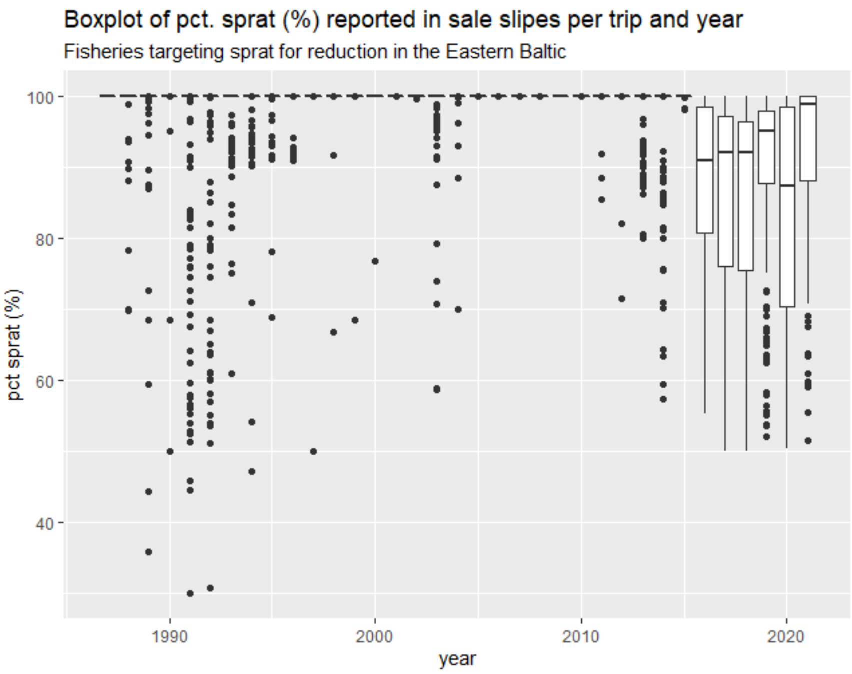

Figure 6 Boxplot of the percentage of sprat per trip in the sale slips from the industrial sprat fishery in the Eastern Baltic.

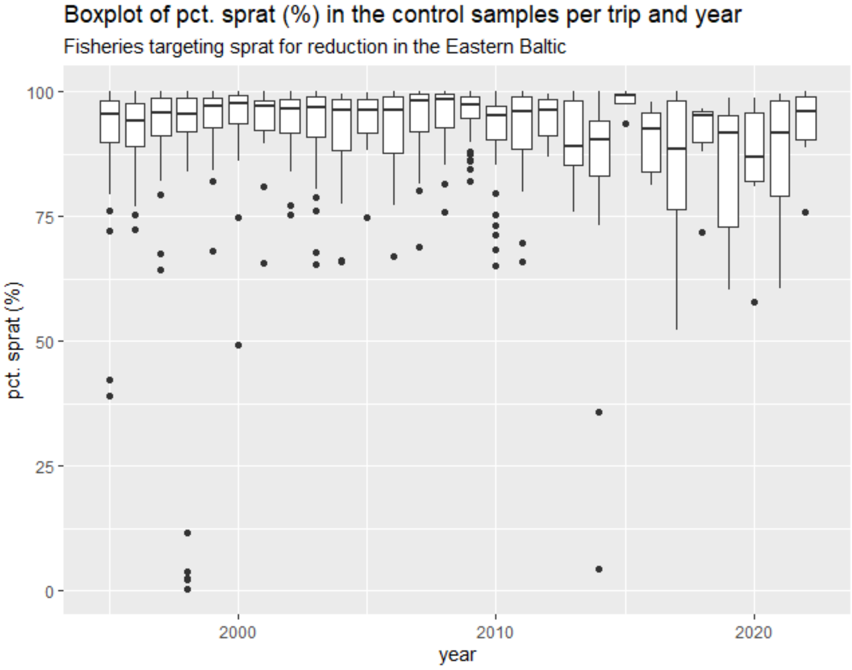

Figure 7 Boxplot of the percentage of sprat per trip in the Danish control samples from the industrial sprat fishery in the Eastern Baltic.

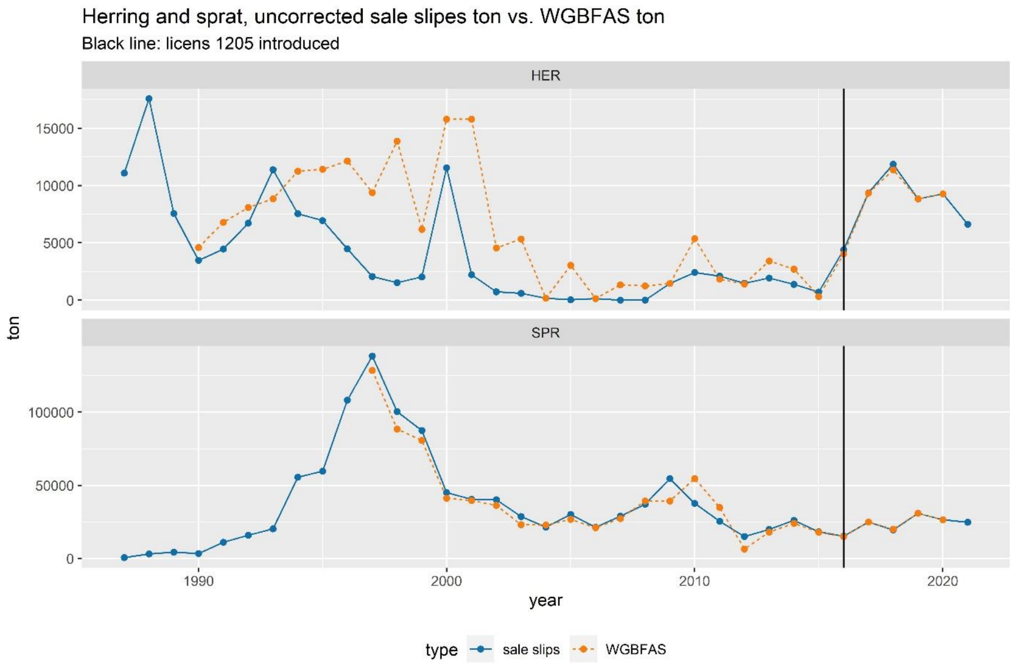

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Figure 8 Comparison between the uploaded historic time series to ICES WGBFAS and the information we presently could find in the sale slips. The figure only has data from the Eastern Baltic

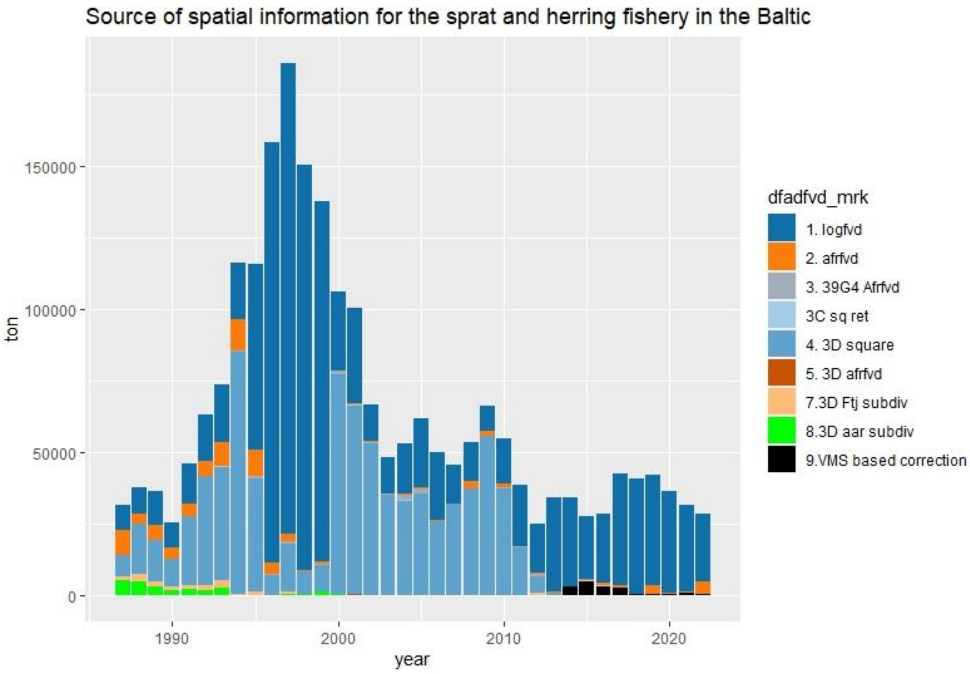

Figure 9 Source used for spatial information at the subdivision level with the present methodology

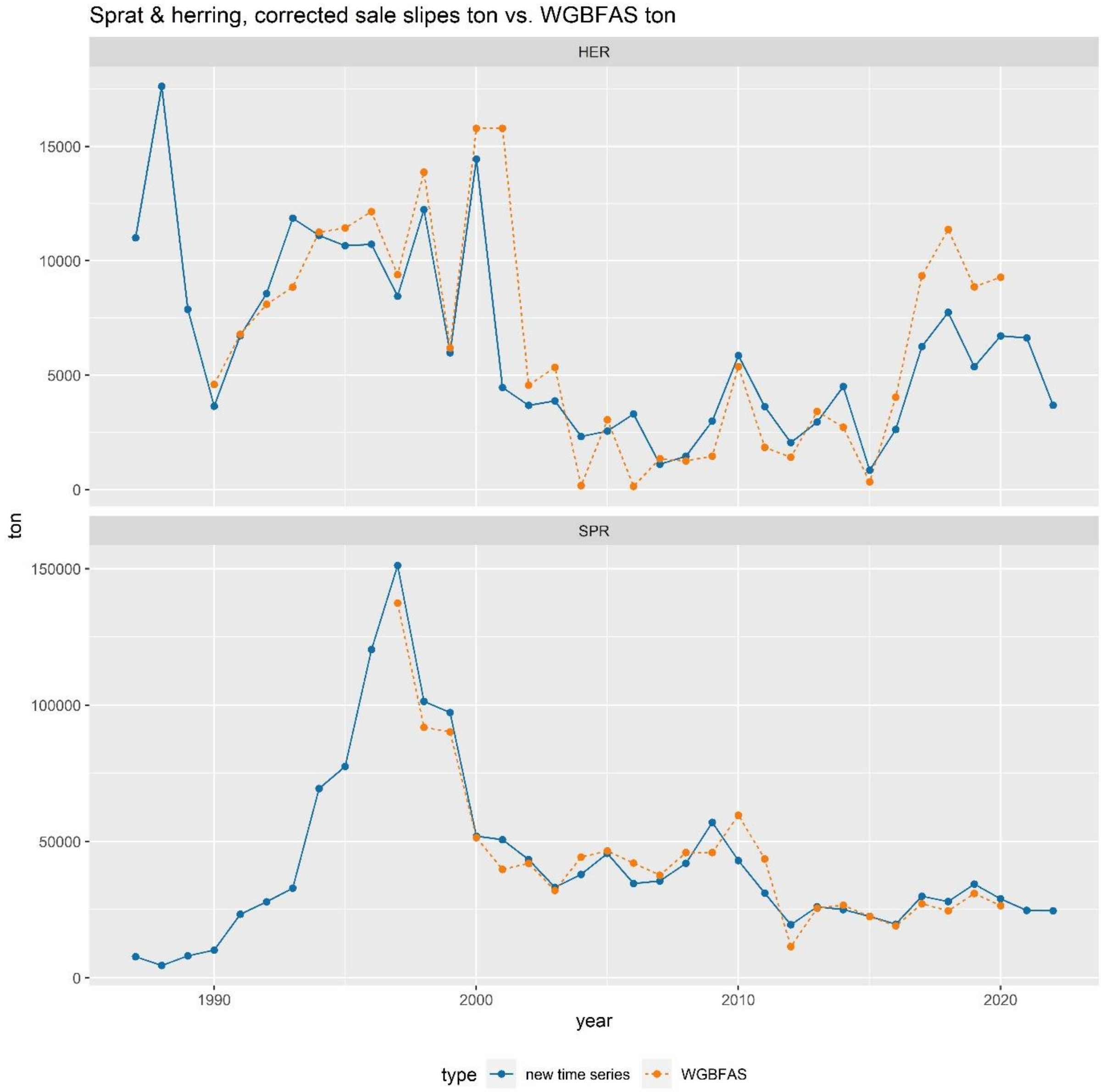

Figure 10 Comparison between the total amount in the historic ICES WGBFAS time series and the new time series. The figure shows sprat from the Baltic and herring from the Eastern Baltic

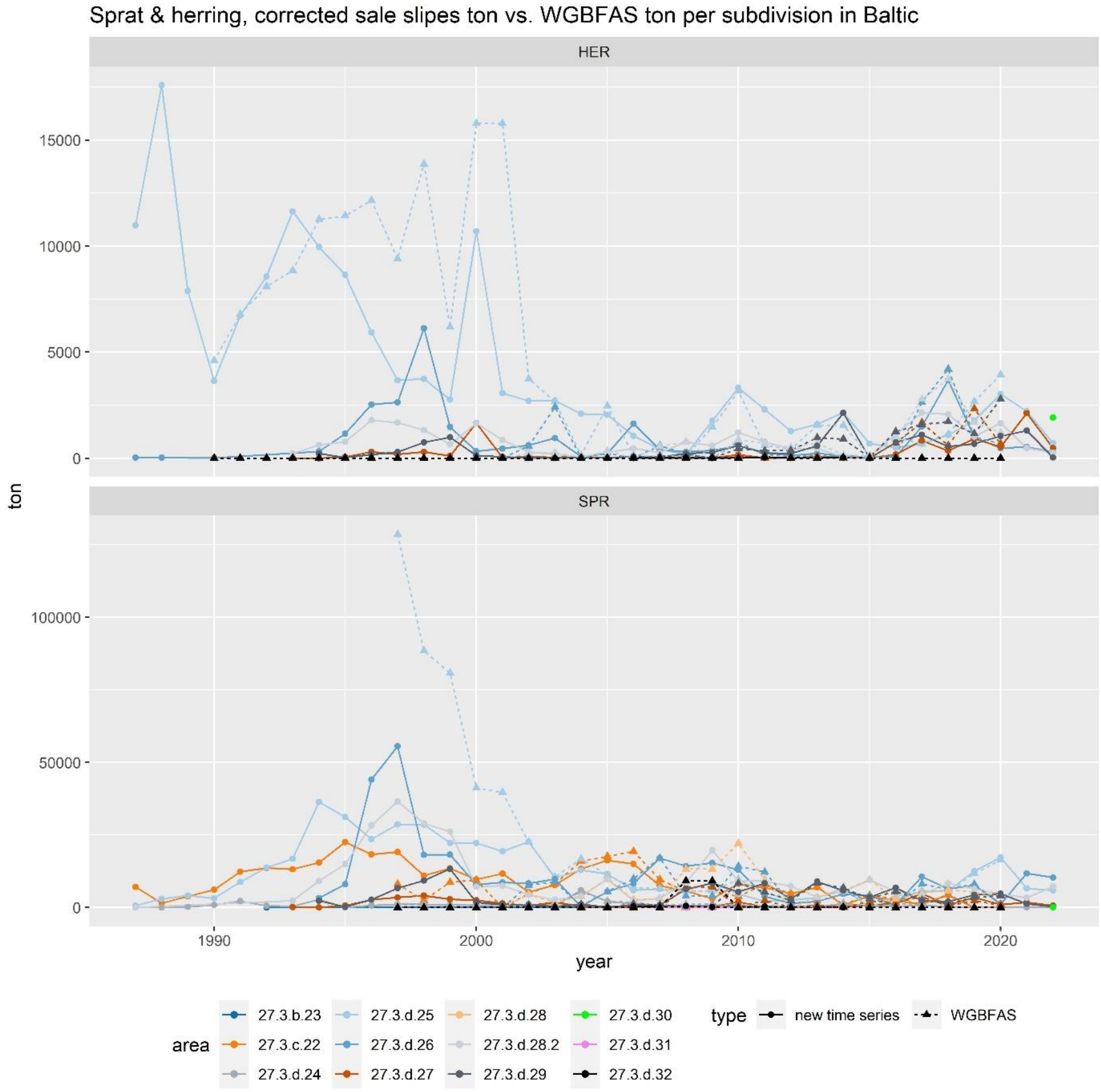

Figure 11 Comparison between the total amount in the historic ICES WGBFAS time series and the new time series per subdivision. The figure shows sprat from the Baltic and herring from the Eastern Baltic

Table 14 Overview of data sources and method used when submitting data from the Baltic to WGBFAS

Overview of data sources used when submitting data from the Baltic to WGBFAS			
MS	Landing category	Time period	Data source
Denmark	IND	2020-present	Sale slips (In 2020, Denmark introduced a new system for estimating the species composition in the landings for reduction. The Danish 1st buyers of these landings now oblige to sub-sample every landing and use these to estimate the species composition in that landing. The estimated figures are reported in the sale slips. The number of sub-

<table>
<tr><td></td><td></td><td></td><td>samples depends on species, area and total amount landed e.g. in 2020 landings of sprat from the Baltic was sub-sampled in the following way;
<table>
<tr><th>Tons</th><th>Number of sub-samples</th></tr>
<tr><td>0-25</td><td>5</td></tr>
<tr><td>25-200</td><td>10</td></tr>
<tr><td>> 200</td><td>15</td></tr>
</table>
(The two biggest 1st buyers of landings for reduction use 3rd party companies to sample the landing))</td></tr>
<tr><td></td><td></td><td>2017- 2019</td><td>Sale slip figures. No correction with control samples

(All vessels had the 1205 license in the period)</td></tr>
<tr><td></td><td></td><td>2016</td><td>55% sale slips (1205 license) 45% Sale slips figures corrected with the 9-square method.

(A new license, 1205, was introduced in the Eastern Baltic fishery for reduction. Vessel fishing with that license is oblige to report the species composition caught and the sale slip figures was not corrected with the 9-square method for these vessels. Sale slip figures from vessel fishing without was still corrected with the 9-square method)</td></tr>
<tr><td></td><td></td><td>2012-2015</td><td>Sale slip figures corrected with the 9-square method.

(In 2012, The Danish Fisheries Agency took over calculation of by-catch with the 9-square method and it became a routine to use the method in the Baltic)</td></tr>
<tr><td></td><td></td><td>1991-2012</td><td>Sale slips figures has been corrected with the 9-square method some years, others not.

(The so-called 9-square method was introduced in 1991. The method use the Danish control samples to estimate the species composition in the fisheries for reduction. A species composition is calculated per square and month based on samples from the square and the 8 surrounding squares within month. The estimate is then applied to the figures from the sale slips per square and month (Logbooks are used to get information about ICES square).

The method was routine for the North Sea, Kattegat and Skagerrak and used as official figures. For the Baltic it has not been an official routine, but some years it has been used, when submitting data to WGBFAS

DTU Aqua was responsible for the calculations, but the results for North Sea, Kattegat and Skagerrak was used by the Danish Fisheries Agency)</td></tr>
<tr><td></td><td></td><td>Before 1991</td><td>No clue</td></tr>
<tr><td></td><td>HUC</td><td>All years</td><td>Sale slips</td></tr>
</table>

3.2. Estonia

Fishery

The Estonian fishery of herring and sprat is mainly for human consumption, however this trend has been decreasing with recent years due to the development of fishmean and oil factory located in Paldiski, Estonia . Estonia TAC share from Central Baltic herring stock is around 8-9%, 46% from Gulf of Riga herring TAC and 9-10% from sprat TAC.

Approach taken to analyze if there are errors in the time series of catch data due to inadequate reporting of species and/or other reasons

Since 2014 Estonian control agency has conducted regular controls to determine the accuracy of the species composition and weight of landed fish. Legally, ± 10% difference in landed weight per species is allowed. The control agency has the leniency to determine based on visual inspection if biological samples need to be taken to determine the species composition, and total landed weight per species. This means that biological samples might not be taken during every inspection event.

When difference is detected between logbook and inspected data then the control agency suggests for the skipper to change/update the logbook data to correspond to what has been determined by the inspection. If this data is updated/changed then corrected data will be used when catches/landings are reported to ICES. However, it is not possible to track in which cases the data was corrected or not.

Main outcomes of the analysis done

The control agency has been collecting samples since 2014. From 2014-2021 total of 1466 fishing trips were inspected (Table 1). From all inspected trips (N=1466) total of 819 trips were sampled for species composition (Table 1). This makes 55.83% of all inspected trips. The number of trips sampled has increased from year to year.

Reported and inspected species composition does not seem to differ a lot between the reported species composition and inspected species compositions (Figure 1, 2). For years 2014-2021 the overall impression is that herring might be slightly overreported compared to sprat. The direction of false reports in general indicates an over reporting of herring in the catch composition as over 45% of inspected trips over reported herring (Table 2).

Table 1. Total number of Estonian trawl fleet fishing trips, and number of trips that were inspected in years 2014-2021.

Year	Inspected	Landed	Sampled	% Inspected	% Sampled
2014	234	2732	95	8.57	40.60
2015	240	3229	93	7.43	38.75
2016	119	2656	78	4.48	65.55
2017	128	3107	23	4.12	17.97
2018	169	2966	84	5.70	49.70
2019	199	2893	143	6.88	71.86
2020	209	2823	164	7.40	78.47
2021	168	2066	139	8.13	82.74

Table 2. Proportion of over or under reporting of herring and sprat in catch composition based on sampled inpected trips for years 2014-2021. N=number of sampled trips; median% - median proportion of over or under reporting; mean% - mean proportion of over or under reporting; sd% - standard deviation of the mean proportion of over or undereporting; overreportedN – number of trips were over reporting was detected; overreported% - % of overreported trips.

Year	Species	N	median%	mean%	sd%	overreportedN	overreported%
2014	HER	94	0.0	0.2	5.7	45	47.9
2014	SPR	94	0.0	-0.2	5.7	36	38.3
2015	HER	90	0.0	-0.5	5.0	42	46.7
2015	SPR	90	0.0	0.5	5.0	39	43.3
2016	HER	78	0.1	1.2	4.6	44	56.4
2016	SPR	78	-0.1	-1.3	4.6	23	29.5
2017	HER	23	2.2	2.3	3.4	18	78.3
2017	SPR	23	-2.2	-2.3	3.4	5	21.7
2018	HER	84	1.2	3.6	9.8	55	65.5
2018	SPR	84	-1.2	-3.6	9.8	24	28.6
2019	HER	143	0.7	1.1	8.2	84	58.7
2019	SPR	143	-0.6	-1.2	8.2	49	34.3
2020	HER	163	1.1	2.0	8.1	105	64.4
2020	SPR	163	-1.1	-2.0	8.1	57	35.0
2021	HER	139	0.5	0.3	5.0	76	54.7
2021	SPR	139	-0.5	-0.3	5.0	59	42.4

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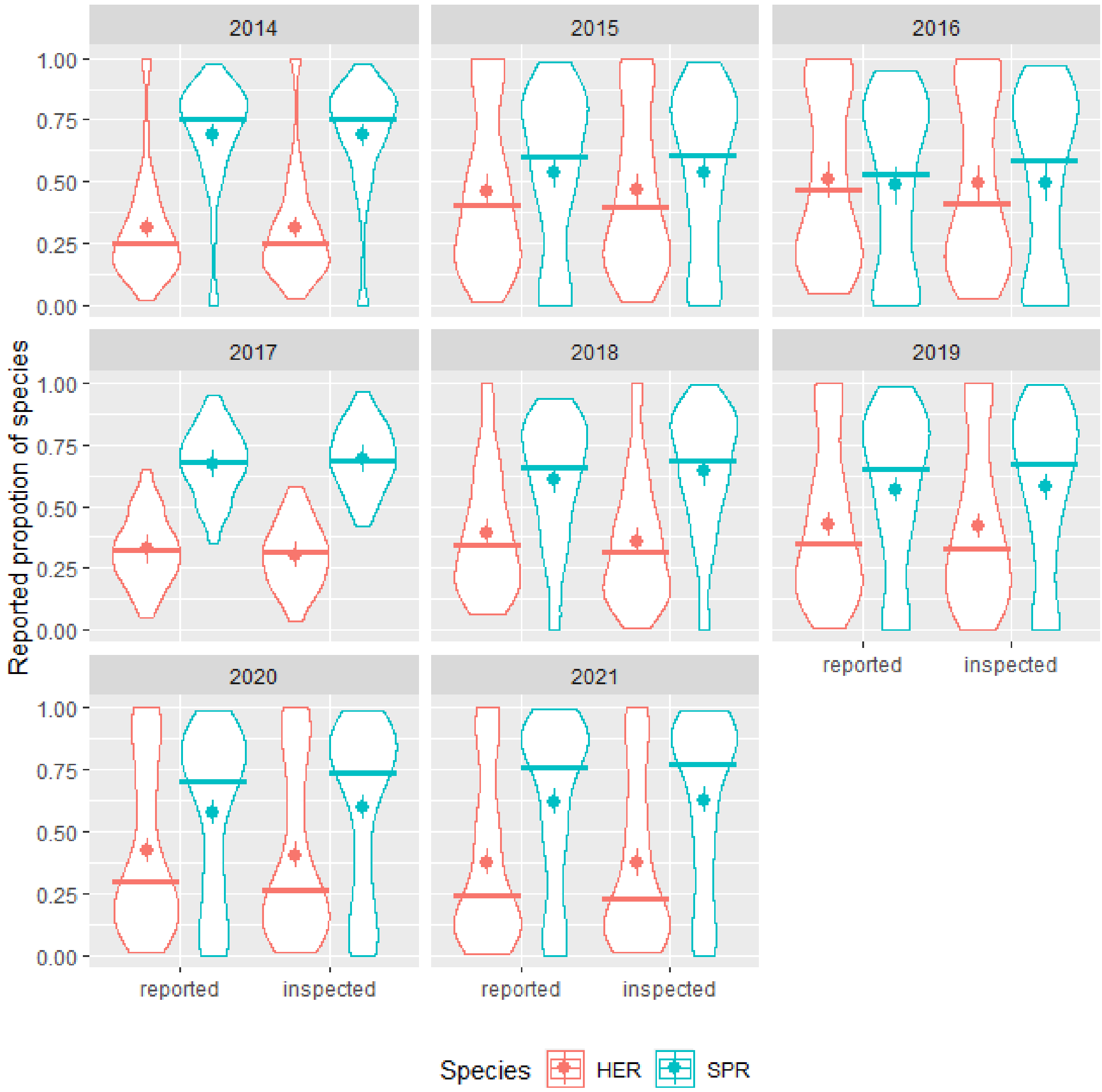

Figure 1. Species proportion distribution comparison between logbooks data and and results from the sampled inspection trips.

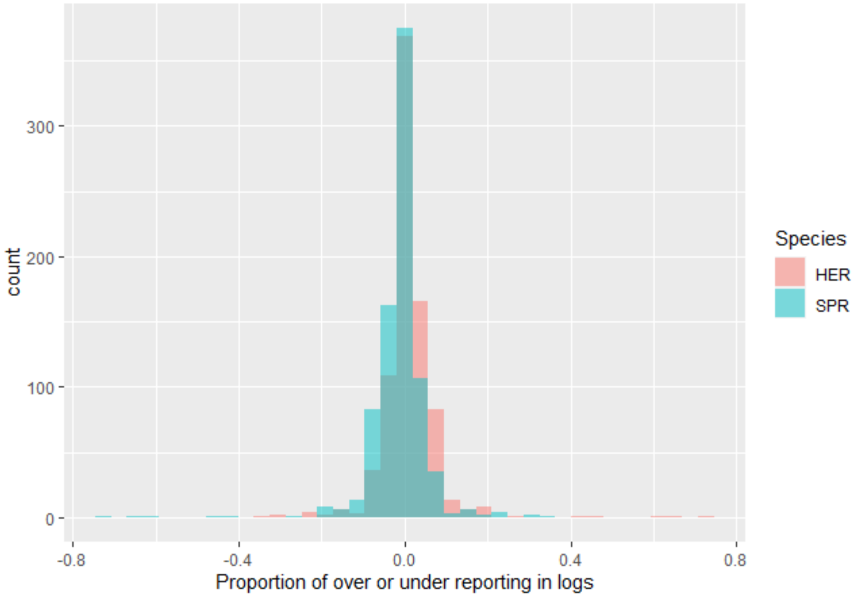

Figure 2. Proportion of over or under reporting of herring and sprat in catch composition. Figure is symmetrical as over reporting of one species comes with an under reporting of the other species. Dark blue indicates overlap. Bars are set at 5% intervals.

Advice to the benchmark

1. *The national data to not be updated* as there are no indications after the analysis that data can be improved. Country will not provide new time series.
2. It is important to note that based on the current available data and analysis conducted we are not able to improve the current data. This however does not mean that the data should not be improved. Currently available data is not enough to conduct such improvements.

3.3. Finland

Fishery

Finnish fishery targeting herring and sprat is conducted mostly with pelagic trawls, but also to a minor extent by coastal trapnets (FPN, FYK) during spawning time on the emphasis to springtime. The stocks concerned are Central Baltic Herring stock (SD 25-29, 32), Gulf of Bothnia Herring stock, i.e. Bothnian Sea Herring (SD 30) and Bothnian Bay Herring (SD 31) – the latter two have always belonged to the same management unit and to the same assessment unit since 2017, and the Baltic Sprat stock (SD's 22-32). Biological data are collected mostly from sampling of commercial trawl fisheries (OTM_SPF and PTM_SPF), but also from trapnets.

The Finnish quotas for the stocks are: GoB, 81,99%, CBH 21,93 % and Baltic Sprat 5,16%. The catches are mostly used for industrial purposes (Figures 3.3.1. And 3.3.2.).

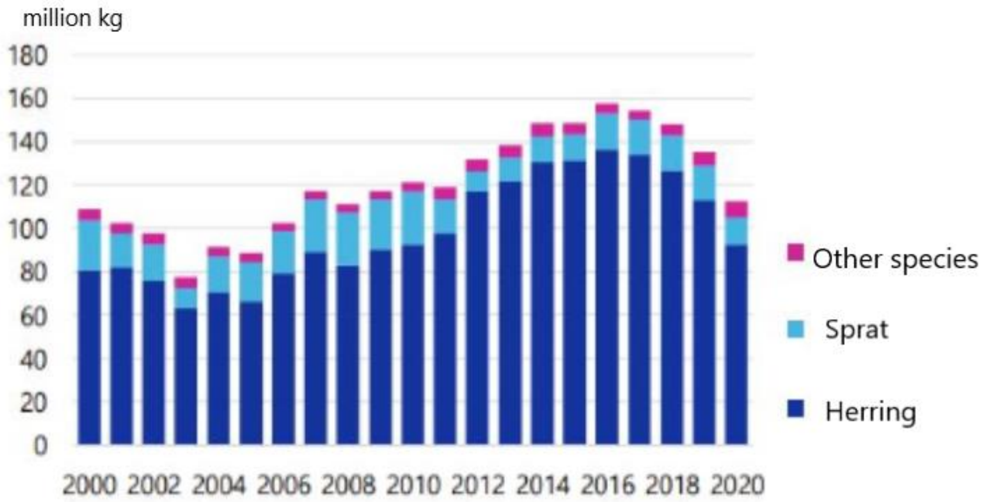

Figure 3.3.1. Catches in Finnish Fisheries in 2000-2020

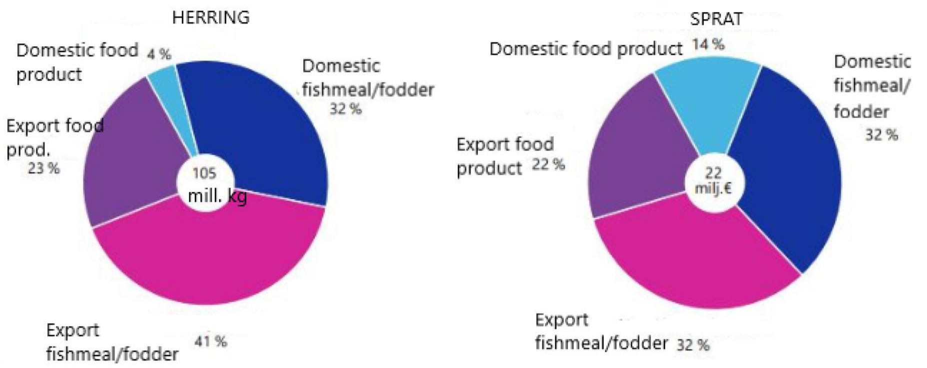

Figure 3.3.2. Shares for human consumption, industrial purposes, domestic use and export in Finnish *official* herring and sprat catches, in millions of kilograms (left) and millions of Euros (right).
(Source: Natural Resources Institute Finland)

Approach taken to analyze if there are errors in the time series of catch data due to inadequate reporting of species and/or other reasons

To assess the existence and potential magnitude of misreporting of sprat for herring and vice-versa in the catches of the Finnish trawlers, we were provided by the fisheries inspection services of ELY-Keskus with data corresponding to a set of 203 catch events distributed in the years 2007 to 2022, in ICES SD 28 (1 catch event), 29 (178 catch events) and 32 (24 catch events). The data provided by ELY-Keskus are anonymous (i.e. no vessel ID) and contain the following variables: ICES rectangle, catch date, inspected herring weight and sprat weight. For most cases the combination of catch date and statistical rectangle in these inspection data was pointing to a single event in the logbooks. There were also occurrences of several catch events on the same day and rectangle both in the inspection data and in the logbooks, most of which were also easily relatable under the assumption that exact or close (i.e. <2% difference) matches in terms of species proportions indicated a same catch event.
No other species than herring and sprat was present in these catches. The value used for the analysis was the difference between the percentage of herring in the catch weight reported in the logbooks and the corresponding percentage in the inspection data.

Main outcomes of the analysis done

Among the 203 catch events inspected, 166 displayed an exact match (<1% difference in herring percentage between logbook and inspection data), 17 displayed a close match (difference ranging from 1 to 5%) and 20 displayed a difference superior to 5% (Figure 3.3.3). Within this last case, 6 events displayed a difference between 5 and 10%, 8 a difference from 10 to 25%, 3 a difference from 25 to 40% and 3 a difference over 40%. All ranges expressed include the lower boundary and exclude the upper one.

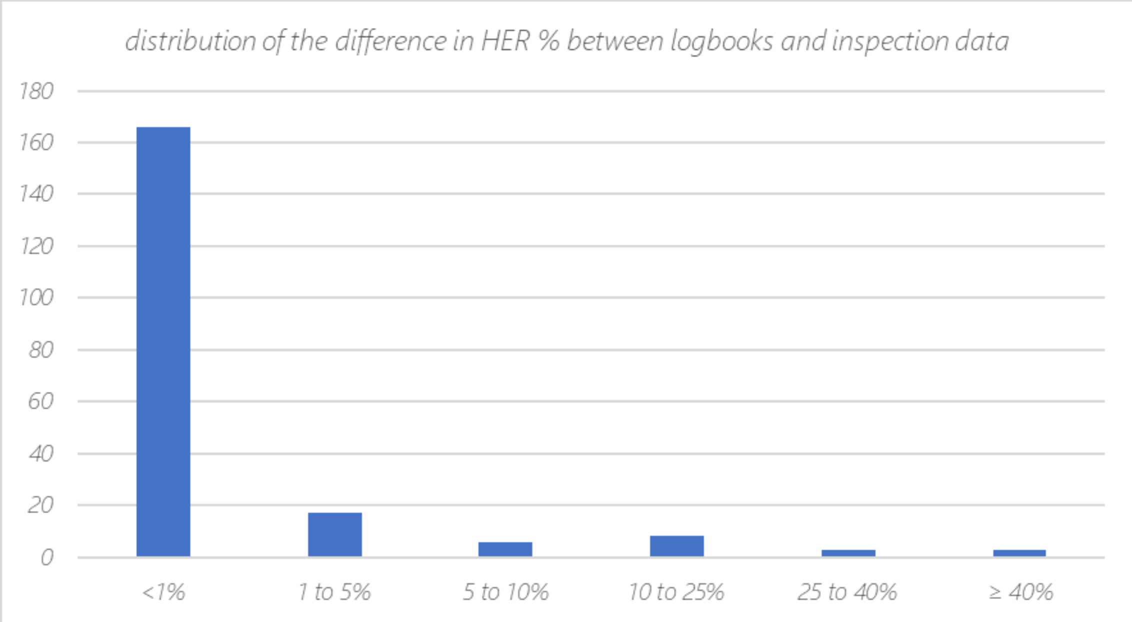

Figure 3.3.3: difference in herring percentage between logbook and inspection data, grouped by percentage range

For the 2007-2008 winter, most differences are 0, two cases show a positive difference by less than 5% and one case shows a negative difference by 15%. For the 2008-2009 winter we observe one positive difference by 10%, and in the following winter an 87.5% negative difference, for which the logbook contains no sprat data. (Figure 3.3.4)

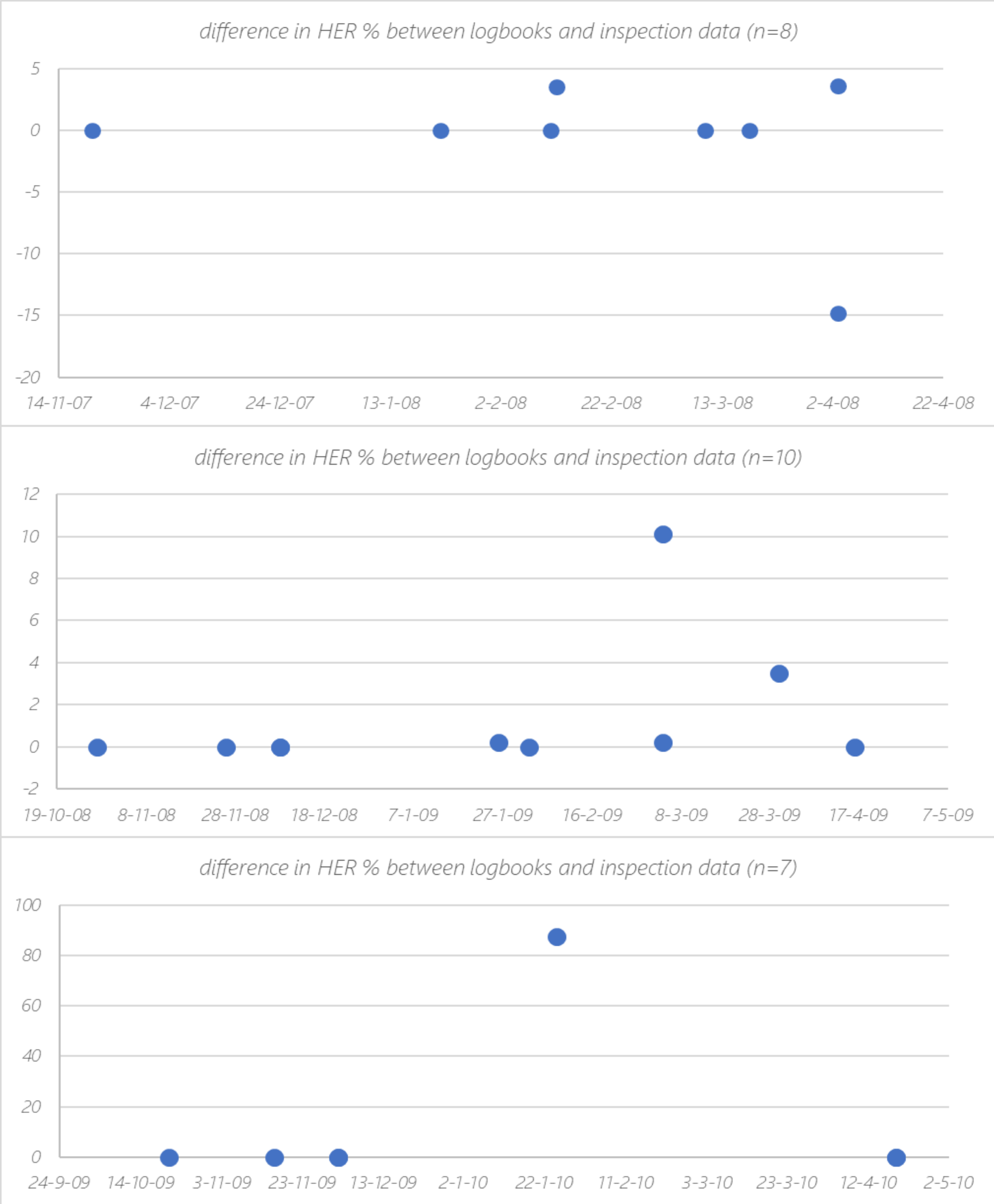

Figure 3.3.4: difference in herring percentage between logbook and inspection data, split by date for the seasons 2007-2008, 2008-2009 and 2009-2010

For the winters 2010-2011, 2011-2012 and 2013-2014, the most meaningful discrepancy is a negative difference of 40% in January 2014, for which the inspection data shows no sprat (Figure 3.3.5).

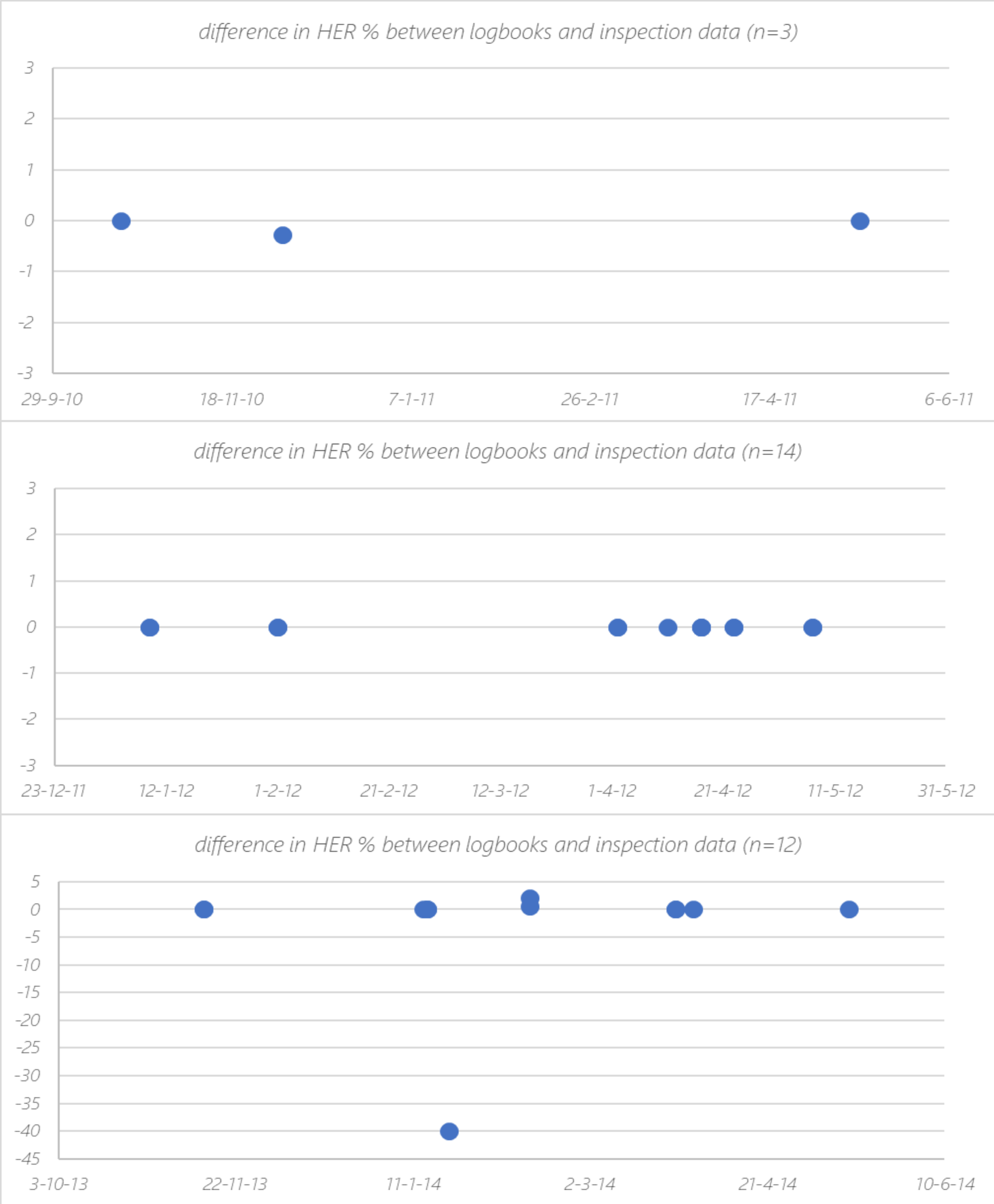

Figure 3.3.5: difference in herring percentage between logbook and inspection data, split by date for the seasons 2010-2011, 2011-2012 and 2013-2014

For the seasons 2014-2015, 2015-2016 and 2016-2017, the most meaningful discrepancy is also a negative difference of 37.6%, for which the inspection data shows much more herring than the logbook (Figure 3.3.6).

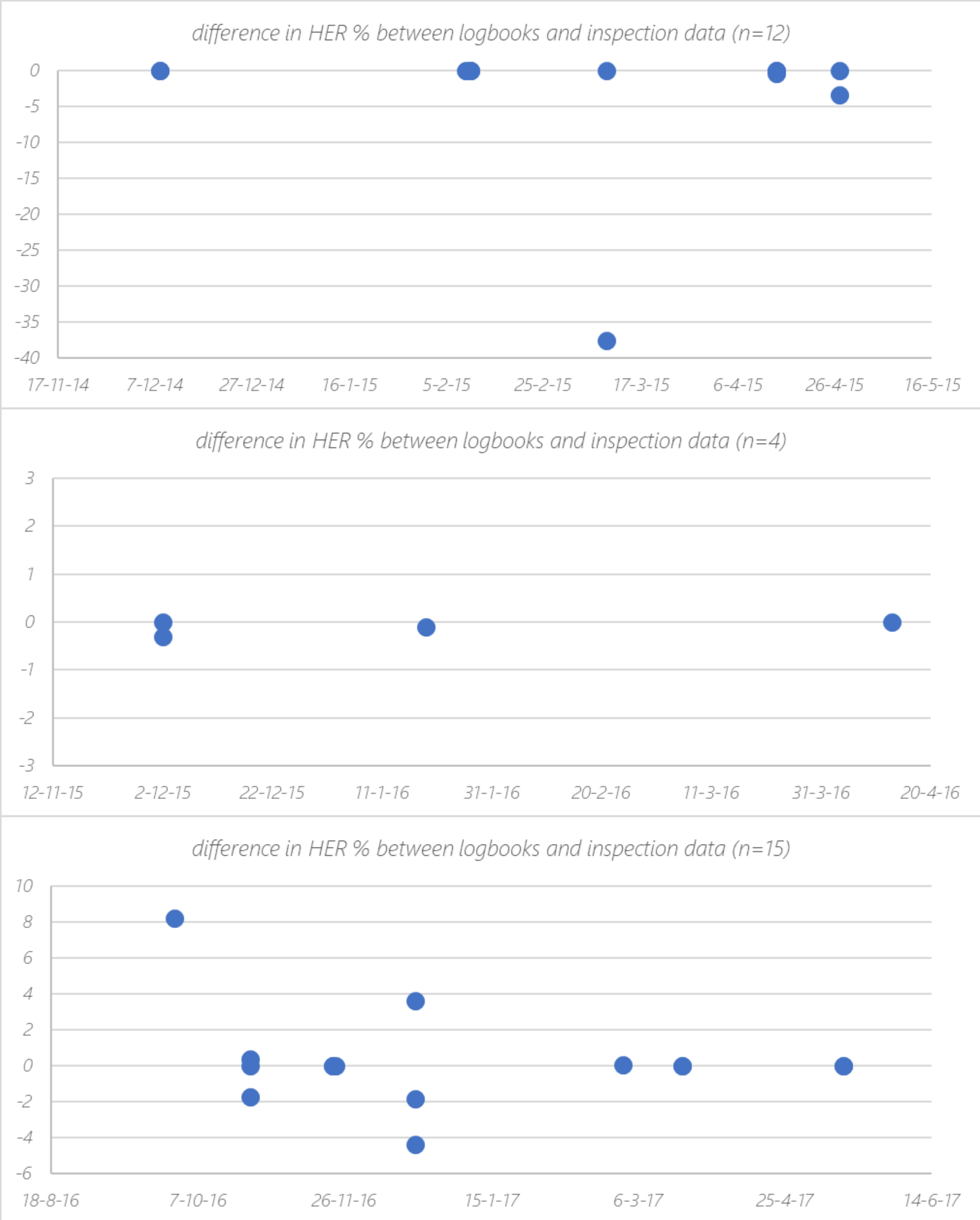

Figure 3.3.6: difference in herring percentage between logbook and inspection data, split by date for the seasons 2014-2015, 2015-2016 and 2016-2017

For the seasons 2017-2018, 2018-2019 and 2019-2020 we observe in early 2018 the most extreme positive difference, for which no herring appear in the inspection data. A 30% positive of herring in October 2018 corresponds to a higher proportion of sprat in inspection data. Reversely the negative difference in March 2020 corresponds to a higher proportion of sprat in the logbook (Figure 3.3.7).

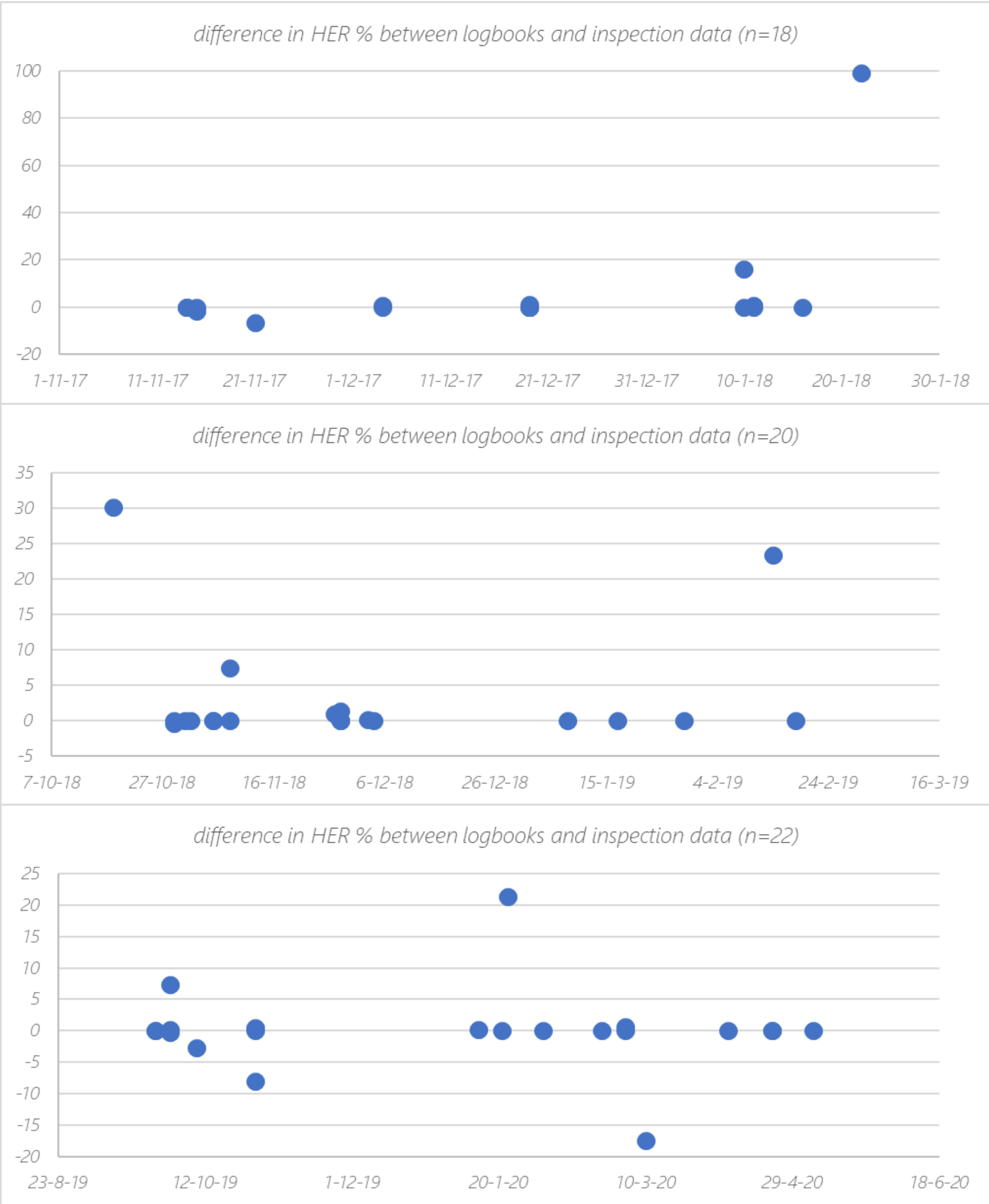

Figure 3.3.7: difference in herring percentage between logbook and inspection data, split by date for the seasons 2017-2018, 2018-2019 and 2019-2020

The 50% positive difference in October 2020 is due to a near absence of sprat in logbook data, and the 31.5% positive difference in November 2021 is due to a higher proportion of herring in the logbook data (Figure 3.3.8).

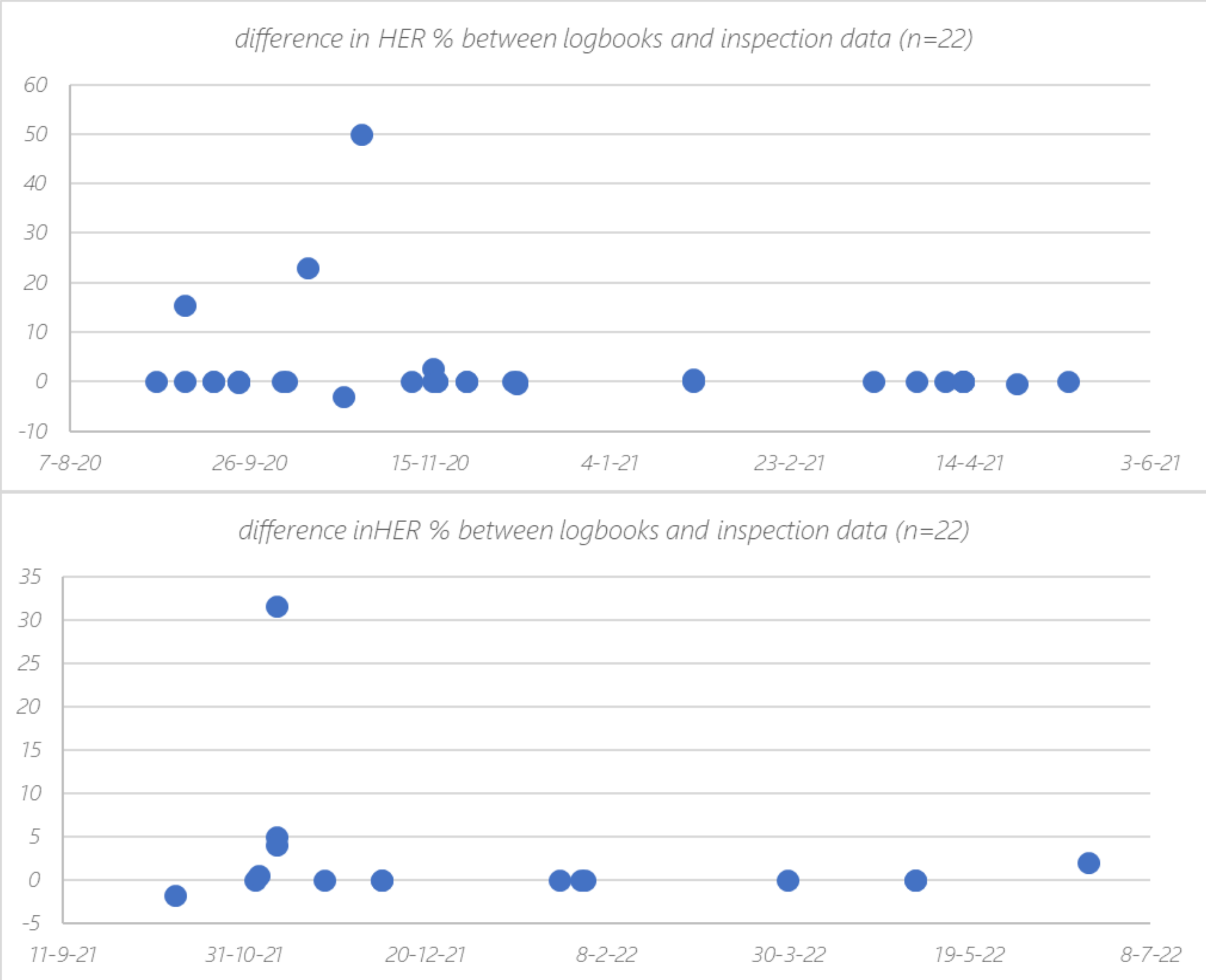

Figure 3.3.8: difference in herring percentage between logbook and inspection data, split by date for the seasons 2017-2018, 2018-2019 and 2019-2020

Discussion, pending issues and advice to the benchmark

The differences observed do not show any temporal pattern, neither in terms of seasonality nor in terms of year. We do not identify a pattern of over-declaration of one species versus the other to adjust *a posteriori* the catch to the available quota, i.e. these data do not suggest any intended misreporting. However, the most extreme discrepancies correspond to rare cases where one species was absent or near absent in either the logbook data or the inspection data, which might also be due to human error i.e. unintended skipping a number when reporting. Additionally, we noticed several cases in which the respective *proportions* of herring and sprat match between the logbook data and inspection data whereas the *amounts* do not, and other cases in which the amounts (and therefore proportions) match. To clarify these issues, we will need further exchanges with the personnel of ELY-Keskus in charge of the inspections. This was not possible for this deadline due to the leave *sine die* of the contact person in ELY who provided the inspection data, and the unavailability of other personnel potentially contributing to this task (no reply to the messages sent so far). Although we hope to get feedback before the WGBFAS meeting, we cannot guarantee that we will.

- ***Should data be updated or not***

Considering the information we have at this stage, the data should be kept as such. Pending further clarifications to be obtained from ELY-Keskus, data may require some minor update.

- ***Are there particular years / periods in the time series that are more or less trustworthy than others***

The differences observed do not show any temporal pattern

3.4. Germany

Fishery

The German fishery for Baltic sprat and Central Baltic herring is mainly used for industrial purposes. The quota share of Germany of the CBH and Baltic sprat EU quota is <1% and <5%, respectively. Two trawlers (>40 m LOA) take most of these fishing opportunities. They fish from SD 25 to SD 29 and land their catches usually in Denmark. In addition, a small number of mid-sized trawlers fish in SD 25 on both stocks. Until 2021 sprat was bycaught in the pelagic trawl fishery targeting Western Baltic spring spawning herring off the island of Rügen (SD 24) (the trawl fishery is closed since then). And a few trawlers caught minor amounts of sprat in SD 22.

Approach taken to analyze if there are errors in the time series of catch data due to inadequate reporting of species and/or other reasons

Two approaches were taken to check the official landings data of the German fishing fleet for species misreporting:

1. Check official landings declarations and logbook entries and compare them with Danish control data, covering the last five years.

2. Compare species compositions from co-sampling of the commercial trawlers analysed by Thünen-OF and compare them with the species composition reported by the vessels (landings declaration and logbooks).

Main outcomes of the analysis done

No indication of misreporting was found in neither approach and for neither species or stocks. In most cases, control data, co-samples from the fishery and the official records did match with >95% similarity.

In some cases, the compared values differed, but could be explained after consulting the logbook entries and feedback from the fisheries control authority in Denmark:

1. **Differences between Danish control data and official landings records**: A total of 48 trips, covering the years 2019 to 2021, was compared (Fig.1-3). Of the 48 trips, 4 trips showed a <95% similarity in species composition (Fig. 1 to 3, blue squares). Two trips (one in 2019 and one in 2021) had a larger herring ratio in the sales notes than registered by the control data. In both cases, the trip was done with a partner vessel, conducting a pair trawl (PTM) and landings were assigned between vessels based on quota availability and agreements between the vessels. Two other trips in 2020 (also

PTM) swapped landings in the respective landings' declarations, possibly due to similar reasons (quota restrictions or internal agreements between the vessels).

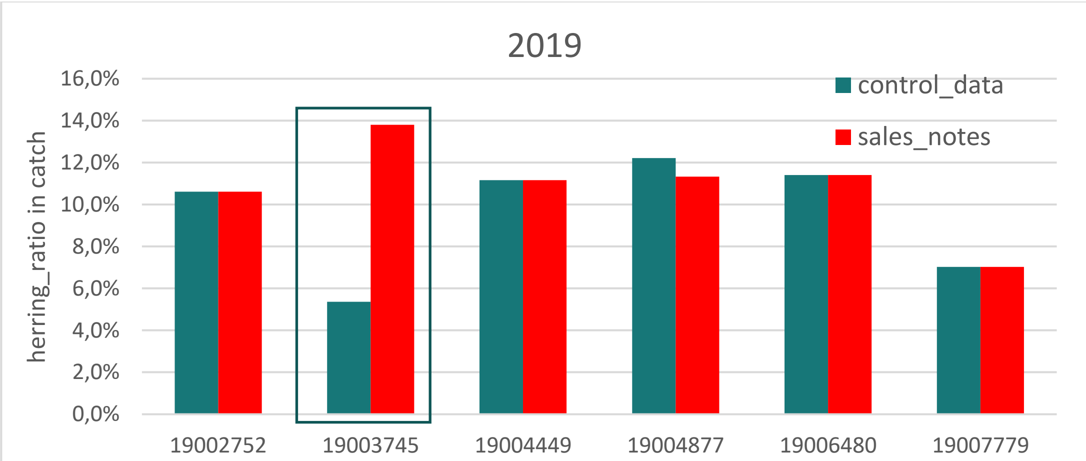

Fig. 1: Ratio of herring in Danish control data (blue) vs. official sales notes (red) in 2019. Trip with a low similarity is marked.

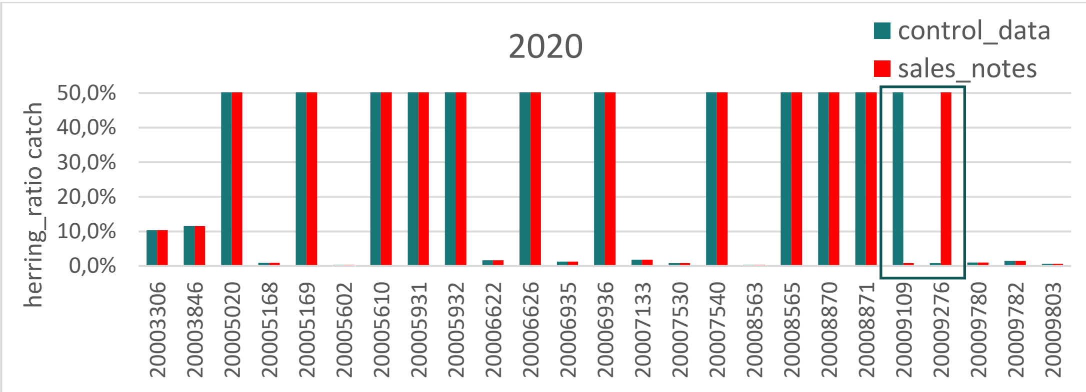

Fig. 2: Ratio of herring in Danish control data (blue) vs. official sales notes (red) in 2020. The Y-axis was cut at 50% to better display the trips with a low herring ratio. Trips with low similarity are marked.

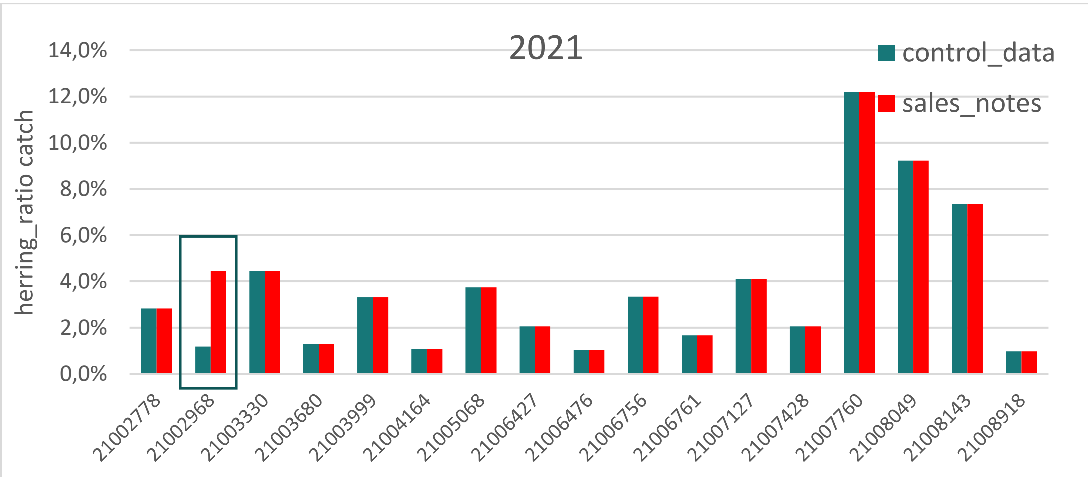

Fig. 3: Ratio of herring in Danish control data (blue) vs. official sales notes (red) in 2021. Trip with a low similarity is marked.

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2. **Differences between co-samples from the fishery and official landings records:** A total of 32 trips, covering the years 2019 to 2021, was compared (Fig.4-6). Of the 32 trips, 11 trips showed a <95% similarity in species composition (Fig. 4 to 6, blue squares). Most differences could be assigned to the design of the co-sampling where the fishery collects an unsorted catch sample in a 5 kg bucket from each trip. Each co-sample from the fishery is analysed in detail by Thünen-OF using fisheries biology standards. This amount is sufficient to provide useful biological data for sprat (and CBH when present) but cannot provide unbiased results on species mixing from different hauls taken during a trip.

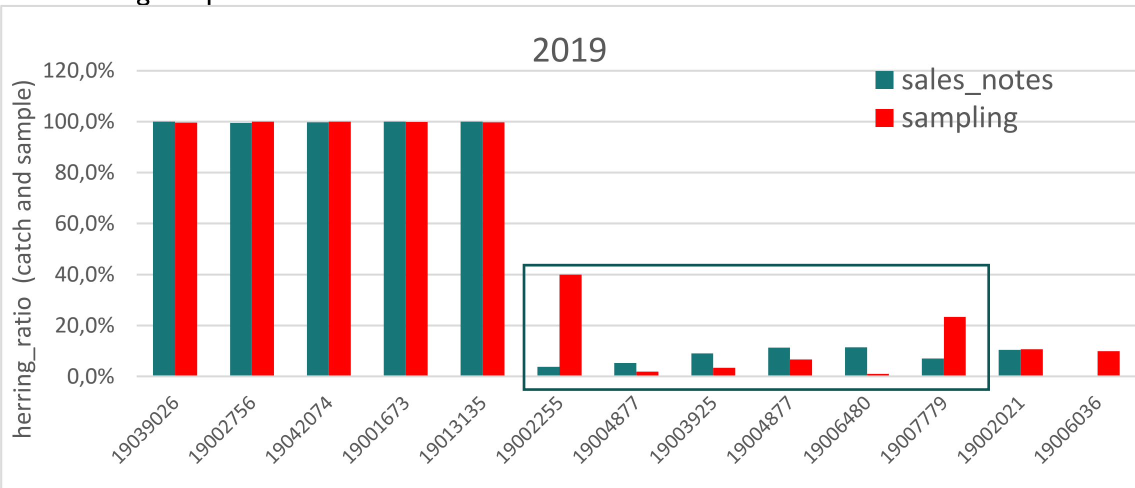

Fig. 4: Ratio of herring in official landings data (blue) vs. co-samples from the fishery (red) in 2019. Trips with a low similarity are marked.

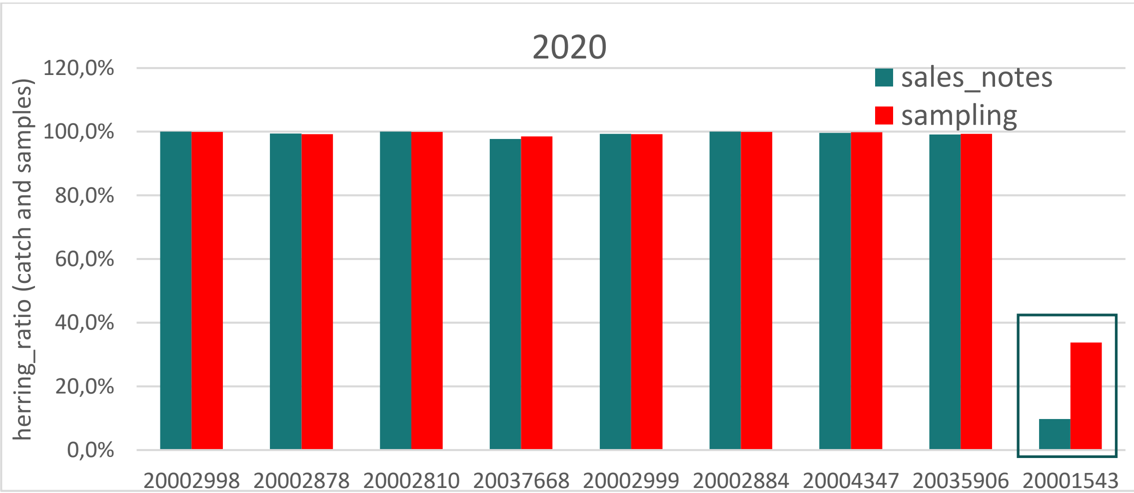

Fig. 5: Ratio of herring in official landings data (blue) vs. co-samples from the fishery (red) in 2020. Trip with a low similarity is marked.

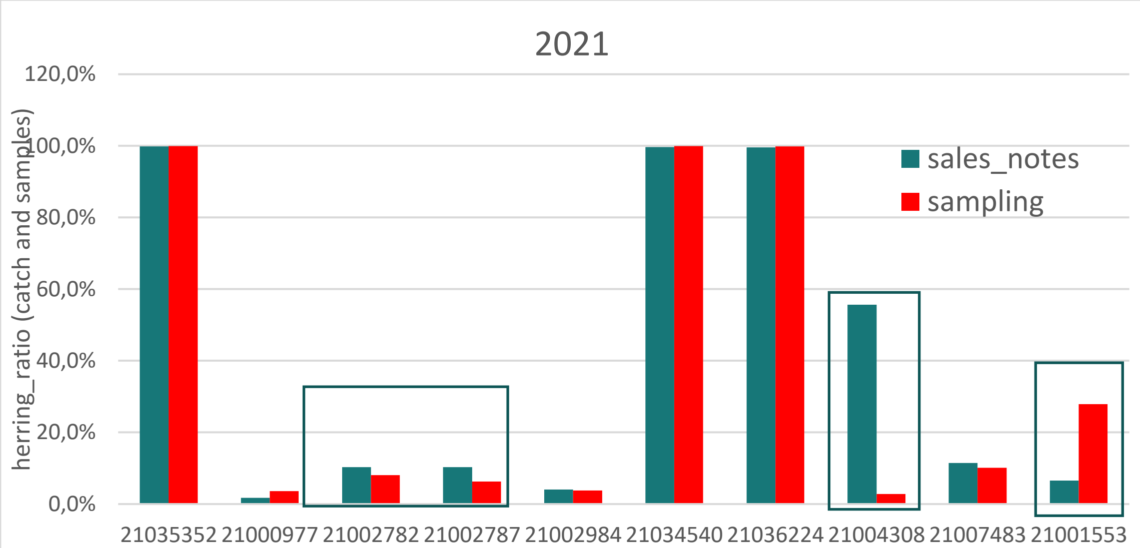

Fig. 6: Ratio of herring in official landings data (blue) vs. co-samples from the fishery (red) in 2021. Trips with a low similarity are marked.

Advice to the benchmark

No evidence of misreporting has been found for the two major German vessels targeting Central Baltic herring and Baltic sprat. The benchmark group can therefore use the submitted data without adjustments or changes.

3.5. Latvia

Fishery

The Latvian fishery for sprat and herring in the Baltic is mainly used for human consumption. Latvia has a relatively small part (<4 %) of the Central Baltic herring quota and for Baltic sprat, Latvia has approx. 12 % of the quota. The relative Latvian quota share has changed over time and in 2021 around 87 % of the total sprat and herring quota in the Central Baltic was related to sprat (Figure 3.5.1).

3.5.1. The relative share of sprat and herring quota in the Latvian Central Baltic fishery (excluding SD 28.1 (Gulf of Riga)).

Latvian pelagic fishery is mainly conducted with pelagic trawls targeting sprat or herring (métiers OTM_SPF_16_31_0_0 and OTM_32_104_0_0). Most landings are taken in ICES SD 28.1 and 28.2 showing differences between both regions – in SD 28.1 (Gulf of Riga) main target stock is the Gulf of Riga herring, whereas in SD 28.2 (Central Baltic) main stock is sprat (Figure 3.5.2). Herring in the Gulf of Riga has a separate management unit. Herring fishery in the Gulf of Riga is performed, using both trawls and trapnets. Herring catches in the Gulf of Riga include the local Gulf of Riga herring and the Central Baltic herring, entering the Gulf of Riga for spawning. Discrimination between the two stocks is based on the different otolith structure due to different feeding conditions and growth of herring in the Gulf of Riga and the Baltic Proper. The Latvian fleet also takes Gulf of Riga herring outside the Gulf of Riga in Subdivision 28.2. In 2021 these catches were 775 t.

In 2020 Latvian fleet consisted of 49 registered offshore vessels (12–40 m) and 603 coastal vessels (< 12 m).

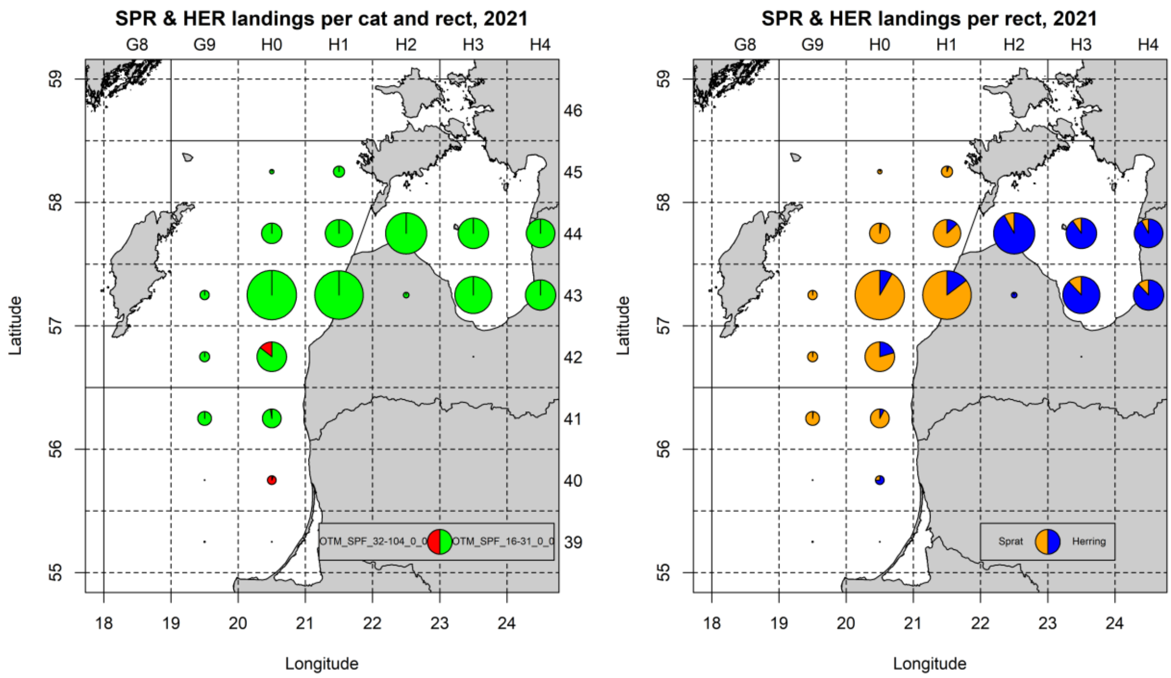

Figure 3.5.2. Sprat and herring landings in 2021 from Latvian vessels by métier and species.

Approach taken to analyze if there are errors in the time series of catch data due to inadequate reporting of species and/or other reasons

Latvian logbook data were compared with Danish control samples provided by the ISSG Small Pelagic group. In total 69 matching trips were identified for the analysis and covered the period from 1998-2019. The majority of samples were from SD 25 near Bornholm (Figure 3.5.3).

Another source of information was Latvian fishery sales notes from Denmark ports which were compared to Latvian logbook data.

Additional information was also asked from the Latvian control agency. Latvian control agency is conducting regular controls to determine the accuracy of the species composition and weight of landed fish.

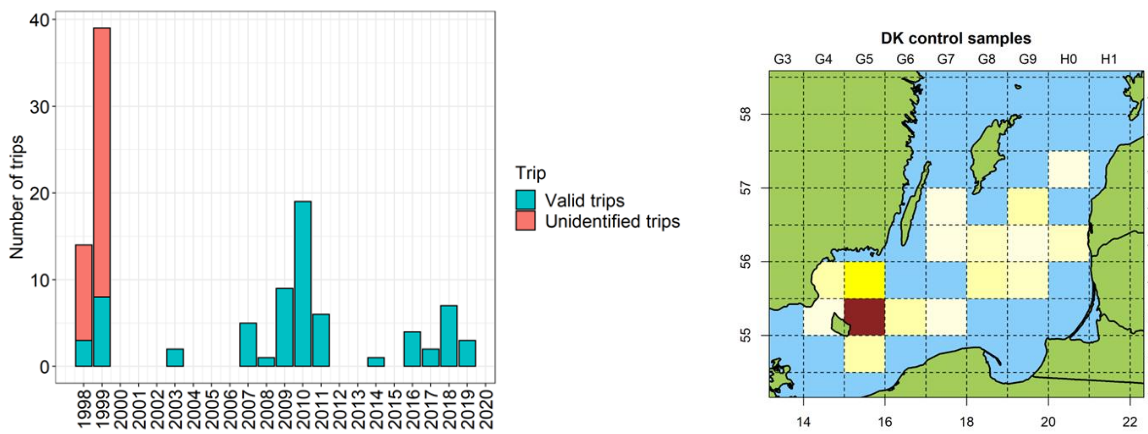

Figure 3.5.3. Coverage of Latvian pelagic fishing trips in Danish control samples.

Main outcomes of the analysis done

Total landings seem quite consistent between Danish control samples and Latvian logbook data. Only 6 trips have a difference larger than 10 %. In the analysed period 91.3 % of trips have a difference of less than 10 %. Fluctuations show no clear trend (Figure 3.5.4).

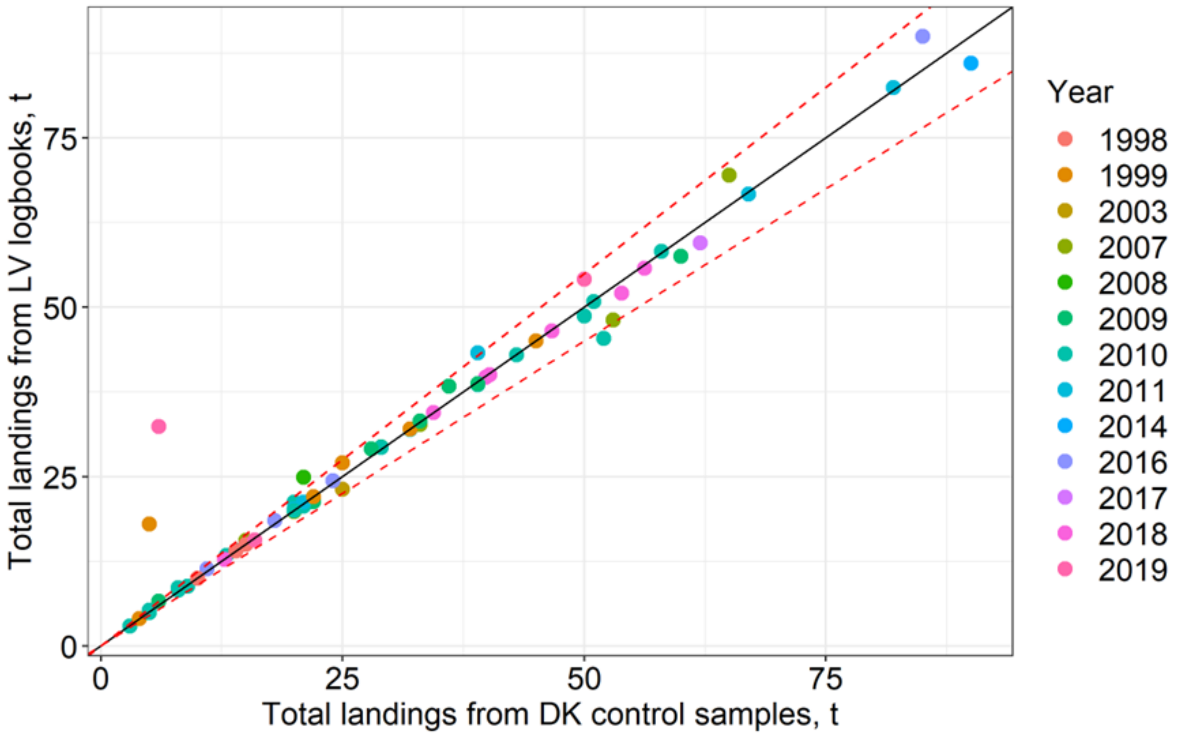

Figure 3.5.4. Relationship between total landings per trip estimated by Danish control samples and Latvian logbook data (1 dot = 1 trip). The middle black line represents a 1:1 ratio. Red dashed lines correspond to a 10 % range.

Sprat landings seem consistent between Danish control samples and Latvian logbook data. In the analysed period 84.1 % of trips have a difference of less than 10 %. Fluctuations have no clear trend. For herring differences are larger, however, herring overall landings are significantly smaller than sprat, thus differences by landing weight are considered negligible compared to the total weight of pelagic landings (Figure 3.5.5).

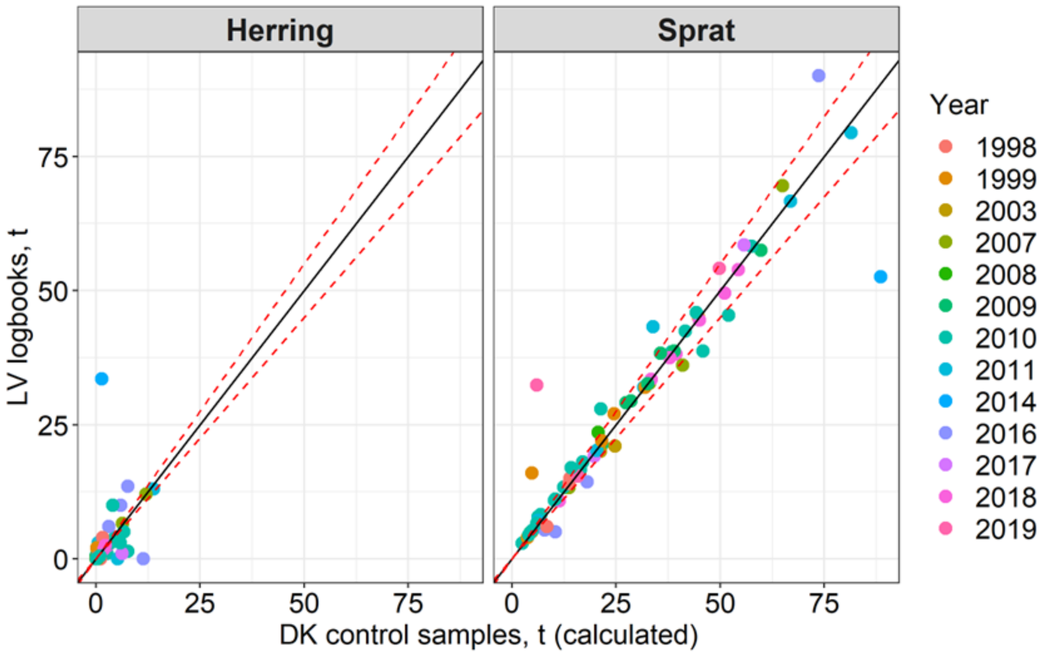

Figure 3.5.5. Relationship between herring and sprat landings per trip estimated by Danish control samples and Latvian logbook data (1 dot = 1 trip). The middle black line represents a 1:1 ratio. Red dashed lines correspond to a 10 % range.

Sales notes show good consistency and in most cases are in line with Latvian logbook data. Few observed differences are likely due to typing errors (Figure 3.5.6).

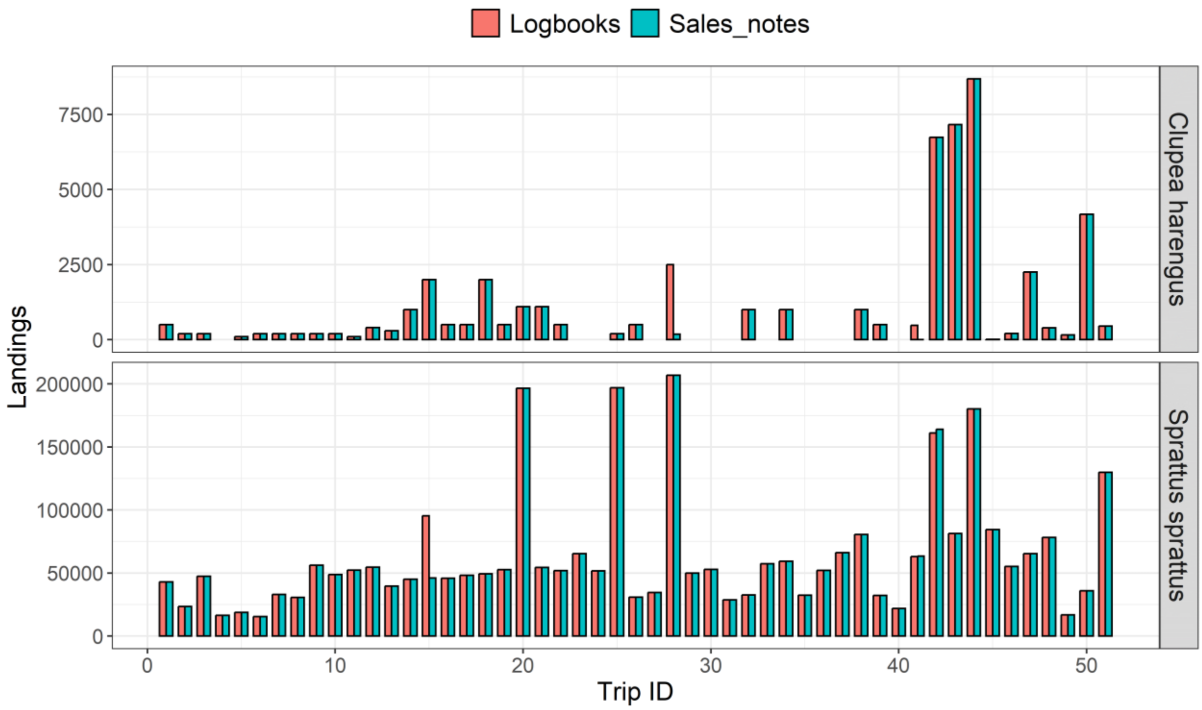

Figure 3.5.6. Comparison between Latvian landing data in sales notes (Denmark) and Latvian logbooks (51 trips in 2019-2022).

According to received information from the Latvian control agency, the agency controls the accuracy of species composition determination and landing weight estimation. Thus, no separate biological samples are taken by the agency and there are no additional data for the analysis. Although fishing trips with agency participation can be identified, analysis of overall control intensity and potential differences when comparing with trips without agency oversight were not analysed at this point.

Advice to the benchmark

***The national data to not be updated* as there are no indications after the analysis that data can be improved. The country will not provide new time series.**

3.6. Lithuania

Fishery

Lithuania has 5% of Baltic sprat and 2.6% of Central Baltic Herring (CBH) quotas. Relative share of SPR vary from 64 to 89 percent depending on TAC allocated by EU Regulations. (Fig3.6.1.)

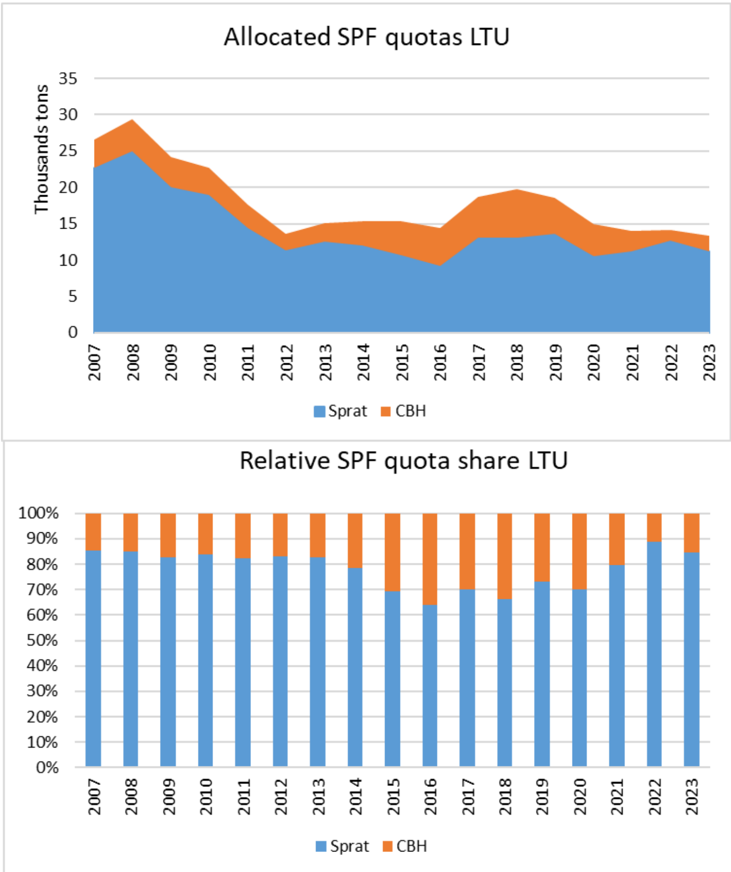

Figure 3.6.1. Allocated SPF quotas and relative sprat rate (blue) in the Lithuanian Baltic fishery.

Trawlers with LOA 24 meters and more are taking about 95% catches of SPF. They are fishing in subdivisions 25, 26, 28.2 and 29 (Fig.3.6.2). Sprat takes the biggest share of catches in almost all ICES statistical rectangles, except 40H0 (close to Lithuanian coast) herring takes the biggest share of catch.

Up to 5% of herring and very tiny quantity of sprat is fished by small scale fishing vessels mainly with fyke-nets. All these catches are landed for HUC in Lithuanian ports.

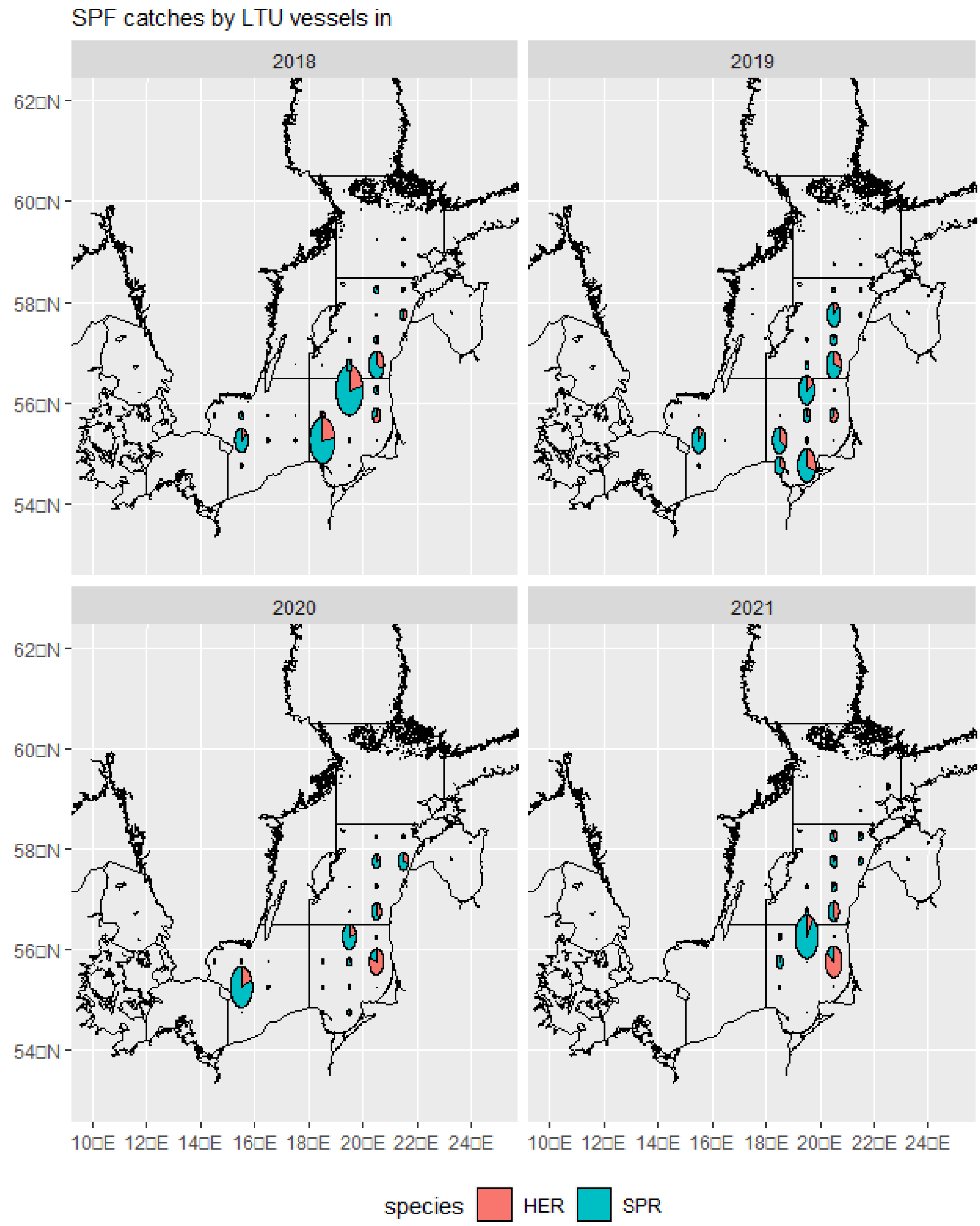

Figure 3.6.2. SPF catches by Lithuanian vessels in 2018-2021 by CES statistical rectangles

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Despite that most of SPF catches are made in eastern part of Baltic Sea most of SPF catches are landed in Denmark (Fig.3.6.3). Less than 1% of total SPR catches are landed in Lithuania (Klaipeda port). Until introduction ban for direct fishing for Eastern Baltic cod, about 10% from total HER catches were landed in Lithuania. Then in 2020 – 2021 share of HER landings in Lithuania increased up to 50% from total landings, however from 2022 Lithuanian trawlers shifted to do landings in foreign ports again.

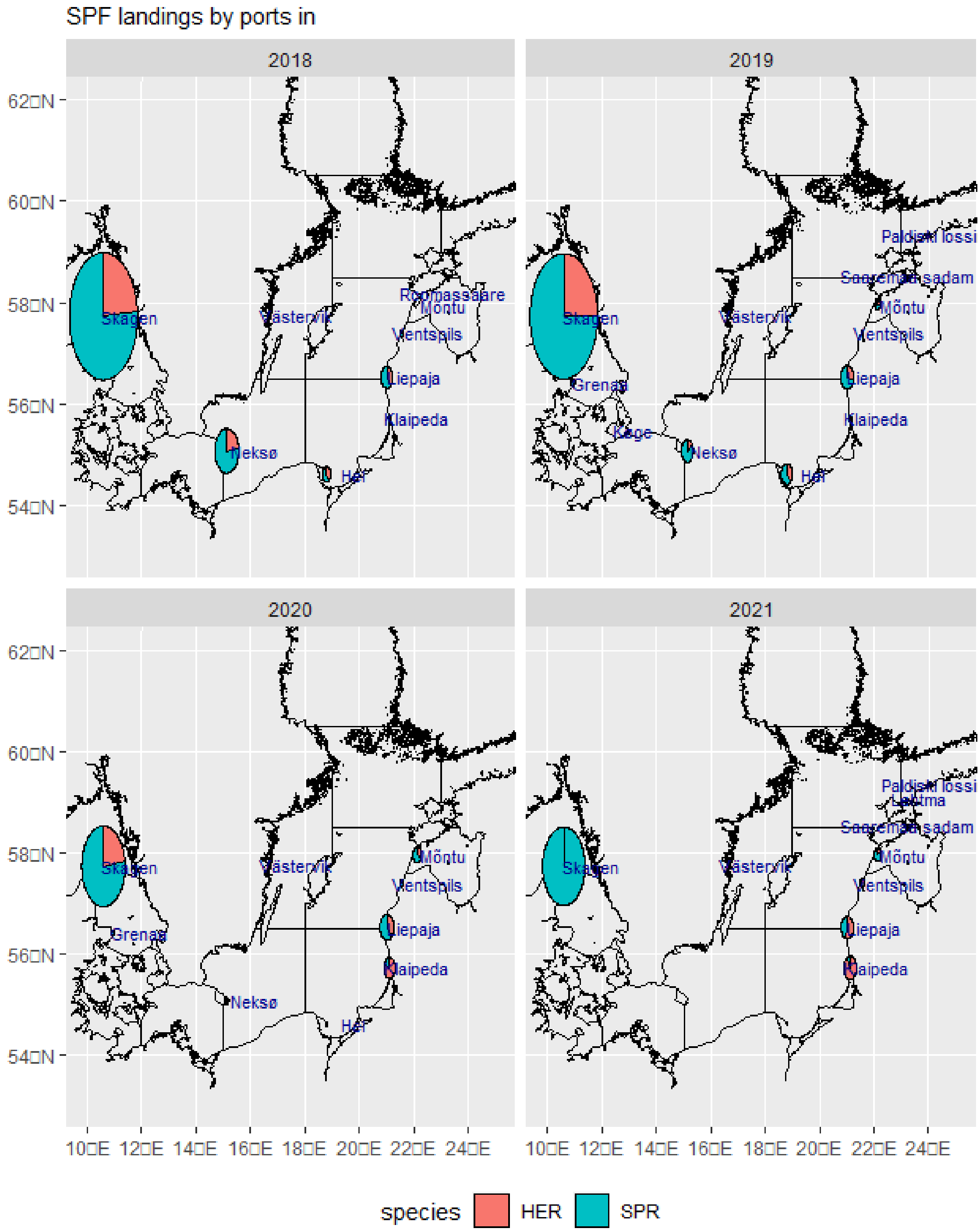

Figure 3.6.3. SPF landings from Lithuanian vessels in 2018-2021

Before 2004 the Lithuanian fishery for sprat and herring (SPF) in the Baltic was mainly for human consumption and most of landings were made in Lithuania. From about 2007 sprat started to fish mainly for industrial purposes and landed mostly in Denmark. Direct fishing for sprat for industrial landings (IND) is conducted with vessel with LOA 24 and more meters using trawls with mesh size 16 mm. Bycatch of herring caught by these gears is landed for IND. Most of IND landings are made in Skagen. Trawlers with mesh size 36 and 40 mm are fishing for herring for human consumption (HUC). Landings for HUC are made in Lithuania, mostly, and in Latvia (Fig.3.6.4).

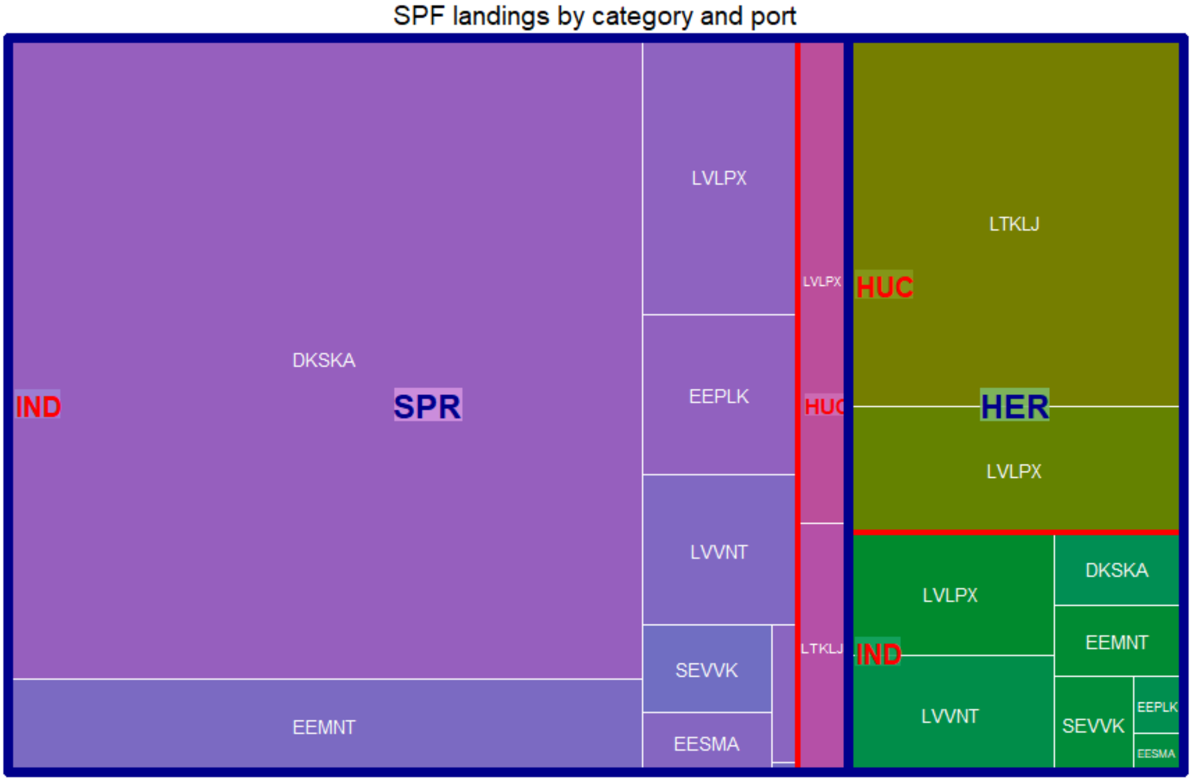

Figure 3.6.4. Distribution of SPF landings by species, landing category and landing port in 2021.

Approach taken to analyze if there are errors in the time series of catch data due to inadequate reporting of species and/or other reasons

Fisheries Service under Ministry of Agriculture (FS) is responsible for collecting logbook, landing declaration and sales notes data. FS is responsible for control of quota uptake.

Landing declaration figures are used for quota uptake control from 2004. If some inconsistences detected during import of landing declaration data corrections can be made only after consulting of master or owner of the vessel concerned. It is the possibility to update/correct figures in the data system if master of the vessels provides reasonable proofs and in the reasonable period. Any other corrections are illegal. Scientific analyses and estimations of catches or landings my be used for discussions, but not as a basis for correction of official landing figures, except if it was court decision.

Earlier (1992-2004) figures from monthly reports (paper format) were used for quota uptake. These reports were based on logbook figures, and it was vessel owner's responsibility to ensure reliability of these reports.

Cross checks between logbook and monthly report figures were made regularly. Unfortunately, most of these primary data were lost during the transition period and are not imported in the present data system.

Overview of data sources used when submitting data from the Baltic to WGBFAS			
MS	**Landing category**	**Time period**	**Data source**
Lithuania	All categories	2004 – present	Landing declarations – available in data system.
		1992-2003	Paper monthly reports, not imported in the data system.
		Before 1992	No clue

As it was sated earlier most of SPF landings are made abroad. Only landings for HUC are made in Lithuanian ports therefore, sampling for catch composition of these landings does not adequately cover the whole SPF landings which are mostly designated for IND.

To achieve better sampling coverage cooperation with data collection institutions in Denmark is ongoing. Thanks to this cooperation, analysis of catch composition of industrial landings made by Lithuanian vessels in Danish ports in the period from 2009 to 2020 was done. Results of this analysis are provided to ISSWG "CS small pelagic in the Baltic" in 2021. However, according to Lithuanian law these estimations could not be used for correction of official landing figures.

3.7. Poland

Fishery

According to the current fishing opportunities in the Baltic Sea for 2023, Poland has about 25% of the EU quota for central Baltic herring and 29% of the sprat (Regulation (EU) 2022/2090). Most of the Polish herring catches come from ICES subdivisions 25 and 26 and midwater trawlers. These herring catches are mainly directed toward human consumption. Herring is also fished in the coastal areas and lagoons (Vistula Lagoon, Szczecin Lagoon) by small-scale fishery using trapnets and gillnets, but the contribution of these catches typically constitute less than 10% of the total Polish herring catches. Most of the Polish sprat catches are taken by midwater trawlers for industrial purposes.

Approach taken to analyze if there are errors in the time series of catch data due to inadequate reporting of species and/or other reasons

A misreporting of central Baltic herring and sprat can exist, and where possible, it is partly accounted for by Poland. Historically, when the data on the bycatch of small herring in the sprat catches were considered representative, the correction of the Polish catches reported to the WGBFAS has been made. Based on the case-by-case expert assessment, when representative data collected by the onboard observers from a given ICES subdivision and quarter were available, corrections have been made. The estimated proportion of herrings in the sprat landings has been used to correct the input figures on the national level and provide as accurate data as possible for assessment.

In line with ICES CM 2012/ACOM:10: WD 5 Walther et al., it is hard to make an accurate estimate on the proportion of herring and sprat in the landings from industrial trawl fisheries with small meshed trawls. These types of trawlers account for the majority of Polish catches. According to the current legal regulations, the permitted margin of tolerance in estimates recorded in the fishing logbook of the quantities in kilograms of fish retained on board shall be 10 % for all species (Article 14(3) of Regulation (EC) No 1224/2009). However,

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by way of derogation from Article 14(3) of Regulation (EC) No 1224/2009, for catches that are landed unsorted the permitted margin of tolerance in estimates recorded in the fishing logbook of the quantities in kilograms of fish retained on board shall be 10 % of the total quantity retained on board (Article 13 of Regulation (EU) 2016/1139). This mainly affects estimates of the catches obtained by trawlers, especially using Refrigerated Sea Water (RSW) systems.

The data used to report official catches are based on the amounts registered in logbooks and not on landing declarations or sales slips. This approach results from the data analysis which has shown that catches registered in logbooks are more accurate. In addition, this information is more detailed in terms of fishing area, gear, time, etc., which is important for the level of data aggregation required by the ICES assessment WGs.

Not all fishing vessels are controlled for the adequacy of the reported catches. The controlling agency has the discretion to determine whether or not to collect biological samples for species composition and weight determination through visual inspection. Not every inspection event will result in the collection of samples. If discrepancies are found between the logbook and the inspection results, the agency may recommend the skipper update the logbook to match the inspection findings. When the data is updated, the corrected information will be reported to ICES for reporting purposes. However, it is not possible to track whether the data was corrected or not.

As part of the DCF, Poland constantly conducts at-sea observed trips from all types of fisheries. Samples collected at sea are considered to be more reliable than those collected on shore. Therefore at-sea sampling data were used in the main analysis of misreporting. However, a comparison of the results with the data obtained by the foreign controlling agency confirmed the trends observed in the Polish data.

The analysis of misreporting of herring and sprat consisted of the following steps. First, data from at-sea observed trips targeting pelagic species in the period 2013-2020 were extracted from the database. The catch composition at a trip level was then calculated. The dataset was combined with official catch statistics from the same trips, which allowed us to compare the shares of different species in total catches. The results were visualized on a set of plots presented below.

Main outcomes of the analysis done

- Typically, one species (herring or sprat) is dominating in the catches of fishing vessels from which biological samples have been obtained (Fig. 3.7.1).
- Overall, there is a relatively good agreement between % of species observed by the onboard observers and reported by fishers. Most of the points in the density plots are located close to the extremes (0 or 100% contribution) with relatively low deviation (Fig. 3.7.1). If the misreporting is present, it is skewed towards overreporting the herring catches, and rarely the opposite situation is observed (overreporting of sprat).
- When misreporting at higher levels (>10%) occurs, it is mainly observed in the fishing vessels that report the lowest total catches in the given trip (Fig. 3.7.2).
- Overall, through the years, the median differences in the percentage of species observed and reported in both species are within the range of ~2.5%, except in 2019, when a higher level of misreporting was observed (Fig. 3.7.3). This pattern can be partially caused by the overrepresentation of single fishing vessel selected for biological sampling, which may result in biased results.

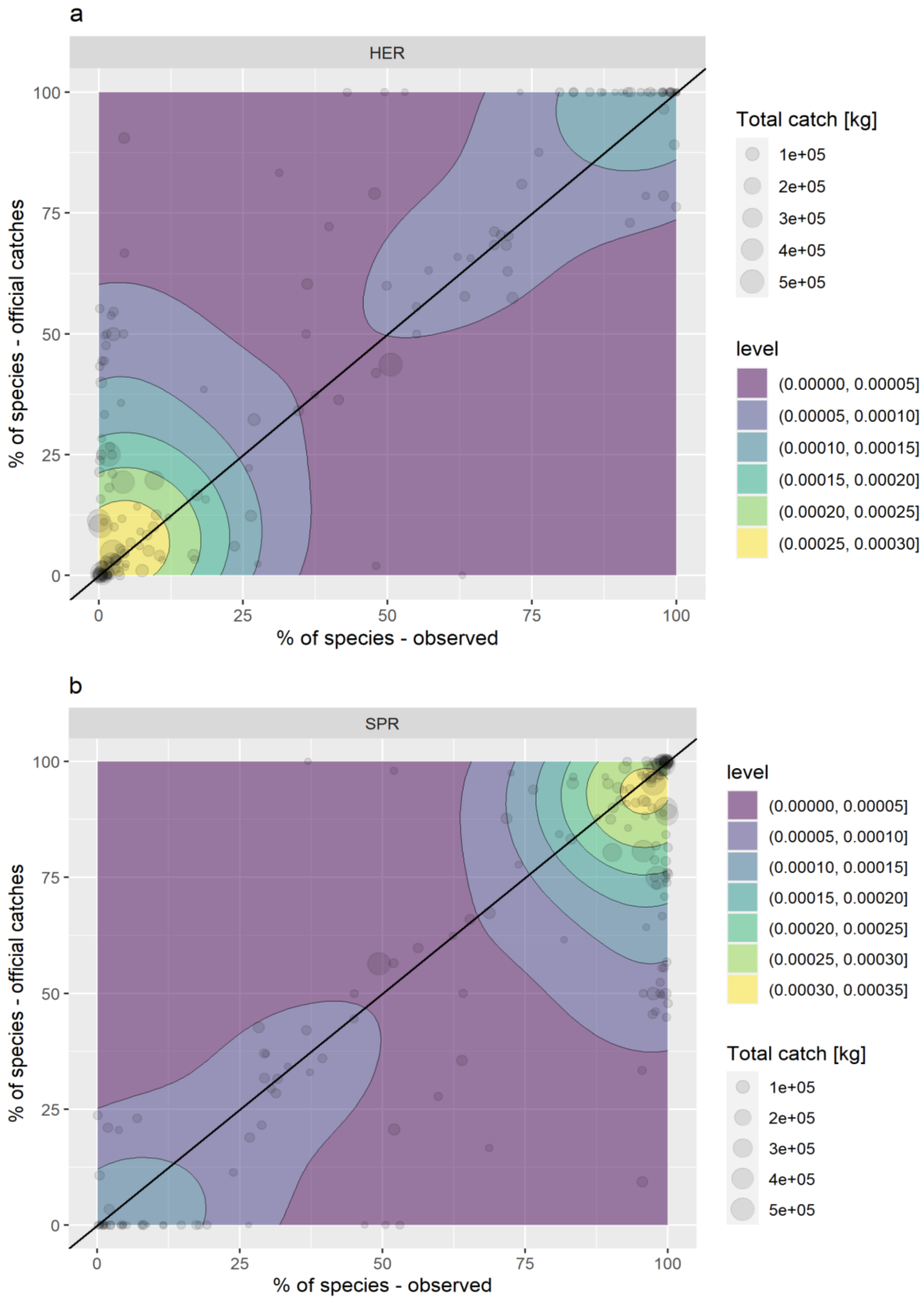

Fig. 3.7.1. 2D kernel density of the percent of herring (a) and sprat (b) observed and in official catches. The distribution of points was visualized using ggplot2::geom_density_2d function. The color gradient indicates the density of points, while the size of points indicates the total catch of the fishing vessel in the given trip.

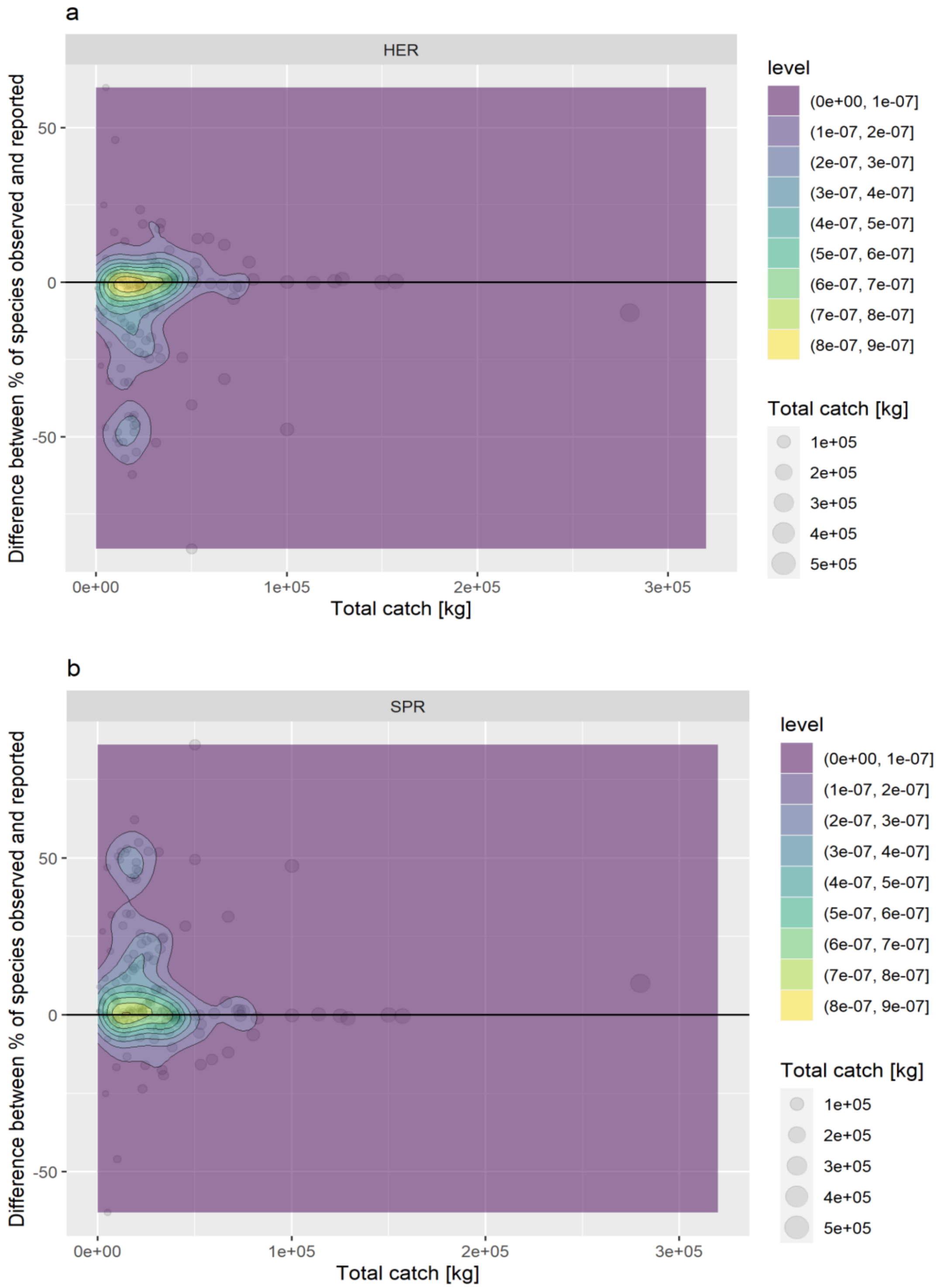

Fig. 3.7.2. 2D kernel density of the difference between the percentage of herring (a) and sprat (b) observed and reported as a function of the total catch of the fishing vessel in the given trip. The distribution of points was visualized using ggplot2::geom_density_2d function. The color gradient indicates the density of points, while the size indicates the fishing vessel's total catch in the given trip.

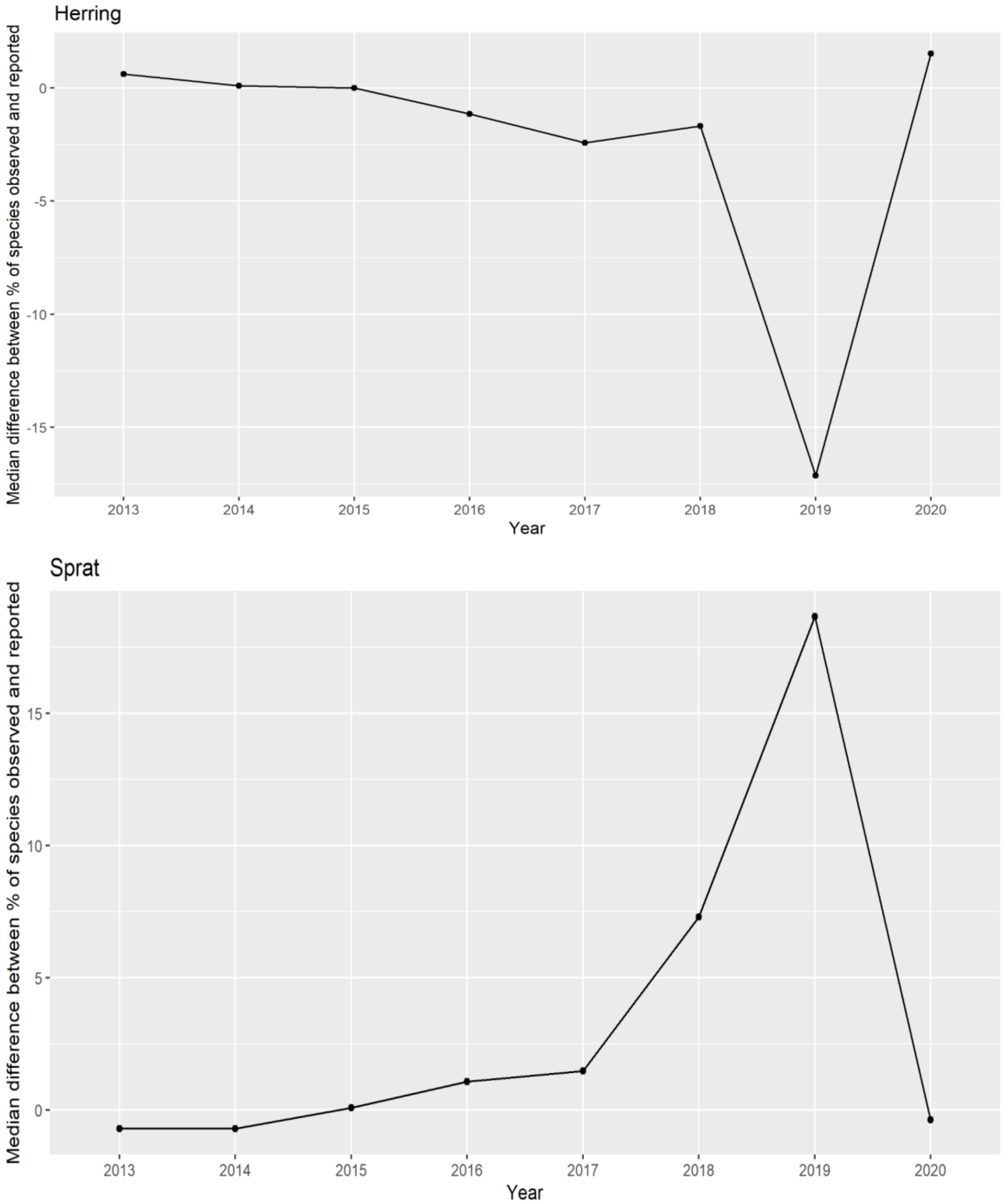

Fig. 3.7.3. Time series of the median difference between the percentage of species observed and reported in herring (upper panel) and sprat (lower panel).

Advice to the benchmark

- *The national data to not be updated* as there are no indications after the analysis that data can be improved. The country will not provide new time series.
- A higher level of misreporting was observed in 2019, after which the misreporting in 2020 moved back to the acceptable level of ~0%. The precise causes of this pattern are not known. It might be

related to the ratio of the quota in herring and sprat or be a product of chance (poor representativeness of the samples). However, that year was indicated as potentially less trustworthy than others.

3.8. Sweden

Fishery

Sweden has about 33% of the EU quota for central Baltic herring and 19% of the sprat. Presently, most of the catches are taken by trawlers that fish herring and sprat for industrial purposes and land in Denmark. Smaller-scale coastal fisheries targeting herring for human consumption also take place and have strong cultural significance even if not large landings.

Approach taken to analyze if there are errors in the time series of catch data due to inadequate reporting of species and/or other reasons

A set of unsupervised anomaly detection techniques was used to try detecting the possible presence of misreporting in the Baltic small pelagic fishery for Herring and Sprat and quantify it.

The datasets used in analysis contained information relative to the study area (Subdivisions 27.3.d.25,…,27.3.d.32, excluding 27.3.d.28.2, 27.3.d.30, 27.3.d.31) in a 22 year time-span (1999-2021). Commercial data included logbook data as well as landing declaration data. Logbooks contain information in time and space on the effort (e.g. vessel and gear features) and the species caught (quantities, taxonomy, contribute of the species to the catch, among the others), being the primary source of commercial information submitted to stock assessment. Landing declarations are generally considered a more accurate estimates of the amount landed by the fishermen but, because the integrate the output of sometimes long trips, taking place over multiple subdivisions, they frequently do not have the spatio-temporal resolution needed by end-users and required for more sophisticated anomaly detection. Environmental information was also considered, namely main temperature at a specified depth interval (-15 to -45 meters) for the Baltic Sea extracted from a pre-existing model (CMEMS Baltic Sea Physical Reanalysis BALTICSEA_REANALYSIS_PHY_003_011, Liu, 2019) and bathymetry information extracted from NOAA databases (ETOPO Global Relief Model, NOAA 2022). Finally, information on the TAC was compiled for the years 1997 to 2020 and merged to the remaining data.

The analytical approaches used in this study include the application of the Newcomb-Benford Law (NBL, for a complete review see Nigrini, 2012) and the application of both regression based (RB here-after) and Isolation Forest algorithms (IF here-after Liu, 2008).

NBL was applied both to logbook data and to landing declarations in order to highlight the possible presence of anomalies in the data overall. In the NBL analysis approach First (F1T here-after) and First Two digits (F12T here-after) tests were used to determine whether the data were consistent or not with the NBL model (Nigrini, 2012). In particular, mean absolute deviation statistic (MAD here-after, Nigrini, 2012) statistic was used (as in Silva Azevedo et al., 2021) with critical cut-off scores reported in Nigrini and Drake (2000).

First Digits	First-Two Digits	Conformity
0.000 to 0.006	0.000 to 0.0012	Close conformity
0.006 to 0.012	0.0012 to 0.0018	Acceptable conformity
0.012 to 0.015	0.0018 to 0.0022	Marginally acceptable conformity
above 0.015	above 0.0022	Nonconformity

Tab.3.8.1: Cut-off critical values of mean absolute deviation to assess the conformity of data to NBL (Drake and Nigrini, 2000).

Logbook data (filtered, n = 145680 records, all species included), did not conform to the NBL both at the F1T ($MAD = 0.016$) and at F12T ($F12T, MAD = 0.012$). Landing declarations of both Sprat and Herring (108747 observations) exhibited acceptable conformity at F1T (F1T, MAD=0.0077) but not at the F12T, (F12T, MAD=0.0035), (Fig. 3.8.1).

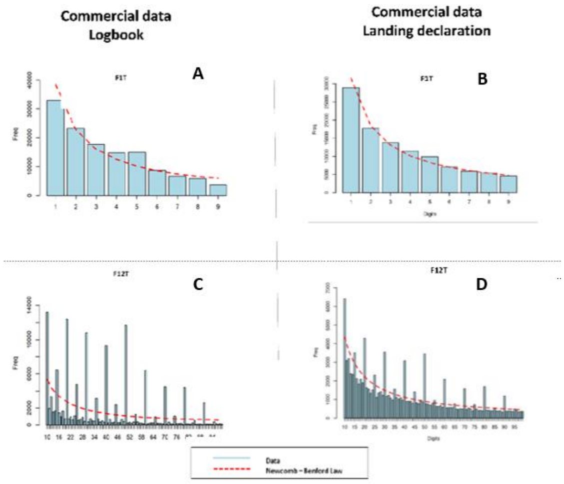

Fig.3.8.1: Digit analysis on commercial landing declaration catches of Herring and Sprat. Database unfiltered (145680 records) tested at first digit (F1T, case ´A´,´B´) and first-two digits (F12T, case ´C´,´D´) with second order test included in both case (SO1T and SO12T, case ´B´ and ´C´)

Unsupervised approaches were used in an attempt to estimate the amount eventually misreported . Information on space (e.g. subdivision), time (e.g. year, month), features of the boat (e.g. gear type), abiotic (e.g. bathymetry interval) and legislative environment (i.e. TAC) was included in the analysis. Data used encompassed most of the catches namely those of mid-water and bottom trawlers (PTM, OTM, PTB, OTB) landing in Denmark and Sweden. Observations were re-assigned in two main groups: Pelagic (aggregating PTM + OTM) and Bottom Trawlers (aggregating PTB + OTB) and split into two bathymetry classes: coastal (> -70 m) and offshore hauls (< -70 m).

The dataset used in IF analysis was stratified on the categorical variables (gear, ICES Subdivision, bathymetry class). Two different parameterization were tested: IFSB (from "Isolation Forest Basic Variables") and IFALL (from "Isolation Forest Basic Variables"). In IFSB the analysis was built using as features: Proportion of Herring, Quarter (ordinal, encoded), Year. Temperature, TAC for Herring and TAC for Sprat were included when IFALL was performed. In both settings, on each unit of the stratification presented, the algorithm was run by fitting 500 isolation trees and using a sample size equal to one fourth of the total number of observations in the level. A threshold of half of the possible anomaly score (anomaly score < 0.50) defined the inliers, while the outliers were furthermore divided in possible outliers (0.50 < anomaly score <0.55) and likely outliers (anomaly score > 0.55). Strata with less than 100 observations were not classified and the relative observed proportions were considered not anomalous.

RB approach was based on two modelling framework: Generalized Additive Models, GAM here-after (Hastie and Tibshirani 1986, see Wood 2006 for a complete review) and Generalized Additive Models for Location Scale and Shape (GAMLSS here-after, Rigby and Stasinopoulous 2006, see Rigby and Stasinopoulous 2017 for a complete review). A series of models was parametrized using the proportion of Herring in each haul as a response and a set of covariates including information on i) gear, ii) vessel, iii) time, iv) space, v) auxiliary effects. The models had the general formula:

$$\boldsymbol{Y} = \boldsymbol{\beta_0} + \boldsymbol{f_i}(\boldsymbol{year}) + \boldsymbol{f_i}(\boldsymbol{month}) + \boldsymbol{f_i}(\mathbf{lat},\ \boldsymbol{lon}) + \boldsymbol{f}(\boldsymbol{length}) + \boldsymbol{f_j}(\mathbf{vessel\_ID})$$

Where i defines intercepts (one for PT and one for BT), a random effect is assigned to the vessel call-sign. RB models were compared, when possible, by using the diagnostic Akaike Information Criterion (AIC), R- squared (R2) and the Cox & Snell Generalised (Pseudo) R-squared (R2cs), visual inspection of the residuals and a parsimonious approach (choose the simplest model i.e. with less knots). Two models performed best: Quasibinomial Generalized Additive Model (qbGAM, here-after) and Beta Zero and One Inflated GAMLSS (beinfGAMLSS here-after). Both are reported as these cannot be directly compared using the same diagnostics.
The inspection of residuals from these models found them to be normal only in certain cases (i.e. when z-scores for beinfGAMLSS as shown in Appendix Fig. 5 and on a lesser extent when scaled Pearson type residuals for qbGAM are considered as shown in Appendix Fig. 4).

Both models approaches were tested also using the de-trended qq-plot (worm plot). The results were not satisfactory: several points are falling outside the confidence band of the plot. The performance of the beinfGAMLSS against the worm plot had improved when fit complex splines (~ 200 knots) for the term relative to the interaction between latitude and longitude (Appendix Fig. 6). On the other hand, since the model may be influenced by biased data points, if any, incrementing further the number of knots in order to fit the data was avoided in order to avoid the influence of the eventually biased information. Discrepancies highlighted indicate that the model should be improved. Models coming from both frameworks (qbGAM and beinfGAMLSS) and relatively complex spatial interaction (no more than an amount of nodes "k" = 200) are presented but should be considered with extra-caution and as preliminary.

The classification in both the models constituting the RB approach was based on the definition of residual as the discrepancy between the observed and the predicted value of the response was used to quantify the anomaly score of a given observation (Chandola et al., 2007). Standardized residuals were used for the selected models to determine the eventual anomalous nature of each data point. R packages used for modelling qbGAM ("mgcv", Wood 2017) and gamlss for "beinfGAMLSS" (Rigby and Stasinopoulos, 2005) provide different types of residuals. In the first case scaled pearson residuals (PRS) while in the latter z-scores (ZSC) were used. The threshold for z-scores and PRS were: 0 < PRS|ZSC < 1 for inlier, 2 < PRS|ZSC < 3 for possible outlier, PRS|ZSC > 3 for likely outlier.

In both IF (IFALL and IFBS) and RB (qbGAM and beinfGAMLSS) it is not possible to indicate a priori if the centre of gravity of the observations consists in non - misreported or misreported hauls. Consquently these scenarios ("few-misreport", FM here-after; "most-misreport", MM here-after) were explored assuming that misreport occur in the same direction in a given context. Moreover those observations classified as "possible misreporting" can be regarded as records "correctly reported" (PC here-after) or "misreported" (PM here-after). The combination of the four techniques (IFBS, IFALL, qbGAM, beinfGAMLSS) with the different scenarios (FM, MM) and the treatment of the possible misreporting (PC, PM) led to 12 classifications and thus 12 alternative time-series (see below).

The generation of alternative time series was performed after the classification by: i) calculating an expected proportion of the C.harengus species in the C. harengus + S.sprattus total catch for each context using the observations classified as normal, ii) compare the proportion expected with the one observed in the observations classified as anomalous, iv) multiply the difference between the two times the total catch in case of an anomalous observation and vi) use the algebraic sum between this quantity and the total catch to shift the amount between the species according to the models.

Main outcomes of the analysis done

The results show variability in the predictions of the different models (Fig. 3.8.2). The predictions of corrected catch under the "few misreport" hypothesis are relatively consistent with the catch originally reported. Under the "most misreport" hypothesis the models predicted catches very different from the original reported ones. Indicating under-reporting of Herring (over-reporting of Sprat) in the past (2001 - 2011) and slight over-reporting of herring and under-reporting of sprat in recent years. However, depending on the treatment of possible misreporting (PC or PM), some approaches pointed in the opposite direction (e.g. "IFBS_MM_PC"), indicating a lack of unanimity in the predictions of the models and a possible pivotal role of the "possible misreporting" observations which interpretation can substantially change the interpretation of results.

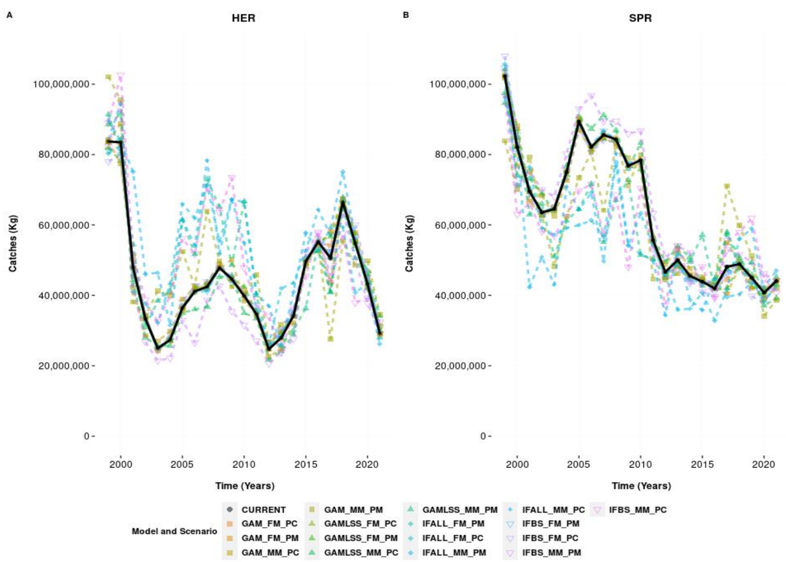

*Fig.3.8.2: Outputs from the different models (*GAMLSS = *beinfGAMLSS,* GAM = *qbGAM,* IFBS = *IFBS,* IFALL *= IFALL) in the different scenarios (indicated by dashed lines in different color, as described in the legend, FM_PC = few misreport and possible misreporting is not misreporting, FM_PM = few misreport and possible*

misreporting is misreporting, MM_PC = most misreport and possible misreporting is not misreporting, MM_PM = most misreport and possible misreporting is misreporting), versus the reported catch (indicated by a solid black line), divided by species (A: Herring, B: Sprat). Black line corresponds to the reported catches.

When all models in the two main scenarios (FM and MM) are averaged the considerations above translate in an average prediction relatively in line with the reported catch in the "few misreport" hypothesis (Fig. 3.8.3 case A and B) and a predicted catch that diverge from the reported one in the "most misreport" hypothesis (Fig. 3 case A and B), (Tab. 3.8.2; Tab.3.8.3).

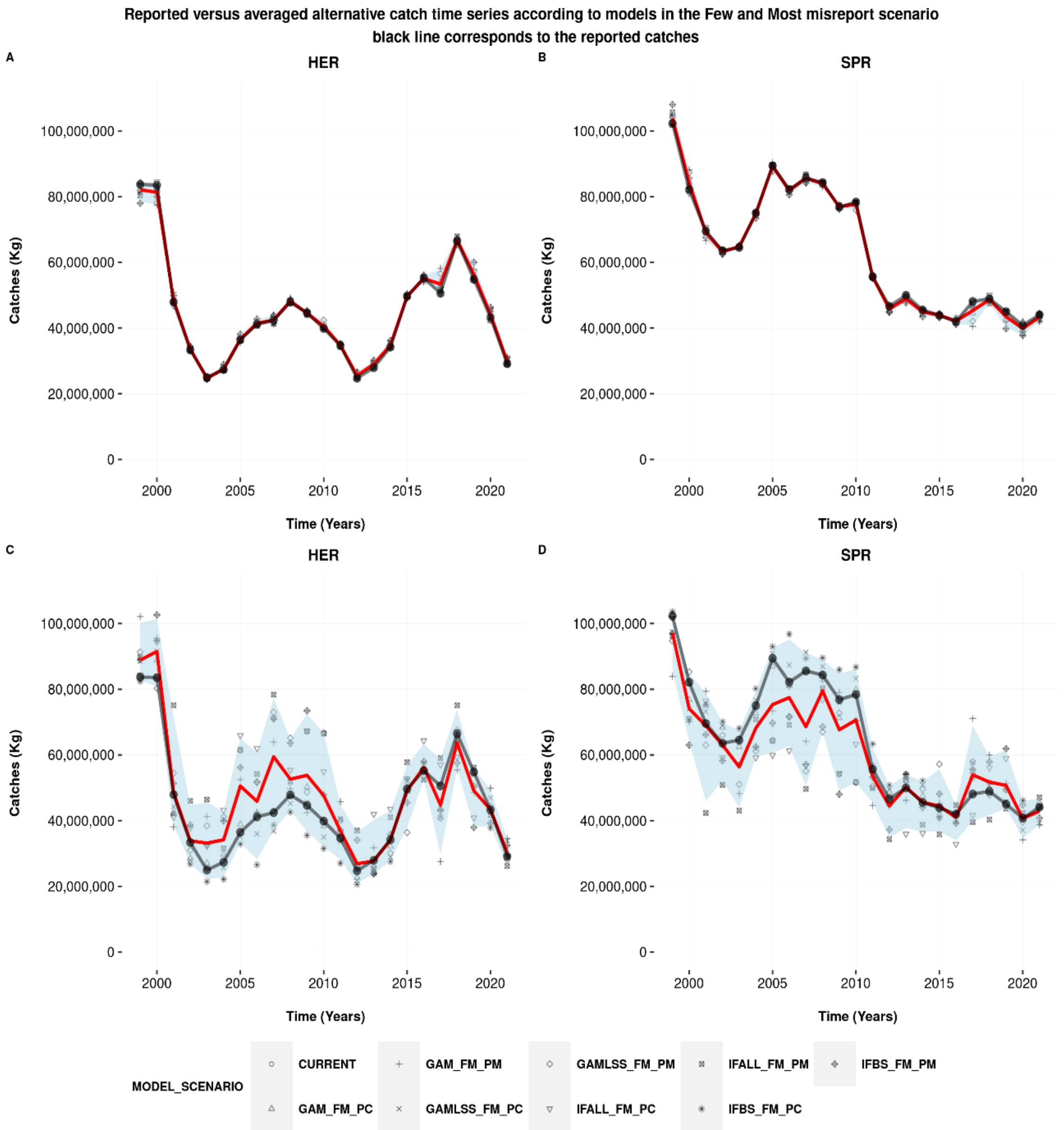

Fig.3.8.3: Outputs from the different models (GAMLSS = beinfGAMLSS, GAM = qbGAM, IFBS = IFBS, IFALL = IFALL) in the few (A, B) and most (C, D) misreport scenarios (indicated by dashed lines in different color, as described in the legend FM_PC = few misreport and possible misreporting is not misreporting, FM_PM = few

misreport and possible misreporting is misreporting), MM_PC = most misreport and possible misreporting is not misreporting, MM_PM = most misreport and possible misreporting is misreporting) averaged, versus the reported catch (indicated by a solid black line), divided by species (A: Herring, B: Sprat). Light blue bands indicate the interval in which 95% of the prediction of the models are falling.). Black line corresponds to the reported catches.

APPROACH	SCENARIO	QUANTITY	MEAN	SD
GAM	FM_PM	HER	3,40	3,43
		SPR	2,75	3,45
	FM_PC	HER	1,02	1,45
		SPR	0,85	1,52
	MM_PM	HER	19,29	18,42
		SPR	12,60	11,14
	MM_PC	HER	5,24	4,90
		SPR	3,35	3,51
GAMLSS	FM_PM	HER	2,86	2,79
		SPR	2,21	2,74
	FM_PC	HER	0,23	0,26
		SPR	0,16	0,24
	MM_PM	HER	22,57	22,96
		SPR	12,77	10,77
	MM_PC	HER	8,61	5,34
		SPR	6,03	4,30
IFALL	FM_PM	HER	1,33	1,20
		SPR	0,95	0,95
	FM_PC	HER	1,10	1,44
		SPR	0,87	1,33
	MM_PM	HER	29,42	26,77
		SPR	16,90	12,32
	MM_PC	HER	25,69	22,93
		SPR	15,42	10,85
IFBS	FM_PM	HER	3,93	2,54
		SPR	2,91	2,58
	FM_PC	HER	1,98	1,74
		SPR	1,53	1,44
	MM_PM	HER	23,92	18,46
		SPR	15,04	9,94
	MM_PC	HER	13,18	7,84
		SPR	8,57	4,30

Tab.3.8.2: Mean and standard deviation of the absolute percentual difference between the reported and predicted catches according to the different models (beinfGAMLSS, qbGAM, IFBS, IFALL*) in different scenarios (FM_PC = few misreport and possible misreporting is not misreporting, FM_PM = few misreport and possible misreporting is misreporting), MM_PC = most misreport and possible misreporting is not misreporting, MM_PM = most misreport and possible misreporting is misreporting) , when data are aggregated by year and species. Since the information on year is omitted here, the absolute value of the predictions for each model and scenarios combination in each year has been calculated and used to compute the statistics shown.*

Year	HER				SPR			
	FM		MM		FM		MM	
	mean	sd	mean	sd	mean	sd	mean	sd
1999	-2,71	2,29	4,59	3,76	2,22	1,87	-3,75	3,07
2000	-2,11	2,55	9,33	8,85	2,15	2,59	-9,48	9,00
2001	0,42	1,93	7,20	24,33	-0,29	1,33	-4,96	16,77
2002	0,77	1,52	4,03	20,29	-0,41	0,80	-2,12	10,65
2003	-1,09	0,84	31,44	32,57	0,42	0,33	-12,17	12,60
2004	1,24	2,24	24,02	29,32	-0,45	0,82	-8,77	10,70
2005	0,91	1,79	43,10	36,15	-0,37	0,73	-17,57	14,74
2006	0,78	1,59	14,24	29,10	-0,39	0,80	-7,13	14,58
2007	-0,31	2,48	44,86	40,02	0,15	1,23	-22,26	19,86
2008	0,45	0,74	12,79	17,66	-0,26	0,42	-7,26	10,02
2009	-0,31	1,01	26,05	30,84	0,18	0,58	-15,14	17,92
2010	1,61	2,21	26,50	34,69	-0,82	1,13	-13,47	17,64
2011	0,63	0,86	3,01	13,05	-0,39	0,54	-1,88	8,13
2012	3,29	2,92	11,70	24,31	-1,74	1,55	-6,20	12,89
2013	4,17	2,59	-1,45	23,28	-2,33	1,45	0,81	13,01
2014	2,35	2,08	0,76	17,87	-1,77	1,57	-0,57	13,43
2015	0,15	0,76	-0,79	13,71	-0,17	0,86	0,90	15,51
2016	-0,01	1,08	2,67	7,30	0,01	1,42	-3,52	9,61
2017	3,69	3,90	-5,52	14,76	-3,88	4,10	5,80	15,51
2018	0,09	1,15	-2,71	8,62	-0,13	1,57	3,69	11,71
2019	2,74	3,48	-11,89	12,14	-3,33	4,24	14,48	14,79
2020	2,53	3,32	-2,38	7,07	-2,69	3,52	2,53	7,50
2021	2,32	2,64	2,28	9,10	-1,53	1,74	-1,51	6,02

Tab.3.8.3: Mean and standard deviation of the percentual difference between the reported and predicted catches according to the different models (beinfGAMLSS, qbGAM, IFBS, IFALL) in different scenarios (FM_PC = few misreport and possible misreporting is not misreporting, FM_PM = few misreport and possible misreporting is misreporting), MM_PC = most misreport and possible misreporting is not misreporting, MM_PM = most misreport and possible misreporting is misreporting) , when data are aggregated by year and species.

Advice to the benchmark

The national data will not be updated in the present benchmark but might be updated in the future since there are some indications of possible misreporting. The country is ready to provide one or more new time series that the stock assessors can explore but these are not, for the time being, considered sufficiently reliable for a definitive inclusion in assessment.

In this work the NBL was used to highlight the presence of possible anomalies and Isolation Forest algorithm and regressive approaches (GAM; GAMLSS) used in trying to estimate the quantities eventually misreported.

The NBL should not be interpreted as evidence of misreporting and alteration of data, but rather highlights the possible presence of anomalous activity and suggests further investigation on the processes originating the data (Nigrini, 2012). Swedish logbook data relative to this fishery did not, in general, conform to the NBL model. Conformity improved when landing declarations were used, but discrepancies were still observed at the F12T. The patterns shown namely those of multipliers of five characterizing a large extent of the records and the improvement of performance with landing declarations suggests that rounding of quantities may have had a role in explaining the discrepancies observed. Patterns observed in logbooks and landing declarations may be explained by misreporting but also by rounding or lack of accuracy in estimation of large catches.

Misreporting is usually considered an intentional directional activity while rounding is conceptually distinct and likely more erratic and bi-directional. Overall, both aspects act to change the conformity of the underlying data and introduce inaccuracies in catch reports that may be worth studying more in detail.

IF and RB are unsupervised techniques and unsupervised techniques and, as such, are not able to distinguish between white noise and possible anomalies (Bolton and Hand, 2002, Nisbet, 2018). Consequently, a classification as outliers of the observations by these methods should not be regarded as proof of misreporting but rather as a description of the grade of difference between the classified observation and the others, as well as a possible indication of anomalies in the data that require further investigation (Nisbet et al., 2018). Both IF and RD models application showed substantial variability in results and different of performance in diagnostic analyses. Furthermore, RB models are known to be susceptible to the presence of outliers which renders them non - robust as outlier detection tools. Results may be further influenced by combinations of parameters in both frameworks (e.g. the threshold to be used in order to spot and outlier).

Under the variability observed in both predictions and diagnostics of the models tested in the present study, further research seems to be needed into the identification of a model that is a good descriptor of the expected proportion of Herring in different spatio-temporal and methodological contexts while being robust to different parametrizations and to the possible presence of outliers. Even if the modelling approaches seem to be consistent with a perception of historical misreporting of herring, these results require improvement and tests before strong conclusions can be drawn and a reliable alternative time-series of Swedish catches can be produced. As such, any application of the present results should be considered, for the time being, exploratory.

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Appendix

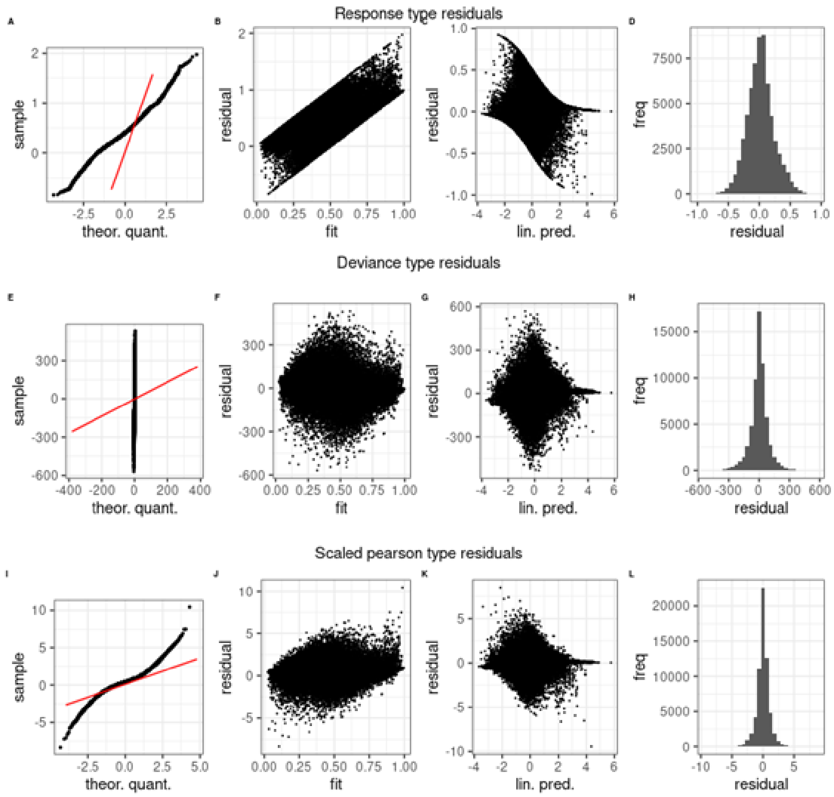

Fig. 4: Selected quasi binomial Generalized Additive Model residuals: A = qq-plot of response residuals, B = response residual versus fitted values, C = response residual versus linear predictor, D = histogram of response residual, E = qq-plot of deviance residuals, F = deviance residual versus fitted values, G = deviance residual versus linear predictor, H = histogram of deviance residual, I = qq-plot of scaled - pearson residuals, J = scaled - pearson residual versus fitted values, K = scaled - pearson residual versus linear predictor, L = histogram of scaled - pearson residual

16.

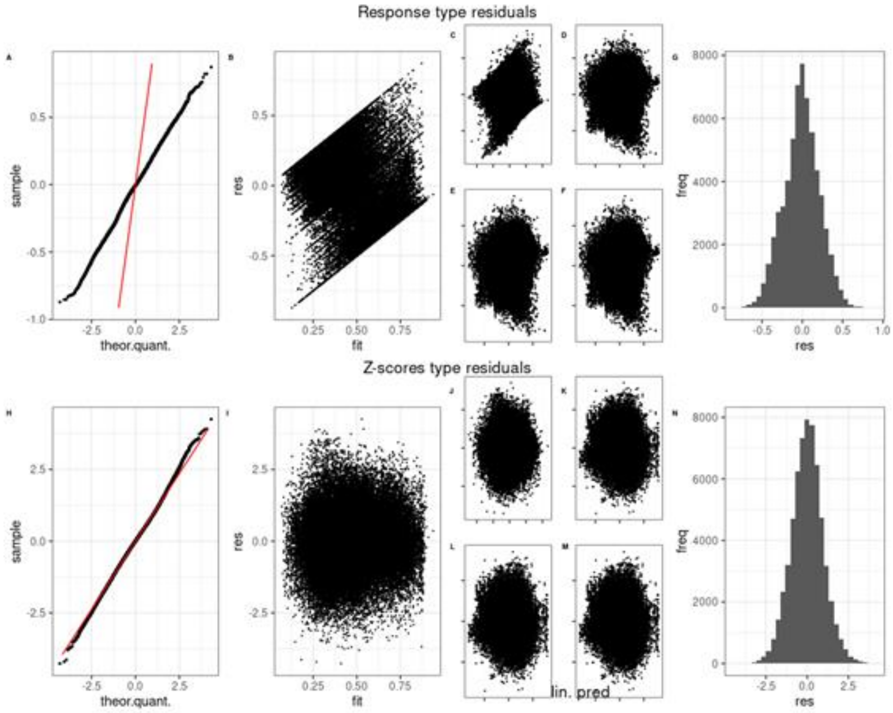

Fig. 5: Selected beta zero and one inflated Generalized Additive Model for Location Scale and Shape residuals: A = qq-plot of response residuals, B = response residual versus fitted values, C = response residuals versus linear predictor for mu model component, D = response residuals versus linear predictor for nu model component, E = response residuals versus linear predictor for tau model component, F = response residuals versus linear predictor for sigma model component, G = histogram of response residuals, H = qq-plot of z-scores residuals, I = z-scores residuals versus fitted values, J = z-scores residuals versus linear predictor for mu model component, K = z-scores residuals versus linear predictor for nu model component, L = z-scores residuals versus linear predictor for tau model component, M = z-scores residuals versus linear predictor for sigma model component, N = histogram of z-scores residuals

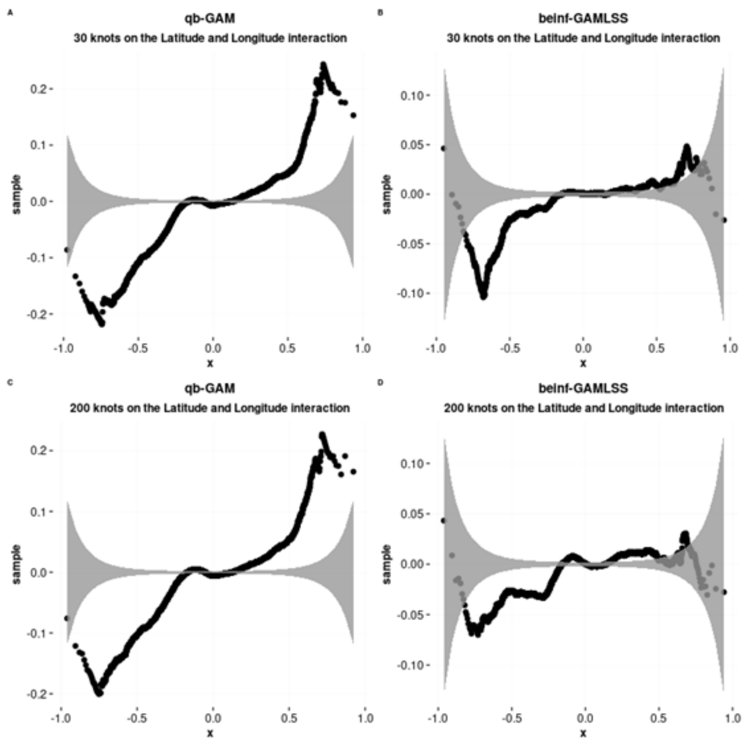

Fig. 6: Worm plot for the two models described in the text: (A) for quasi – binomial model (30 knots) and (B) for beta zero and one inflated gamlss model (30 knots). The models with the same parametrization but a lesser amount of knots in the interaction between latitude and longitude are also shown for comparison: (A) for quasi – binomial model (30 knots) and (B) for beta zero and one inflated gamlss model (30 knots).

9 ISSG Case Study Freezer Trawler Fleet Exploiting Pelagic Fisheries in the Northeast Atlantic

9.1 Background

In 2018, The EU freezer trawler fleet targeting small pelagic species (mackerel, herring, horse mackerel, blue whiting, sprat and argentine) in the North Atlantic and North Sea was identified by the RCG as a potential candidate for the development of a regionally coordinated sampling plan. The current sampling of the fleet, which is largely Dutch owned and operates under the flags of the Netherlands, Germany, France and the UK (England), is conducted by the Dutch and German administrations. While there exists an element of cooperation, the national sampling schemes differ in extent and methodology and there is no formal arrangement or harmonisation.

The primary aim of this ISSG is to propose a statistically robust regional sampling scheme for the European pelagic freezer trawler fleet where both the monitoring of the pelagic target species and the incidental bycatches are taken into account. So far, simulation studies have been conducted to investigate annual sampling coverage for a suite of preselected stocks under various sampling schemes including random selection of individual fishing trips and vessels. Furthermore, the ISSG carried out an exercise to design a pilot study based on the NLD observer programme.

9.2 Work-plan

The following tasks have been identified during the RCG meeting in 2022 for the attention of the ISSG in 2022/23:

1. Finalize specifications of pilot study

2. Identify pilot trip (NS Herring Q3/4 2022)

3. Perform pilot study

4. Review, analysis and comparison with NL market sampling/DE observer sampling

5. Investigate possibility of extending to all NS Herring trips in 2023

6. Develop appropriate protocols for other fisheries.

9.3 Progress during 2022 - 2023

9.3.1 Specifications and identification of pilot study (Tass, 1,2)

Based on the exercise to design a pilot study carried out by the ISSG in 2021/2022, the specifications of the pilot study were finalised, namely an observer trip carried out for the North Sea Herring fishery in Q3 within the NLD observer programme.

Sampling protocol pilot study

Selection trip

Within the NLD observer programme annually 12 trips are sampled, homogenously distributed (monthly) over the year. Since 2019, sampling is randomized through a weighted random selection of fishing companies based on the number of freezer trawler vessels (active in European waters) owned by each company. Observer trips are selected through a weighted random selection of fishing companies based on the number of freezer trawler vessels (active in European waters) owned by each company.

The pilot study, to be conducted during a regular observer trip, was selected according to standard procedures with the note that it should involve a North Sea herring trip.

Sampling

A scientific observer boarded the selected vessel with the following instructions:

- Collect operational- and catch data each time the fishing gear was deployed (each 'haul'): vessel position; haul duration; depth; weather conditions; total catch estimate.
- Take unsorted catch sample of 30-150 kg (depending on the target species; e.g. herring "small" sample and mackerel "large sample") prior to the sorting process from the first five hauls, followed by every second haul.
    - Weigh unsorted catch sample by species.
    - Identify and measure all fish to the cm below (herring and sprat from 0.5 cm below).
    - For 15 hauls* take a random age sample, consisting of 50 herring individuals (i.e. total of 750 individuals for the pilot trip), from the unsorted catch sample and process; i.e. take individual length measurements 'to the mm below' and individual wet weight (grammes), determine sex and maturity by opening the body cavity, and collect otoliths. The otoliths are stored in paper bags and taken back to the lab for age determination.

      * When new length classes are observed within a haul, take an additional age sample of the haul of 50 individuals.
- Monitor for incidental bycatches on the bridge and at the conveyer belt in close collaboration with the crew for as many hauls as possible.

9.3.2 Pilot study (Tasks 3, 4)

The pilot study was carried out during an observer trip targeting herring in ICES Division 27.4.a in Q3 2022; end August – begin September 2022 (sampling scheme TRIP OBS). During TRIP OBS 45 hauls were deployed, from which 25 hauls were sampled for length. Age samples were taken from 15 hauls (out of the 25 sampled hauls). North Sea herring age samples were also collected within the NLD self-sampling programme (sampling scheme TRIPS SS) during 30 hauls (originating from 6 trips).

Overall, TRIP OBS aged 743 herring individuals and TRIPS SS 739 herring individuals (Table 9.1). Length distribution of the aged fish are similar (Figure 9.1), indicating that age samples were taken from the same population. The age distribution varied between trips. Especially ages 2 and 10 onwards were not observed in all trips (Figure 9.2). As a result, the overall age distribution varied between the two sampling schemes (Figure 9.3).

As the spatial distribution of TRIP OBS did not cover all herring landings of the Dutch pelagic fleet in Q3 (Figure 9.4), it is possible that certain stock components may have been missed. However, it must be noted that when the proposed protocol would be incorporated in the regular NLD observer programme, a trip would be conducted on a monthly basis which would most likely increase the spatial sampling coverage of the fleet and reduce the chance of missing certain stock components.

The age samples collected within TRIP OBS were used to examine the effect of the number of aged individuals within a sample on the mean length and weight estimates. For this aid a bootstrapping exercise was conducted under the assumption that the TRIP OBS dataset represents the population. The results show that for the more abundant ages in the TRIP OBS dataset, the estimated mean length and weight is more accurate when number of aged individuals increase (Figures 9.5, 9.6). For the less abundant ages (ages 2, 10 and onwards) the results should be neglected as these ages are underrepresented in the TRIP OBS dataset.

While the pilot study shows promising results, it is focussed on only one species*area combination of the European pelagic freezer trawler fleet, namely the North Sea herring fishery in Q3. As a common harmonised protocol is needed when sampling the fleet, the ISSG recommends an additional two pilot studies for the period 2023/2024 conducted by both NLD and DEU for different species*area combination(s).

Table 9.1: Overview of number of sampled trips, number of age samples and number of herring individuals aged by sampling scheme in Q3 2022 ICES Division 27.4.a. Where sampling scheme TRIP OBS is the pilot study and sampling scheme TRIP SS is the NLD self-sampling programme

Year	Q	ICES Division	Sampling Scheme	# sampled trips	# age samples	# herring individuals aged
2022	3	27.4.a	TRIP OBS	1	15	743
2022	3	27.4.a	TRIPS SS	6	30	739

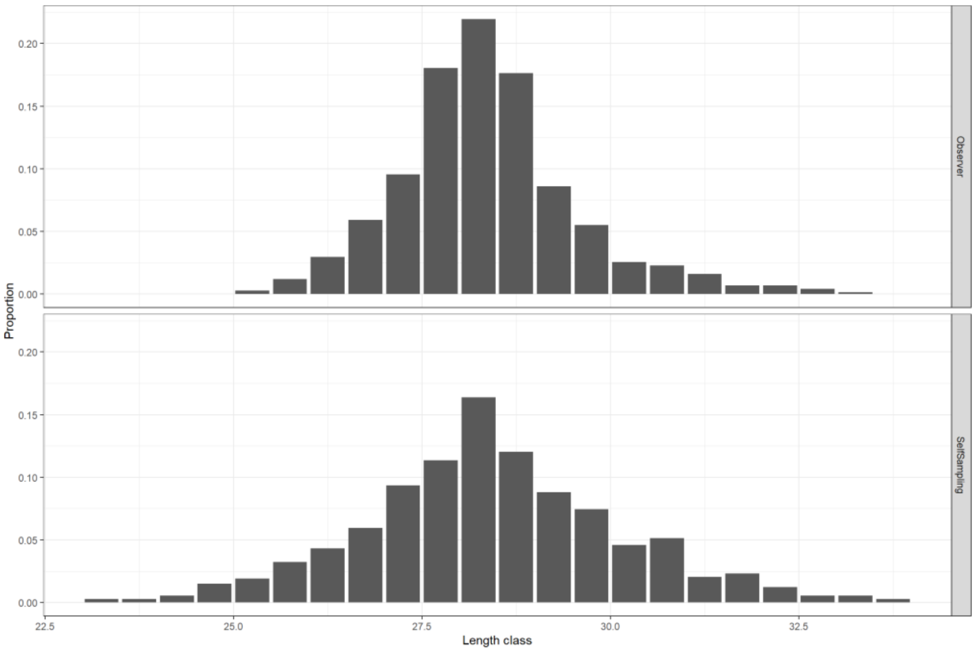

Figure 9.1: Proportion per length class by sampling programme.

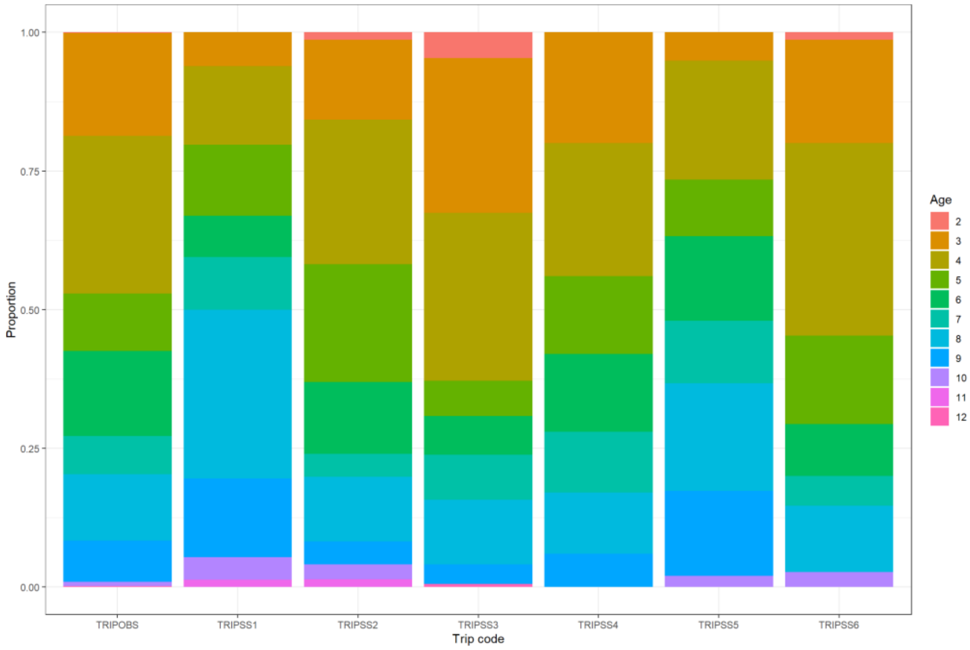

Figure 9.2: Proportion ages by trip.

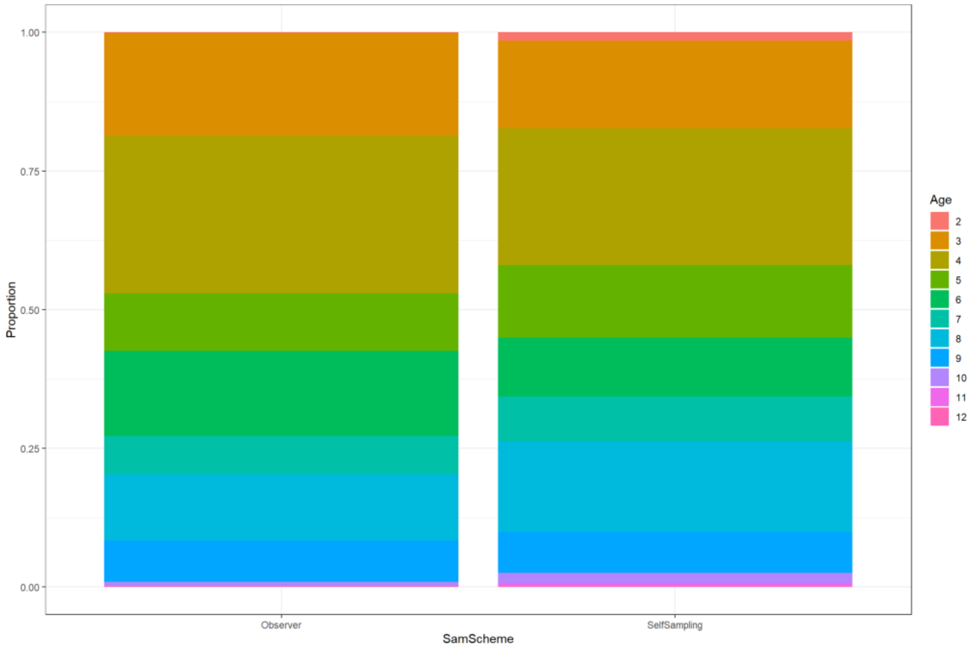

Figure 9.3: Proportion ages by sampling programme.

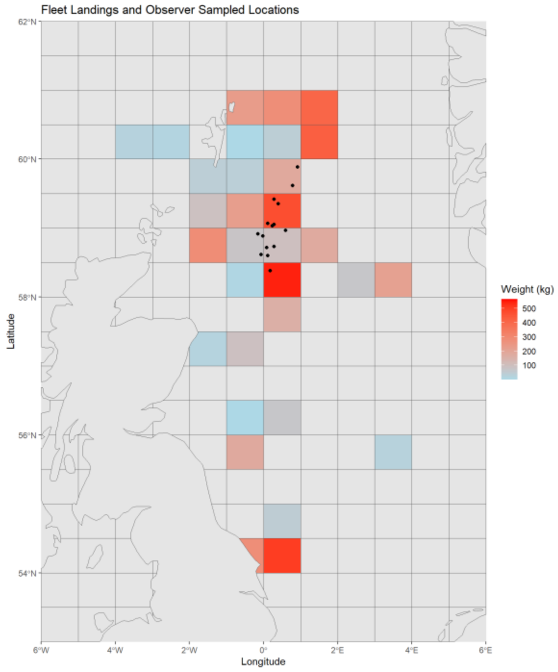

Figure 9.4: Distribution of total herring landings (expressed tonnes, shaded colours per ICES rectangle) of the Dutch pelagic fleet in Q3 and positions of age samples (black dots) of the pilot study.

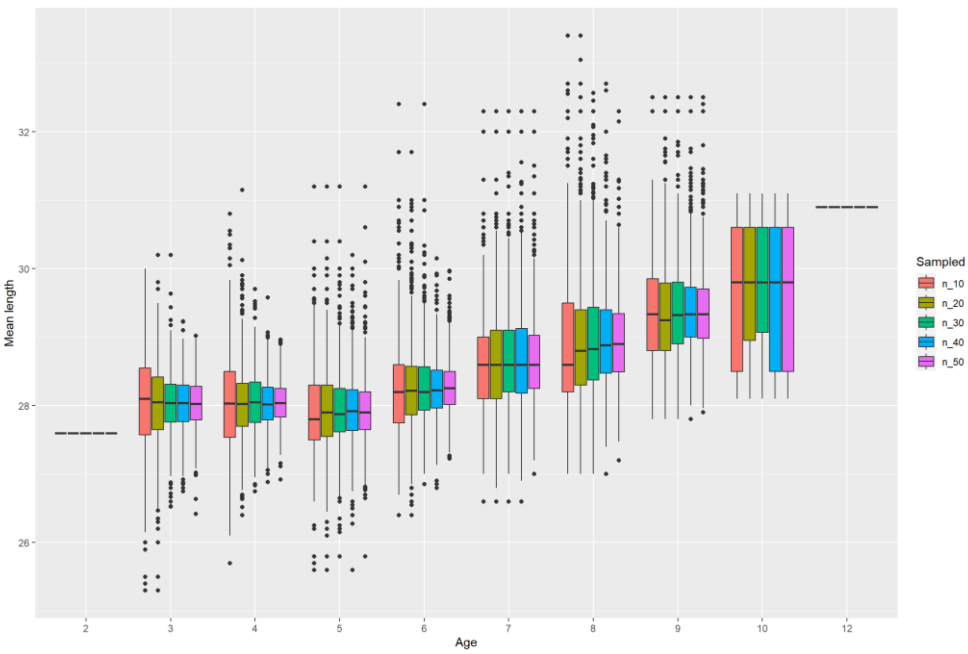

Figure 9.5: Mean length by age based on bootstrap exercise with age sampes of 10 (n_10), 20 (n_20), 30 (n_30), 40 (n_40) and 50 (n_50 individuals).

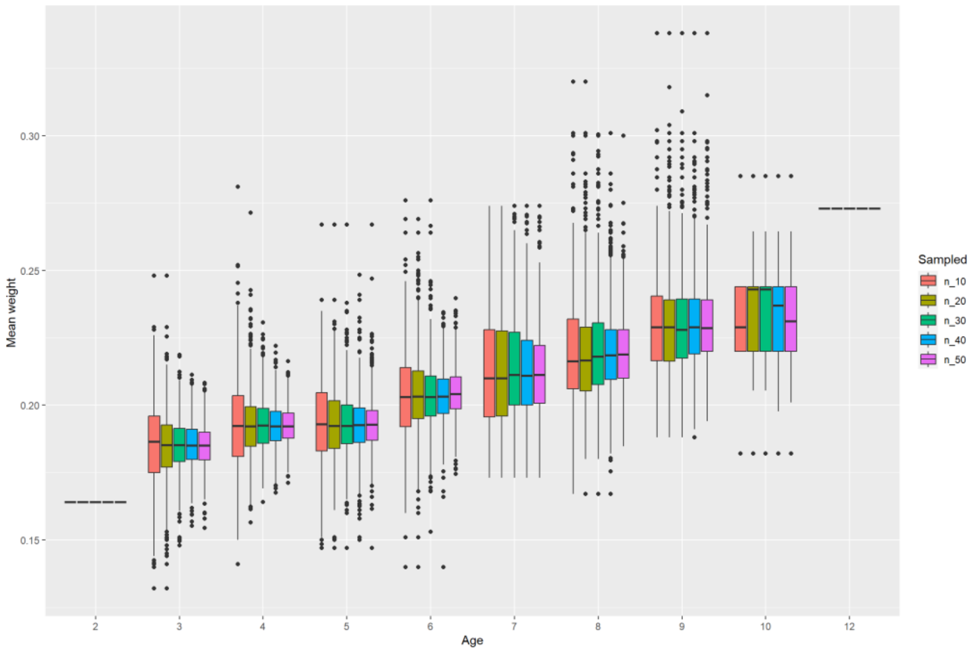

Figure 9.6: Mean weight by age based on bootstrap exercise with age sampes of 10 (n_10), 20 (n_20), 30 (n_30), 40 (n_40) and 50 (n_50 individuals).

9.4 Roadmap/follow-up

The following tasks have been identified during the RCG meeting in 2023 for the attention of the ISSG in 2023/24:

1. Identify and conduct NLD and DEU pilot studies
2. Review, analyse and compare results pilot studies with NLD market sampling / DEU observer sampling
3. Develop harmonized protocol for sampling the EU freezer trawler fleet

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* Not SG participant, but conducted the presented analyses.

10 ISSG Case Study of the Trawl Fishery in Iberian Waters

10.1 Progress during 2022/2023

There was no progress during 2022/2023 because the ISSG was put on hold for 2022-2023 season.

10.2 Conclusions and Work plan for 2023-2024:

The ISSG will be revived in 2023-2024. The work plan it will be the following:

June 2023–May 2024 and June 2024-May 2025 (starting in April 2024):

- update the allocation of sampling effort to ports based on recent data on landings from trawl fisheries in the Atlantic Iberian waters (data for 2 years 2022 and 2023, available in Q2 2024).
- define the sampling plan to be implemented in the pilot study and prepare changes/additions to contracts to allow for the implementation of the pilot study.

June 2025-May 2026 and June 2026-May 2027 (calendar year of 2026):

- implementation of the pilot study

June 2026-May 2027 and June 2027-May 2028 (starting in April 2027):

- analysis of the results of the pilot study (data for 2026, available in April 2027).
- define future steps.

RCG's Secretariat
Co-funded by the European Maritime and Fisheries Fund

11 ISSG Evaluation of the Data Collected for SSF at EU level

11.1 Background

Small Scale Fisheries (SSF) are an important economic and social activity in many European inshore coastal areas. These fisheries have reduced mobility, which makes them dependent on local and regional ecosystems, and focus their impact on coastal fish resources and habitats. Unlike large scale fisheries (LSF), official statistics are often limited for SSF. Data on catches and effort are therefore dependent on sampling if there are no census data, which has traditionally hampered the understanding of these fisheries, and underestimated their impacts.

2020 was the first year of work for this ISSG where the main objective is to move forwards a better coordination on the data collection for these fisheries under the umbrella of the RCGs.

11.2 Work-plan

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

1. Sampling coverage of the SSF and estimation methodologies in collaboration with WGCATCH.
2. Use of RDBES and fisheries overviews data to improve SSF coordination.
3. RDBES data model from a SSF perspective.
4. Comparison between transversal and sampling data.

11.3 Progress during 2022/2023

Much of the work of this ISSG is done in conjunction with other ISSGs and also with the ICES WGCATCH group. During this period 2022-2023, work will continue on the part of the sampling coverage of these fisheries, and on different methodologies to provide estimates of catches, effort, etc.

As in previous years, fisheries overviews for the North Atlantic and Baltic have been reported. In addition, work is being done with the ISSG Fisheries Overviews on how the information uploaded to the RDB can be used in relation to the biological information (CS data).

Finally, the data model developed for the incorporation of the SSF data into the RDBES was discussed with the Core Group, and a new table related to data quality was proposed.

The comparison between transversal and sampling data was not covered during this period, but it is intended to be able to do this analysis in the following year.

11.4 Roadmap/follow-up

The plan for the period 2023/2024 is to be able to work on those tasks that were planned for the previous period, but which it has not been possible to cover. These tasks will also be worked on in parallel especially with ICES WGCATCH, such as the SSF sampling coverage and methodologies to perform different types of estimates, the improvement of SSF fisheries effort estimates in collaboration with ISSG Metiers and the new EU Control Regulation follow up and its impact on these fisheries.

In addition, and as mentioned in the previous section, the ISSG will also discuss how the information uploaded in the RDBES and the specific fisheries overviews reports, can improve the regional coordination in the data collection of the SSF.

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12 ISSG Identification of Case Studies for PETS Bycatch Monitoring

12.1 Background

Interactions between fisheries and non-target species such as protected, endangered and threatened species (PETS), including cetaceans, seabirds, turtles, some elasmobranchs, and rare fish species, can be frequent and widespread. These interactions may lead to levels of incidental mortality which, in some cases, could pose a threat to species or population viability. Such interactions can also have an adverse effect on fishing productivity, profitability and crew safety.

Under the previous Data Collection Framework (Council regulation (EC) No. 199/2008), there were no binding obligations for Member States (MS) to collect data on species other than commercial fish species and certain invertebrate species. When the current DCF (Regulation (EU) 2017/1004) came into force in 2017, collection of data on PETS bycatch when observers are onboard became mandatory. Therefore, MS have begun to implement new data collection protocols in their at-sea observer programmes following guidelines developed by ICES expert Working Groups (WGBYC, WGCATCH) to improve the collection and quality of data on PETS bycatch. However, sampling designs remain focused primarily on active gears. In addition, under several EU instruments (Regulation 2019/1241 on technical measures, Habitats Directive 92/43/EEC, and Birds Directive 2009/147/EC) MS are required to monitor and report on bycatch of protected species, including cetaceans, seabirds and marine turtles.

The overall aim for RCG NA NS&EA and the RCG Baltic is to review the status of current issues, achievements and developments of regional coordination and identify future needs in line with DCF requirements and the wider European environmental monitoring and management. With this aim in mind several ISSG were created trying to cover different topics related to different needs in line with the DCF requirements, including PETS bycatch issues.

12.2 Work-plan

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

1. How much effort is needed? And Data quality issues (WGCATCH & WGBYC)
2. Improve and update the Risk assessment based on WGBYC outputs
3. Other end-users needs (e.g. COM, ASCOBANS, HELCOM)
4. RDBES PETS data incorporation

12.3 Progress during 2022/2023

All tasks that were planned for the period 2022-2023 have been considered as work in progress. It was noted that most of the technical work relevant for the RCGs is carried out by ICES WGs (e.g. WGCATCH, WGBYC), where most of this ISSG memebers are members. WGBYC worked on a PETS species priority list by ICES Ecoregion considering different variables (e.g. abundance, conservation status etc.). This list would help to Member States to prioritize and focused on these species by Ecoregion in their sampling programmes protocols. WGBYC has been also improving the fisheries risk assessment evaluation, based on incorporating more detailed data for the analysis. Several Workshops have been also requested by DGENV (WKPETSAMP2 and WKPETSAMP3) to ICES. These workshops are covering tasks as the analysis of how much effort could be needed to provide sound bycatch estimates, but also based on different simulations, how different variables impact on the final bycatch estimates.

The incorporation of PETS data is also an important objective following the RDBES roadmap. The RDBES core group, together with WGBYC and this ISSG members, are working on this and the first test will be carried out during 2023-2024 following the roadmap established by the core group.

The development of the Regional Work Plans are also the other key point where this ISSG is focused on. Part of the work is being done together with Fishn´Co project. In addition, this ISSG is following the main outputs coming from relevant projects related to PETS as CetAMBiCion. This is very important as this project is also covering tasks related to the improvement of the coordination of the monitoring programmes by different Member States etc. This includes the common dolphin issues in the Bay of Biscay. The Baltic colleagues also created a specific PETS group, where they are working in the improvement for the coordination in at sea sampling programmes for better data collection in this region.

12.4 Roadmap/follow-up

As a lot of initiatives and demands are happening at the same time under different context that are all related to PETS, the ISSG decided that an important role of this ISSG would be to being a forum or a net. This will allow to identify the things that are happening at national, regional, or international level related to PETS and share this information with main endusers. All initiatives coming from different organizations will be follow up too (ICES WGs work, specific projects etc.).

The plan for the period 2023/2024 is also to continue to follow all the work being done and identify those tasks where the RCGs have responsibility to improve coordination in sampling and data collection. It should be noted that if not all, most of the members of this ISSG are participating in these actions, being members of the relevant ICES groups in terms of bycatch or participating in the mentioned projects.

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13 ISSG Diadromous Species

13.1 Background

Data collection for diadromous species (eel and salmon) under DCF was introduced in 2007 and improved in 2012. Sea trout was added later to mandatory data collection under DCF. Since then, end-user data needs and assessment aspects have changed or adapted or are currently under active development, which is why some DCF mandatory data is currently not used in ICES EGs / international assessments.

The ISSG Diadromous Fishes is coordinating the data collection of primarily three species (eel, salmon, and sea trout) in the NANSEA, BALTIC and MED&BS regions. European eel is present as one panmictic stock over all regions, while salmon and sea trout occur in hundreds of individual river stocks in NANSEA and Baltic regions. Assessment models and data needs differ by species and region and are still under active development. Consequently, the ISSG Diadromous Fishes practices regular direct communication and exchange with end-users in order to provide for suitable data collection for the assessment needs of the respective international expert groups. Generally, the designated goal of ISSG Diadromous Fishes is to provide information, a basis for discussions, and feedback regarding diadromous DCF data collection among members states. ISSG Diadromous Fishes seeks also to constantly challenge and improve the current state of play, with the intention to help facilitate the best possible acquisition and use of data collected under the DCF for local/national/international end-user needs.

Due to cancelled ICES Expert Group meetings (WGNAS & WGBAST) in 2022, resulting from the Russian invasion in Ukraine, leading to belated or missing input from end-users, ISSG Diadromous Fishes did not organize a full-scale dedicated meeting in 2022. Instead, a one-day extraordinary hybrid meeting was held alongside the annual WGEEL meeting in Toomebridge, Northern Ireland. During this meeting, representatives from different end-user groups gave presentations relevant to the ISSG. The group also held discussions regarding the regional workplans (RWPs), data transmission issues, and the potential use of indicator rivers in eel assessment.

In 2023, a dedicated full scale ISSG Diadromous Fishes meeting was held during two-days, virtually on May 16th and May 17th. Altogether, 24 diadromous experts from 14 countries participated during at least part of the meeting's sessions. Presentations were given by relevant experts from WGNAS, WGBAST, WGEEL, DCRF/GFCM Eel Project and the ICES RBDES database. During the meeting, the group also discussed various topics and points identified by participating experts or derived from outcomes from RCG-related or ICES EG related workshops and meetings.

The following points were considered to be of highest priority:

- Data collection under DCF, following end-user needs: Which data are currently collected, what is used by international end-users and what is missing? – Updates and input from the ICES end-users.
- General data management and data processing of DCF collected data.
- Use of ICES own RBDES database for mandatory diadromous data collected under DCF.
- Potential for the development of Regional Workplans in diadromous data collection under DCF for regional harmonization and improvement of comparability of methodologies and collected data.
- Potential issues raised in latest ICES WGEEL, WGNAS and WGBAST reports and meeting of relevance for DCF.

Currently there are no data collection activities or workplans on any diadromous species that are coordinated on a regional level. However, there are some potential elements in data collection (electrofishing surveys, smolt counts, spawner counts among others) that may be possible to construct under a regional work plan in medium term.

The group is chaired by Marko Freese (GER) and Tapani Pakkarinen (FIN). A new co-chair is currently needed as Tapani Pakarinen is about to resign after years of (co-)chairing.

13.2 Work-plan

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

1. Complete all ICES EG annual meetings, discuss data needs for assessment and extract relevant information from relevant workshops and projects to distribute and discuss in (postponed) ISSG meeting.
2. Implement outcomes and recommendations that may result from Fishn'Co. (RWPs)
3. Promotion of data workshops (potential reissue of WKESDCF2012, workshop on data management, data processing for the connected EGs).
4. Further strengthen a regular and direct exchange between ICES EGs and GFCM responsible experts to ask for advancements on data needs for the improvement in data collection under DCF.

13.3 Progress during 2022/2023

1. Outcomes and relevant information from completed workshops and meetings have been acknowledged and shared among ISSG Diadromous Fishes members. The new spatial life cycle model of WGNAS is currently in a benchmark process, while WGEEL is actively preparing further steps in the development of a new spatial modelling approach that would incorporate DCF-derived data, additional to the (currently used) recruitment time-series. Both model developments could potentially slightly change the end-user needs in DCF diadromous data collection.

2. There are currently no formal agreements and no decisions for regional work plans for salmon, sea trout, or eel - but discussions are underway within the WGs and in the ISSG Diadromous Fishes. Outcomes of the discussions within WGs are supposed to provide towards proposing candidate RWPs.

<u>MS agreed that the following activities should be further developed to be part of the RWP:</u>

- Ensure harmonized and comparable data between regions (e.g., in sampling methodologies such as electrofishing protocols or comparability of fisheries effort data).
- Enable usage of RDBES for (partial) data storage (a central database to host DCF data is needed).
- Meetings and/or email exchanges between ISSG Diadromous Fishes and EWG will be maintained to ensure alignment between data collection and data use.

<u>The current state of RWPs in the relevant EGs:</u>

- WGBAST are already working at a regional scale (BALTIC), hence forming RWPs for further improvements in harmonization and regionalization is recommended and needs to be agreed on.

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- WGNAS are already working at a regional scale (NANSEA), hence forming RWPs for further improvements in harmonization and regionalization is recommended and needs to be agreed on.
- WGEEL will discuss the potential of RWPs for the first time during the 2023 WGEEL meeting in September 2023. There could be a potential to develop RWPs for the Baltic, North Sea, and Mediterranean regions, e.g., resulting from work done within SUDOANG and GFCM.

3. No progress in the organization or promotion of data workshops (potential reissue of WKESDCF2012, workshop on data management, data processing for the connected EGs).
4. Direct exchange with the relevant ICES EGs (namely WGEEL, WGNAS, WGBAST, WGTRUTTA) has been further strengthened. ISSG Diadromous Fishes is recognized and considered by ICES EGs.

13.4 Roadmap/follow-up

1. Implement outcomes and recommendations in mandatory data collection that may result from ICES WGEEL & WGNAS modelling developments, ICES EG annual meetings as well as GFCM eel project and other information from relevant workshops and projects.
2. Further strengthen a regular and direct exchange with ICES-EGs and GFCM-experts to recognize potentially changing data needs for improvements in data collection for assessments under DCF.
3. Discuss and promote the development of Regional Work Plans to further harmonize data collection for diadromous species where applicable.
4. Motivate diadromous end-user groups and respective experts to collaborate with RBDES (and maybe DATRAS) core group to find a central storage solution for DCF mandatory data collected for diadromous species.

13.5 SG Participants

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14 ISSG Marine Recreational Fisheries

14.1 Background

Recreational fisheries data is collected by individual Member States (MS) according to the Basic Regulation (EU) No 1380/2013 and the multiannual data collection framework (EU) 2016/1251. However, there is no standardization between countries and in general there is no one-size fits all approach due to the diverse nature of the sector and cultural differences. Challenges in recreational fisheries data collection are data gaps (no data collected) mostly due to lacking MS commitment, periodicity of surveys (no time series), and single instead of multispecies surveys. Also often lacking is economic and social data to evaluate the sectoral contribution.

ISSG Recreational Fisheries was established in 2021 because the RCG NANSEA and RCG Baltic needed progress with regional sampling plans for Marine Recreational Fisheries (MRF). The EU-MAP states the relevance of the regional approach for these fisheries, including evaluating end users' needs for biological data collection, coordinating national surveys of recreational fishing, and defining potential thresholds. As the new regulation does not have a pre-defined list of species, it will be determined by region based on end-user needs. ISSG Recreational Fisheries aims to harmonize recreational fisheries data collection particularly on a regional level. For this subgroup to work properly, it is needed to ensure that the right people are involved, including experts from WGRFS, DCF, and PGECON. National Correspondents (NC) need to be approached to ensure that relevant bodies are contacted to ensure expert participation.

This ISSG aims to fit on preparatory work for decision making, including input for RWPs. The ISSG on Recreational Fisheries work coordinates with the relevant ICES EG (WGRFS) and the Fishn'Co consortium. ISSG Recreational Fisheries focuses on defining a species list at a regional level, working on regional sampling plans for shared stocks, and incorporating MRF data in the RDBES.

Eighteen experts from 11 countries attended the group's last meeting (in 2021).

The group is chaired by Harry V. Strehlow (GER).

14.2 Work-plan

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

1. Develop Regional Work Plans
2. Identify end-user needs
    - Liaise with RCG LP, RCG ECON, RCG Med & BS, ICCAT
3. Decide on list of species to incorporate at the regional level
4. Incorporate recreational data into RDBES
    - Initiate test data call

Report on regulatory reporting requirements in marine recreational fisheries in relation to relevant changing EU legislation.

14.3 Progress during 2022/2023

Like 2022 there was also no physical meeting in 2023. This will be postponed to late summer 2023. Prior to the 2023 Technical Meeting RCG NANSEA & Baltic some preparatory work was done by the chair but without involving the SG participants. This was partly criticised during the TM. The exchange of information and discussion with SG members will resume during the WGRFS meeting in Ancona, Italy (19.-23.06.2023) and the upcoming ISSG Recreational Fisheries meeting.

Some of the work plan objectives are finished (species list), most are ongoing. Communication with WGRFS was hampered due to long parental leave of chair but will be resumed.

The main outcomes were:

1. Candidate regional work plan identified: no progress
   a. Western Baltic Sea
   b. Western Baltic cod
   c. Countries: DE, DK, SE

Although a candidate RWP has been decided there has been no work on producing such a table. In general, there is no formal agreement but data collection requirements and raising procedures are agreed between DE, DK and SE. Some of this is documented in a working document of the WKBALTCOD report.

The biggest issues remaining is how to deal with missing commitment of individual MS to collect recreational fisheries data. No answer could be given during the TM in Gdansk.

It is also fully unclear if it makes sense to develop a general RWP for the Baltic Sea covering all species, since extent and effort of recreational fisheries on different species vary extremely (from irrelevant to significant).

2. Identify end user needs:

After several years of working on the revision of the Control Regulation the final version was adopted by the 31st of May and will entry into force 31.12.2023. One of the biggest changes concerns the recreational fishery sector. The revised Control Regulation stipulates that: "*MS required to register recreational fishers and collect and report recreational catch data of certain species electronically*". So (1) MS will need to put a licensing or registry system in place registering all marine recreational fishers and (2) MS will need to ensure that recreational fishers report catches of certain species – for which recreational fishing opportunities exists or rebuilding plans – electronically. Currently this would affect the following species: western & eastern Baltic cod, Baltic salmon, northern sea bass and ICCAT species e.g., Tuna.

In general, this is a good development, because this regulatory change could deliver numbers of sea anglers and hopefully also personal data to reduce costly population surveys to estimate numbers of anglers and enable reaching out to the angling population to recruit respondents for example for panel surveys. However, the new Control Regulation also poses a major administrative effort for MS and response burden of over 8.7 million recreational anglers in Europe to deliver data electronically. In addition, this development poses a major threat to recreational data collection & data quality as MS may retreat to the position that they are fulfilling their data collection obligations regardless of the DCF requirements. Relying on electronic catch reporting without ground proofing the "self-reported" data will most likely erode data quality and the statistical robustness of the collected recreational data. End users and administrations need to be aware that the Control Regulation provides another mechanism to collect recreational fisheries data besides EUMAP.

Also one needs to be aware that the Control Regulation only covers species for which recreational fishing opportunities exist or which are under rebuilding plans, however, catches and effort of recreationally targeted species can become important or negligible over time so multispecies surveys are needed (species focus does not allow for this).

The revised European Fisheries and Aquaculture Statistics Regulation stipulates that: "*Statistical population of natural or legal persons exercising recreational fisheries in the Union & Volume of catches from recreational fisheries exploiting marine biological resources*" need to be provided annually. Without explanation the collected data will however be completely useless due to:

- Data gaps: not all countries collect recreational fisheries data and the catch data collected varies between countries.
- Catch not defined: catches include a take (harvest) and a discard (release) component, but data are inconsistent and it is often unclear which component is meant.
- Time inconsistency: not all countries report data every year, for example because surveys are conducted less frequently (e.g. biennially), accordingly there is no consistency between years as intermittent data is often not provided.
- DCF species and regions: there are differences in reporting catches by species and regions due to different DCF requirements.

3. Species list submitted to Commission

A species list was developed by WRGFS during the 2022 meeting covering regional seas. This was submitted to the Commission in spring 2023. The list can also be found on the sharepoint. ISSG Recreational notes that in general multispecies surveys are recommended as the costs are not significantly greater than for single species data collection. Also some recreational fisheries develop over time and/or become negligible. In addition, non-assessment relevant stocks could be relevant from an ecosystem point of view, e.g. achieving GES (DG Environment).

4. Incorporate recreational data into RDBES: no progress

In general, it can be assured that a central database to host recreational data is wanted. Attribute tables were developed years ago and provided to the RDBES core group. A voluntary test data call launched along the 2022 WGRFS meeting yielded no data. Accordingly, WGRFS organized an ICES Workshop on Recreational Fisheries in Stock Assessments (WKRFSA) which will take place on the 3rd-5th of July 2023. Prior to WKRFSA a mandatory data call was launched to explore the inclusion of recreational data into stock assessments. This will also provide the opportunity to allow checking data formats from recreational data provided by individual MS for inclusion into the RDBES.

During the TM it was assured that the RDBES core group is still working on including recreational data into the RDBES. The process was delayed but momentum will be resumed. It will also be explored if it rather makes sense to duplicate the RDBES and set up a separate standalone database to host the recreational data (possibly alongside with data from the ISSG Diadromous). A roadmap who is meeting with whom still needs to be agreed.

14.4 Roadmap/follow-up

ISSG Recreational Fisheries annual meeting was postponed to summer 2023 – consultation with SG members will start during this years WGRFS meeting in June.

1. A critical question remains concerning the developments of RWPs, particularly if MS have varying expertise and enthusiasm to conduct recreational fisheries surveys?

The following tasks for the period (2023-2024) were adopted:

- Develop Regional Work Plans
- Control Regulation follow up: impact on recreational fisheries
- WKRFSA Follow up: Incorporation of recreational fisheries data in the assessment working groups
- RDBES Core group support in the development of the RDBES to incorporate recreational fisheries data

14.5 SG Participants

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15 ISSG Regionally Coordinated Stomach Sampling

15.1 Background

Fundamental changes in the importance of natural versus fishing induced mortality have been observed in the North Atlantic while moving towards maximum sustainable yield (MSY) management targets. The reduction of fishing mortality in combination with successive recovery of fish stocks, especially of some larger predatory species, led to an increasing natural mortality as opposed to fishing mortality. Consequently, estimates of natural mortality have become more important for stock assessments and forecasts. In general, information on prey availability, competition and predation processes in fish stomachs are needed to support several policies (e.g., Common Fisheries Policy (CFP), EU Marine Strategy Framework Directive (MSFD)) that envisage an Ecosystem Approach to Fisheries (EAF) and an Ecosystem Based Fisheries Management (EBFM). Assessing trophic relations with detailed stomach contents analysis increases knowledge on suitable stock-recruit models (e.g., density dependent effects like cannibalism), assessment of fish species (e.g., estimates of Natural Mortality), reliable Biological Reference Points (BRP) considering species interactions, all aiming at providing a more appropriate framework for the implementation of multi-annual management plans. New data on predation is also important for providing both tactical and strategic advice for management of marine ecosystems (FAO 2008), since they positively contribute to the quality of the tools used to quantitatively assess their dynamics (i.e. multispecies assessment models, ecosystem models, etc.). A DG MARE tender (Contract No MARE/2012/02-SI2.632887) pilot study on stomach sampling in the North and Baltic Seas was able to demonstrate, in cooperation with the ICES Working Group on Multi Species Stock Assessment Methods (WGSAM), that cost-effective sampling of stomachs is possible during existing surveys. It was possible to analyse stomachs in a cost-effective manner with the help of national labs and/or external contractors. Results of the FishPi project (EU MARE/2014/19) conclude that opportunistic stomach sampling on existing DCF surveys is a promising way forward. However, missing regional coordination was identified a challenge. The lack of coordination leads to unbalanced sampling effort resulting in a lack of statistically sound sampling of all key species needed for food web characterisation and finally to a barrier for moving towards an Ecosystem Approach to Fisheries (EAF).

The main objective of the ISSG Regionally Coordinated Stomach Sampling is to establish a regionally coordinated stomach sampling program – potentially covering on-board sampling, stomachs analyses in laboratory, data storage and report – in European waters, starting with the North Sea, Skagerrak and Kattegat as a case study.

Chairs: Pierre Cresson (France), Matthias Bernreuther (Germany).

15.2 Work-plan

Terms of Reference

1. Organize a workshop on the finalization of the stomach sampling plan and methods
2. Coordinate the International Bottom Trawl Survey (IBTS) stomach sampling and propose different options for the analysis of collected samples
3. Better define the costs allocated to sampling and analyses

15.3 Progress during 2022/2023

The ISSG met twice during the 2022/2023 period (16 November 2022 and 28 April 2023), to discuss the work done on the terms of reference. Both meetings were held online and were attended by 15 and 14 participants respectively.

Communication with the IBTSWG on the status and future of the stomach sampling during the IBTS

Pierre Cresson joined the IBTSWG 2023, held in Lysekil, Sweden, on 28 March 2023 for a discussion on the status, progress and problems or challenges associated with the stomach sampling and storage of the samples. 4 points were included in the discussion:

(1) Collecting the number of stomachs collected during IBTS Q3 2022 and Q1 2023
(2) Discussion on a protocol to automatize the sharing of these numbers between IBTSWG and Stomach Content ISSG
(3) Discussing the coordination of the work between ISSG and IBTSWG
(4) Discussion about general issues, notably having feedback from national cruise leaders, on the implementation of the on-board collection protocol.

The vast majority of the time was devoted to the discussion on the future of the sampling and is reported under ToR 2 below.

Communication with the IBTSWG allowed the collection of the number of stomachs collected during IBTS Q3 2022 and Q1 2023, along with the data already available for IBTS Q1 2022 (Table 15.1)

The participation of Pierre Cresson, and position of the IBTSWG regarding the future of stomach collection and analysis will be included in the IBTSWG report, to be published at the end of May.

Year	Quarter	Species	Germany	Denmark	France	Netherlands	Norway	Sweden	Scotland	England	UK	Total
2022	Q1	Megrim	0	0	0	0	80	0	-	-	0	80
		Monkfish	0	2	0	8	49	0	-	-	7	66
		Whiting	36	156	526	412	463	310	-	-	37	1 940
	Total		36	158	526	420	592	310	-	-	44	2 086
	Q3	Megrim	0	0	0	0	16	0	72	0	-	88
		Monkfish	1	12	0	0	1	7	77	41	-	139
		Whiting	170	209	0	0	51	275	491	0	-	1 196
	Total Q3		171	221	0	0	68	282	640	41	-	1 423
	Total 2022		207	379	526	420	660	592	640	41	44	3 509
2023	Q1	Brill	1	1	0	3	nd	8	-	-	0	5
		Cod	61	39	85	175	nd	316	-	-	311	671
		Dogfish	1	0	0	5	nd	0	-	-	0	6
		Halibut	0	2			nd	0	-	-	0	2
		Horse Mackerel	0	1	18	22	nd	47	-	-	101	142
		Ling	0	3		1	nd	4	-	-	21	25
		Pollock	0	4			nd	4	-	-	0	4
		Tub Gurnard	0	3	40		nd	2	-	-	1	44
		Turbot	0	1	3	10	nd	3	-	-	1	15
		Whiting	0	0		300	nd	0	-	-	0	300
		Rays and skates	0	0		0	nd	5				
	Total 2023		63	54	146	516	nd	389	-	-	435	1 214
	Total		270	433	672	936	660	981	640	41	435	5 068

Table 15.1: Number of stomachs collected during IBTS, by species, country, year and quarter. Data for Q1 2023 for Norway were not available at the time of this report. Numbers for Scotland and England are reported by country or summed for UK.

ToR 1: Organize a workshop on the finalization of the stomach sampling plan and methods

The ISSG Stomach sampling met online on 16 November 2022 to work on a) the at-sea stomach sampling manual and b) the laboratory stomach content analysis manual (15 participants). The final manuals were formatted and approved during the second online ISSG Stomach sampling meeting on 28 April 2023 (Annexes 15.1 and 15.2).

ToR 2: Coordinate the International Bottom Trawl Survey (IBTS) stomach sampling and propose different options for the analysis of collected samples

An active coordination of the International Bottom Trawl Survey (IBTS) stomach sampling was not explicitly necessary. The communication between the two groups (IBTS working group, IBTSWG, and this group) had been established, and two exchange and feedback meetings between the IBTSWG and the RCG ISSG Stomach sampling have been arranged. A favorable aspect that simplifies the work is the fact that some members of this RCG ISSG are also members of the IBTSWG and are actively involved in the IBTS, which facilitates the communication. The result of this communication was the collection of stomachs during the first and third quarter IBTS in 2022 and during the first quarter in 2023.

The IBTSWG has been willing to sample the stomachs in 2022 and 2023, without additional funding despite the extra workload requested for this task, as a starter to initiate this protocol. The IBTSWG is now concerned by the uncertainties regarding the future of this protocol.

Sampling is an extra burden during surveys. As stomachs already collected are not analysed, freezers are getting full in most laboratories and space in freezers is limited. The risk of sample degradation due to freezers malfunctioning cannot be excluded if samples are to be stored for long period of time.

In this context, it is not apparent for the IBTSWG whether the samples will be analysed in the near future. The IBTSWG recommendation is to suspend the stomach sampling for the short term, until the analysis issues are solved. If funding is not available in the short-term, an indication of how long the samples being held frozen are viable for should be provided.

ToR 3: Better define the costs allocated to sampling and analyses

A prerequisite for a proper estimation of the costs associated with stomach sampling is a relatively realistic estimation of stomach samples to be expected annually. Therefore, we have updated the species list of the rolling stomach sampling plan. Up to now, the numbers of the minor species and elasmobranchs have been neglected, but we have remedied this neglect during the 2022/2023 ISSG period.

Updated numbers for the expected stomachs from 2025 to 2027

Based on the accepted species list for the stomach sampling in the North Sea (Annex 15.3), the numbers of the expected stomachs sampled during the IBTS in quarters 1 and 3 were updated (Table 15.2). The numbers for the main species remained unchanged, sampling 2 stomachs per 5 cm length class and species (RCG NA NS&EA RCG Baltic 2022), but the previously not estimated numbers for the "minor" species and the sharks, rays and skates (elasmobranchs) were added to the total numbers. For this, all caught minor species were regarded as "sampled" for the analyses. The elasmobranchs were only sampled when the assessment of the specimen was that it was dying and the probability of survival was evaluated as being low. Based on a review paper of Ellis et al. 2017 on the capture and post-release mortality of elasmobranchs, we estimated the numbers of expected stomachs from elasmobranchs based on a mortality rate of 10%. The resulting numbers ranged from 188 expected stomachs for France (only quarter 1) in 2025 to 1268 expected stomachs for Scotland (quarters 1 and 3) in 2025, while the numbers for the other years and countries varied between these two extremes.

NOTE: According to new information on the distribution and feeding of Atlantic mackerel, the inclusion of mackerel in the sampling plan in quarter one appears necessary. Mackerel stomachs were visually inspected to check whether a full-scale sampling in the future 1st quarter surveys may make sense. From 67 individuals examined 18 fish, i.e., 27 %, were feeding, either on planktonic crustaceans (n=14) or sandeels (n=4). However, the size range of the mackerel caught was almost limited to juveniles (15-21 cm length) (personal communication Kai Wieland, DTU Aqua).

Therefore, the group decided to include the stomach sampling of mackerel in quarter one. However, due to time constraints, the numbers for expected stomachs of mackerel to sample in Q1 have not been included in this report, but will be included, in the next updated sampling plan.

Table 15.2: Updated stomach sampling numbers for 2025 to 2027.

Nation	Year	Quarter	Main species	expected number of stomachs (Main)	Quarter	expected number of stomachs (Minor)	Sum of all stomachs per year and nation (Main + Minor)
Denmark	2025	1	Haddock	59	1	21	380
		3		64	3	72	
		3	Mackerel	165			
England	2025	3	Haddock	294	3	118	645
		3	Mackerel	233			
France	2025	1	Haddock	35	1	115	188
		1	Mackerel	39			
Germany	2025	1	Haddock	426	1	113	724
		3		26	3	59	
		3	Mackerel	100			
Netherlands	2025	1	Haddock	74	1	113	241
		1	Mackerel	54			
Norway	2025	1	Haddock	248	1	93	857
		3		250	3	122	
		3	Mackerel	144			
Scotland	2025	1	Haddock	347	1	98	1268
		3		443	3	111	
		3	Mackerel	270			

Nation	Year	Quarter	Main species	expected number of stomachs (Main)	Quarter	expected number of stomachs (Minor)	Sum of all stomachs per year and nation (Main + Minor)
Sweden	2025	1	Haddock	123	1	194	593
		3		92	3	80	
		3	Mackerel	105			
Denmark	2026	1	Saithe	6	1	21	456
		3		22			
		1	Grey gurnard	150			
		3		183	3	72	
		1	Red gurnard	1			
		3		1			
England	2026	3	Saithe	183	3	118	573
		3	Grey gurnard	263			
		3	Red gurnard	9			
France	2026	1	Saithe	0	1	115	312
		1	Grey gurnard	186			
		1	Red gurnard	11			
Germany	2026	1	Saithe	180	1	113	854
		3		14			
		1	Grey gurnard	336			
		3		118	3	59	
		1	Red gurnard	34			
		3		0			
Netherlands	2026	1	Saithe	0	1	113	288
		1	Grey gurnard	161			
		1	Red gurnard	14			
Norway	2026	1	Saithe	169	1	93	1036
		3		292			
		1	Grey gurnard	186			
		3		169	3	122	
		1	Red gurnard	4			
		3		0			
Scotland	2026	1	Saithe	74	1	98	1128
		3		172			
		1	Grey gurnard	219			
		3		319	3	111	
		1	Red gurnard	87			
		3		48			
Sweden	2026	1	Saithe	62	1	194	604

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Nation	Year	Quarter	Main species	expected number of stomachs (Main)	Quarter	expected number of stomachs (Minor)	Sum of all stomachs per year and nation (Main + Minor)
		3		96			
		1	Grey gurnard	98			
		3		75	3	80	
		1	Red gurnard	0			
		3		0			
Denmark	2027	1	Whiting	158	1	21	427
		3		173			
		1	Anglerfish	1			
		3		1	3	72	
		1	Megrim	1			
		3		0			
England	2027	3	Whiting	317	3	118	504
		3	Anglerfish	20			
		3	Megrim	49			
France	2027	1	Whiting	258	1	115	373
		1	Anglerfish	0			
		1	Megrim	0			
Germany	2027	1	Whiting	387	1	113	723
		3		89			
		1	Anglerfish	29			
		3		1	3	59	
		1	Megrim	45			
		3		0			
Netherlands	2027	1	Whiting	227	1	113	341
		1	Anglerfish	1			
		1	Megrim	0			
Norway	2027	1	Whiting	218	1	93	792
		3		207			
		1	Anglerfish	23			
		3		22	3	122	
		1	Megrim	46			
		3		60			
Scotland	2027	1	Whiting	269	1	98	976
		3		367			
		1	Anglerfish	16			
		3		22	3	111	
		1	Megrim	36			

Nation	Year	Quarter	Main species	expected number of stomachs (Main)	Quarter	expected number of stomachs (Minor)	Sum of all stomachs per year and nation (Main + Minor)
		3		57			
Sweden	2027	1	Whiting	181	1	194	586
		3		128			
		1	Anglerfish	3			
		3		1	3	80	
		1	Megrim	0			
		3		0			

Costs for stomach content analyses

Based on the updated stomach numbers in Table 15.2, we estimated the costs for the analyses of the stomachs. We multiplied the stomach numbers with the minimum cost of 12 € and a maximum cost of 23 € per stomach (Table 15.3).

Table 15.3: Numbers and potential costs of the stomach samples from 2025 to 2027

Nation	Year	Sum of all stomachs per year and nation (Main + Minor)	Minimum costs for content analyses (12€ per stomach)	Maximum costs for content analyses (23€ per stomach)	Sum of all stomachs per nation (Main + Minor)	Minimum costs for content analyses (2025 to 2027)	Maximum costs for content analyses (2025 to 2027)
Denmark	2025	380	4561	8742	1263	15160	29056
	2026	456	5473	10490			
	2027	427	5125	9823			
England	2025	645	7734	14824	1722	20659	39597
	2026	573	6876	13180			
	2027	504	6048	11593			
France	2025	188	2260	4331	873	10475	20077
	2026	312	3742	7172			
	2027	373	4474	8575			
Germany	2025	724	8691	16657	2302	27620	52939
	2026	854	10251	19647			
	2027	723	8679	16634			
Netherlands	2025	241	2890	5539	871	10446	20022
	2026	288	3460	6632			

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	2027	341	4096	7851			
Norway	2025	857	10284	19711	2684	32209	61733
	2026	1036	12426	23817			
	2027	792	9498	18205			
Scotland	2025	1268	15217	29166	3372	40468	77563
	2026	1128	13537	25946			
	2027	976	11713	22450			
Sweden	2025	593	7116	13638	1784	21407	41030
	2026	604	7254	13903			
	2027	586	7038	13489			

The total number of stomach samples for the period 2025 to 2027 is expected to be 14 871 (Table 15.4) which would mean an average of approx. 5 000 stomachs that have to be analysed by one stomach analysis center (SAC) and the costs for the analysis (no other costs such as transport and administration included) would range from a minimum of approx. 65 000 € to a maximum of 125 000 € annually. If the stomachs would be allocated to e.g. 3 SAC, the amount of stomachs would lie around 1 600 to 1 700 stomachs annually.

Table 15.4: Summary of the numbers and the associated costs for 2025 - 2027 and as a sum and an average for the that period.

Year	no. Stomachs	Cost analysis min (12 € per stomach)	Cost data entry (10% of stomach content analysis)	Cost analysis min incl. data entry	Cost analysis max (23 € per stomach)	Cost data entry (10% of stomach content analysis)	Cost analysis max incl. data entry
2025	4896	58752	5875	64627	112608	11261	123869
2026	5252	63024	6302	69326	120796	12080	132876
2027	4723	56676	5668	62344	108629	10863	119492
sum	14871	178452	17845	196297	342033	34203	376236
average	4957	59484	5948	65432	114011	11401	125412

When considering the additional associated costs to the stomach content sampling and analysis (e.g. additional staff costs on board the research vessels, transport, data storage, processing and management), the minimum and maximum average annual costs are expected to vary between 172 000 and 232 000 € (Table 15.5). Compared to the cost estimation in last year´s report, an 8% increase in costs due to the inflation were added. However, it is pretty complex to accurately estimate how these costs should be re-evaluated to take the inflation into account.

Table 15.5: Expected average annual minimum and maximum costs associated with the stomach sampling in the period 2025 to 2027.

Cost component	Average annual minimum costs (€)	Average annual maximum costs (€)
Stomach analyses + data entry	65 432	125 412
Transport of samples	11 000	11 000
Additional staff costs on-board	82 000	82 000
Data storage, processing and management	8 000	8 000
Miscellaneous expenses	5 500	5 500
SUM	171 932	231 912

15.4 Roadmap/follow-up

Future tasks

- Incorporate mackerel in quarter 1 into the sampling plan and update the expected stomach numbers.
- Convince decision makers to allocate financial resources for the analysis of stomach contents.
- Coordinate the stomach sampling program and the stomach content analyses.

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References

- Ellis, J.R., McCully Phillips, S. R. & Poisson, F. (2017). A review of capture and post-release mortality of elasmobranchs. Journal of Fish Biology 90, 653–722.
- RCG NA NS&EA RCG Baltic 2022. Regional Coordination Group North Atlantic, North Sea & Eastern Arctic and Regional Coordination Group Baltic. 2022. Part I Report, 100 pgs. Part II Decisions and Recommendations, 13 pgs. Part III, Intersessional Subgroup (ISSG) 2021-2022 Reports, 159 pgs. (https://datacollection.jrc.ec.europa.eu/docs/rcg)
- Robb, A.P. (1992). Changes in the gall bladder of whiting (*Merlangius merlangus*) in relation to recent feeding history. ICES J. Mar. Sci. 49, 431-436.

ANNEX 15.1 – Step-by-step at -sea sampling manual

Regional Coordination Group
North Atlantic
North Sea & Eastern Arctic

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Baltic

DCF Regional Coordination Group North Atlantic, North Sea, and Eastern Arctic (RCG NANSEA) + Baltic (RCG Baltic)

- At-sea Stomach sampling manual -

General

- Stomachs should be selected randomly within 5-cm groups, but can be taken from fish sampled for maturity and age determination. The stomachs are frozen individually in plastic bags together with a label describing the sampled fish. Only predators larger than or equal to 15 cm should be sampled as fish below this size are generally not piscivorous. Deviations from this rule could apply to e.g. Atlantic mackerel and Horse mackerel, which may feed on fish larvae and post-larvae at sizes smaller than 15 cm total length (Table 1). Fish smaller than 15 cm total length may be frozen as a whole fish. Note: This 15 cm threshold may vary in other regions of the North Atlantic and Mediterranean, sampling other fish species.
- Data are recorded in the ICES exchange format on the labels used for year, quarter, ship and haul consistent with those used for haul information uploaded to DATRAS (Table 2 and 3). This assures accessibility of further haul details if necessary. **Note**: The ICES Fish stomach database is under review (April 2023).
- Note: All photographs were taken by Karolina Wikström (SLU) who owns the copyright.

Selection of stomachs at sea

The selection of stomachs should be based on the following stomach classification:

1. *Everted stomach*. Some fish have everted stomachs due to the pressure difference between trawling depth and the surface of the sea. Since it is not known whether these stomachs contained food or not, such ones should not be sampled.

2. *Stomach showing evidence of regurgitation*. Some fish have regurgitated all or part of their stomach contents and these stomachs should not be sampled. The number of such stomachs encountered during the examination must however be recorded to ensure that the proportion of feeding fish in the sample is accurately defined. In practice, it is often difficult to tell whether regurgitation has taken place, except in situations of prey remains in mouth or pharynx.

3. *Non-everted stomach showing no evidence of regurgitation* – with or without contents – should be sampled. It should be noted that not all feeding fish have significantly distended stomachs, i.e. feeding does not necessarily mean full.

4. *Empty stomach* is included in the category *Non-everted Stomach of a fish showing no evidence of regurgitation*.

The stomachs sampled at sea should thus originate from feeding fish showing no evidence of regurgitation (category 3) and from non-feeding fish (empty stomachs; category 4). The sampling should continue until at least two stomachs classified in one of these two categories per length class are obtained.

Step-by-step picture sampling guide

Protocol for stomach sampling at sea

Strep 1. Collect predators according to the sampling scheme elaborated for each sea area and predator species (in this case North Sea, Skagerrak and Kattegat; Table 1).

Step 2. Do not sample everted stomachs -> Look into the mouth, if you see the stomach or parts of it, dot not sample!

Step 3. Check the individual predators for evidence of regurgitation -> Look into the mouth. If you see prey or prey remains in mouth or pharynx, do not sample, but remember to record them. However, if you see perfectly fresh prey in mouth or esophagus, this could indicate net feeding, and this “prey” should be removed and the stomach can be sampled.

Step 4. Measure total length below (cm), weigh the fish (in g) and register the information (and the relevant subsequent information) either on paper protocol or in national on-board data system.

Figure 1

Step 5. Stun the fish by a blow to the head and kill it with a cut through the throat. Continue to cut until the esophagus is severed (Fig. 1).

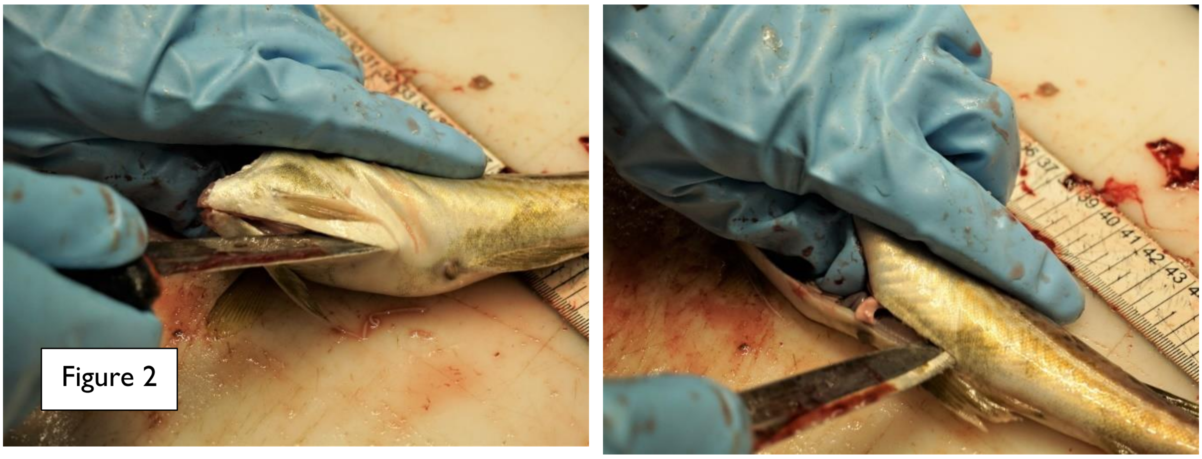
Figure 2

Step 6. Cut the ventral side from throat to anus, but not through it, using knife or scissors (Fig. 2). By keeping the fish on its right side (looking into the abdominal cavity from the left side) the gall bladder is exposed to the viewer which facilitates the stomach removal process.

Step 7. Open the fish and determine the sex and (optionally) the maturity stage.

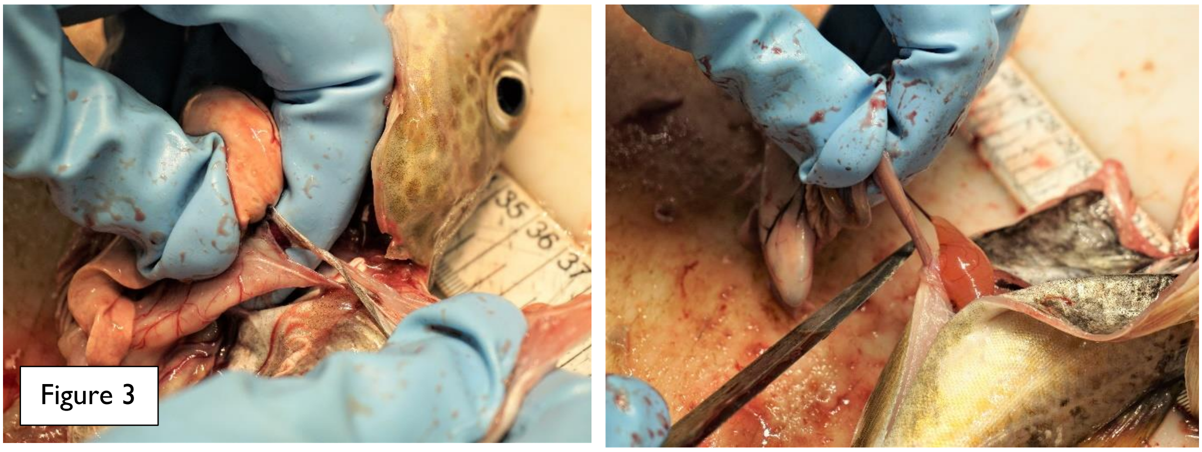
Figure 3

Step 8. The esophagus should already be cut through (or almost), but the liver is still attached to the dorsal side of the fish. Cut or tare the connective tissue to remove it (Fig. 3). Remove intestinal package from the body cavity and cut the colon close to the anus. If the colon is full of runny substance the anus can be left attached to the colon as a natural clamp to keep the contents contained. Gonads should not stay attached to the intestinal package but should be removed from the fish (if they are large and will significantly impact the gutted weight).

Figure 4

Step 9. Carefully cut the liver off the intestinal package, and make sure to leave the gallbladder intact and still attached to the intestinal package (Fig. 4). Note the gallbladder stage (1-4, Table 4, Fig. 1). However, reporting the gallbladder status is not mandatory, but may be useful for gadoids. Place the intestinal package in a labeled plastic bag. Collect all stomachs from the same species and haul in a larger bag and freeze it quickly.

Figure 5

Step 10. Remove heart and gonads from the fish (if not done previously) and note the gutted fish weight (Fig. 5). The kidney should not be removed. Collect otoliths and store in a labeled paper bag.

For flatfishes (steps 1 to 4 identical to roundfishes):

Figure 6

Step 5. Kill the fish before starting the dissection by using a blow to the head. Make a small incision between the ventral fin and the anus to allow for easier access, using knife/scalpel or scissors. Be careful not to cut through the anus. Cut along the abdominal cavity to access the stomach (Fig. 6).

Figure 7

Step 6. Sever esophagus and the connective tissue to the liver (Fig. 7).

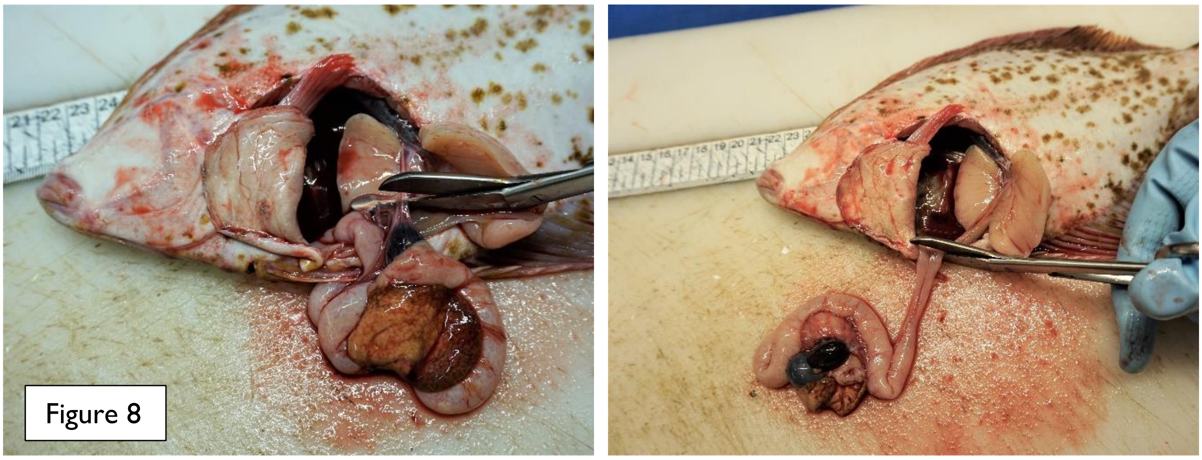

Figure 8

Step 7. Flip the intestinal package out and cut the connective tissue to the gall bladder and the colon close to the anus (Fig. 8). If the colon is full of runny substance the anus can be left attached to the colon as a natural clamp to keep the contents contained.

Figure 9

Step 8. Cut the connective tissue to the liver to remove it, careful not to damage the gallbladder (Fig. 9). Note the gallbladder stage (1-4, Table 4, Figure 1). However, reporting the gallbladder stage is not mandatory. Place the intestinal package in a labeled plastic bag. Collect all stomachs from the same species and haul in a larger bag and freeze it quickly.

Step 9. Be aware: For flatfishes, the gonads are left in the body when noting the gutted weight (Fig. 10).

Additional information:

- For minor species (Table 1) it is mandatory to measure length, weight and determine sex (determining maturity, measuring liver weights and taking otoliths for age reading is optional).
- Either analyze the stomach contents at the laboratory or send the frozen stomachs to the stomach analysis center (SAC) upon arrival (have to be established!).
- It is recommended that the predator (and prey) species are recorded using WORMS' AphiaID codes (http://www.marinespecies.org/aphia.php).
- Fallback option: In case of time constraints, entire fish can be frozen and the sample bags should be labelled accordingly (Table 2).

Tables

Table 1. Updated 5-year rolling sampling plan (November 2022)

<table>
<tr><th>Year</th><th>Quarter</th><th>Species</th><th>"Minor" species sampled each year</th><th>Species to be sampled opportunistically each year (dead specimens; live specimens are generally released)</th></tr>
<tr><td rowspan="6">1</td><td>1</td><td rowspan="2">Whiting</td><td rowspan="24">Turbot
Brill
Pollack
Tusk
Ling
Tub gurnard</td><td rowspan="24">Starry ray
Cuckoo ray
Thornback ray
Spotted ray
Common skate-complex
Spurdog
Tope
Halibut</td></tr>
<tr><td>3</td></tr>
<tr><td>1</td><td rowspan="2">Anglerfish</td></tr>
<tr><td>3</td></tr>
<tr><td>1</td><td rowspan="2">Megrim</td></tr>
<tr><td>3</td></tr>
<tr><td rowspan="4">2</td><td>1</td><td rowspan="2">Cod</td></tr>
<tr><td>3</td></tr>
<tr><td>1</td><td rowspan="2">Horse Mackerel</td></tr>
<tr><td>3</td></tr>
<tr><td rowspan="4">3</td><td>1</td><td rowspan="2">Hake</td></tr>
<tr><td>3</td></tr>
<tr><td>1</td><td rowspan="2">Plaice</td></tr>
<tr><td>3</td></tr>
<tr><td rowspan="4">4</td><td>1</td><td rowspan="2">Haddock</td></tr>
<tr><td>3</td></tr>
<tr><td>1</td><td rowspan="2">Mackerel</td></tr>
<tr><td>3</td></tr>
<tr><td rowspan="6">5</td><td>1</td><td rowspan="2">Saithe</td></tr>
<tr><td>3</td></tr>
<tr><td>1</td><td rowspan="2">Red gurnard</td></tr>
<tr><td>3</td></tr>
<tr><td>1</td><td rowspan="2">Grey gurnard</td></tr>
<tr><td>3</td></tr>
</table>

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Table 2. Label to be included in each stomach bag

Ship + Cruise/survey-No.
Station/haul number
Date
Species
Total body length (cm)
Wet weight (g)
Sample ID

Table 3. ICES data exchange format for stomach data (https://www.ices.dk/data/data-portals/Pages/Fish-stomach.aspx). NOTE: Gear code might be added.

Field	Description
Dataset	Dataset name
RecordType	SS for single stomach
Country	Country that collected the data
Ship	Vessel that collected the data
Latitude	Data sampling position – latitude
Longitude	Data sampling position – longitude
Estimated_Lat_Long	Flag whether the sampling position based on the reported area
ICES_StatRec	ICES statistical rectangle
ICES_AreaCode	ICES area code
Year	YYYY
Month	MM
Day	DD
Time	Sampling time: HHMM
Station	Station reference
Haul	Haul number
Sampling_Method	Predator sampling method code
Depth	Sampling depth
Temperature	°C
SampleNo(FishID)	Predator reference code – Fish ID unique for country, year, quarter and ship
ICES_SampleID	ICES predator reference
Predator_AphiaID	Predator WoRMS AphiaID
Predator_LatinName	Predator taxon Latin Name

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Field	Description
Predator_Weight(mean)	(Mean) predator weight
Predator_Age(mean)	(Mean) predator age
Predator_Lengh(mean)	(Mean) predator length
Predator_LowerLengthBound	Predator´s length lower bound
Predator_UpperLengthBound	Predator´s length upper bound
Predator_CPUE	Predator catch per hour
GallBladder_stage(class)	Gall bladder stage
Stomach_METFP	Method of stomach preservation
Stomach_TotalNo	Total number of stomachs in the pool. Should always be 1.
Stomach_WithFood	Number of stomachs with food. Can be 0 or 1.
Stomach_Regurgitated	Number of stomachs regurgitated. Can be 0 or 1.
Stomach_WithSkeletalRemains	Number of stomachs with skeletal remains. Can be 0 or 1.
Stomach_Empty	Number of empty stomachs. Can be 0 or 1.
Stomach_ContentWgt	Stomach content weight
Stomach_EmptyWgt	Stomach empty weight (This field is in historical data but no longer considered necessary)
Stomach fullness	Stomach fullness (This field is in historical data but no longer considered necessary)
Stomach_Item	Stomach item name
ICES_ItemID	ICES stomach item ID
Prey_AphiaID	Prey WoRMS AphiaID
Prey_LatinName	Prey taxon Latin Name
Prey_IdentMet	Prey identification method
Prey_DigestionStage	Prey digestion stage
Prey_TotalNo	Total number of preys
Prey_Weight	Prey weight in grams
Prey_LengthIdentifier	Prey length identifier
Prey_Length	Prey length in mm
Prey_LowerLengthBound	Prey length lower bound
Prey_UpperLengthBound	Prey length upper bound
Prey_MinNo	Minimum number of preys (This field is in historical data but no longer considered necessary)
Remarks	Any relevant comments

Table 4. Condition of gall bladder, bile and hindgut, which can be used to differentiate between empty and regurgitated stomachs (from Robb 1992).

Stage	Gall bladder	Bile colour	Hind gut	State
1	Shrunken, empty or with small amount of bile	Pale	Contains large amounts of bile and digested food material	Feeding*
2	Elongate	Pale green to light emerald green	Contains some bile and digested food particles	Feeding*
3	Elongate	Dark green	Empty or contains some food particles	Empty
4	Round	Dark blue	Empty	Empty

*NB: If fish satisfying these criteria are found without food in their stomach, they should be classified as regurgitated

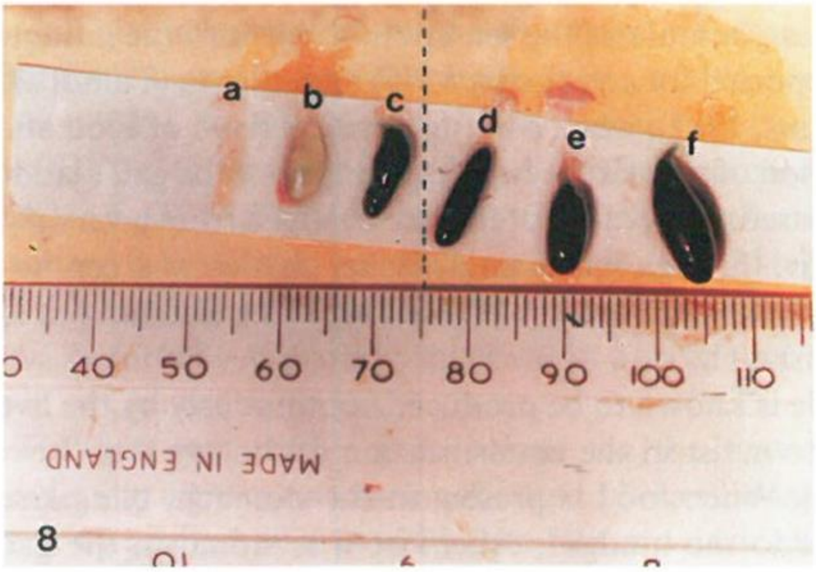

Figure 1. Different gallbladder stages of whiting, indicating: a-c feeding fish and d-f non-feeding fish (from: Robb, A.P. (1992). Changes in the gall bladder of whiting (*Merlangius merlangus*) in relation to recent feeding history. ICES J. Mar. Sci. 49, 431-436)

ANNEX 15.2 – Step-by-step laboratory stomach analysis manual

Regional Coordination Group
North Atlantic
North Sea & Eastern Arctic

Regional Coordination Group
Baltic

DCF Regional Coordination Group North Atlantic, North Sea, and Eastern Arctic (RCG NANSEA) + Baltic (RCG Baltic)

- Laboratory Stomach Analysis Manual -

Step-by-Step - Laboratory Stomach Analysis Manual

A - Sample Treatment

Sample types:

a) Deep frozen stomach
b) Deep frozen whole fish

Defrost only small numbers of samples because all defrosted samples have to be analysed fast and must not be frozen again!

B - Sample information

Variable names and table sections correspond to protocol below called "DCF Stomach Analysis Protocol" (Table1).

- Every predator fish gets its own Stomach Analysis Record
  -> Record No: 1 of 1
- If there is a need for a second Stomach Analysis Record, due to high numbers of different prey types:
  -> Record No: 2 of 2
- Name of the analysing person
  -> Analysed by: Tom Brady
- Date of first analysis
  -> e.g. Date: 12.02.2022
- Transfer the Sample Card to the Stomach Analysis Record (cross-check with the sampling information from the Station Logs, if available)

DCF Stomach Analysis			Date :		Analysed by :			Reocrd No:	
Sample information	Vessel	Cruise-No.	Survey	Sampling Date	Station #	Haul #	Gear	Fish	Stomach

- Vessel
  -> G.O. SARS, etc.
- Cruise-No.
  -> Cruise number, e.g. 45 or 22/06
- Survey
  -> use ICES DATRAS acronym (+ quarter if appropriate), e.g. NS-IBTS Q3
- Sampling Date
  -> ddmmyyyy
- Station #
  -> Station number, e.g. 256
- Haul #
  -> Haul number, e.g. 4
- Gear
  -> e.g. GOV, Kabeljauhopser, etc.
- Fish
  -> tick if the sample is the entire fish
- Stomach
  -> tick if the sample is only the stomach

C - Predator information

When the sample type is only the stomach, transfer the length and weight values from the onboard sampling protocol.

Predator information	Species				
	Fish ID	Total length (cm)	Predator weight (g)	Gutted weight (g)	

- Species
  -> Predator species in LATIN, e.g. *Gadus morhua*
- Fish ID
  -> use national or survey-specific numbering.
- Total length (cm below). NOTE: if other length measurement is conducted, please indicate.
  -> Total length of predator, accuracy to the nearest cm below.
- Predator weight (g)
  -> Total wet weight of predator, accuracy: 0.1 g
- Gutted weight (g)
  -> Gutted weight of predator, accuracy: 0.1 g, Gutted = remove all organs in the abdominal cavity

D - Stomach information

Stomach information	Full stomach weight (g)	Empty stomach weight (g)	Stomach content weight (g)	Stomach Full / Empty

- Full stomach weight (g)
  -> First remove all adherent water with a paper tissue, then weigh the stomach. Preferred weight accuracy: 0.001 g
- Empty stomach weight (g)
  -> Remove stomach content with tweezers and/or the use of water, then weigh the stomach wall. Preferred weight accuracy: 0.001 g
- Stomach content weight (g)
  -> Calculate difference between full and empty stomach (this should preferably be done at a later stage at the computer)
- **Be aware: It is also possible to skip the last three work steps and estimate the total stomach content by adding up the weights of all different prey species or types in the stomach!**

- Stomach Full / Empty
  -> Code to categorise Full / Empty Stomachs

  0 = empty stomach; there is no prey in the stomach, small amounts of mucus (<=0,2% body weight, BW) as well as non-dietary items, e.g. nematodes, tapeworms, sand or plastic particles do not count as prey items.

  1 = filled (non-empty) stomach; there is at least a single prey item (or a substantial amount of mucus, that means > 0,2% BW) in the stomach.

  2 = regurgitated according to gall bladder state

E - Prey information

Prey information	Stomach ID		Nematodes:			
Species / Taxon	Digestion stage	Prey Numbers	Prey Size (mm)	Measurement type	Prey weight (g)	Comments

- Stomach ID (often identical to Fish ID)

- Nematodes
  -> Number of nematodes in the stomach

  Semi quantitative scale: 0 = 0 nematodes
  + = up to 10
  ++ = up to 50
  +++ = over 50

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- Species / Taxon
  -> Fish prey (and relevant invertebrates, Table 2) should be identified to the most detailed level possible (species). Invertebrates are identified to at least larger taxon (mandatory) or if feasible to more detailed (e.g. genus or species) taxon (optional) (see Table Prey Codes in Table 2). All prey species are recorded using WoRMS' AphiaID codes (http://www.marinespecies.org/aphia.php).
- Digestion Stage (1 – 3 for fish and invertebrates; 0 for fish – net feeding)
  -> 1 = intact prey (skin, fins, flesh, legs is/are complete)

  2 = prey in more advanced stages of digestion, some appendages might be detached

  3 = skeletal material or remains (fish: no flesh, only bones, otoliths; invertebrates: shells, siphon, bristles, legs, cheliped, tails, heads, eyes, etc.)
- Prey Numbers
  -> Count all fish species and invertebrates (Table 2). Number of fish prey or relevant invertebrate prey organisms (Table 2) with identical digestion stages and sizes!
- Prey Size (mm)
  -> Measure size only if prey organism is complete (different length measurement types in table below).
  - Fish: Total length, TL, below in mm (or Standard length if TL is not possible)
  - Crab: Carapace width in mm
  - Shrimp: Distance between bases of rostrum and uropods in mm
  - Isopod (*Saduria entomon*): Total length (excl. antennae); pleotelson for partially digested individuals
- Measurement type

  -> Indicate what was measured, e.g. Total length (TL), Standard length (SL), etc.

Prey group	Length measured	Code
Vertebrata	Total length from snout to end of tail fin	TL
	Standard length from snout to basis of tail fin	SL
Crustacea	Total length of small crustaceans like mysids, krill and amphipods and intact *Nephrops*, shrimps, prawns and *Saduria entomon*.	TL
	Length from bases of eye stalks or rostrum to uropods or carapace length in the case of advanced digestion stage of nephrops, shrimps and prawns.	CL
	Carapace width of crabs	CW
	Pleotelson length of *Saduria entomon* in the case of advanced digestion stage.	PL
Cephalopoda	Mantle length	ML
	Beak length in the case of advanced digestion stage.	BL
Others	Total length of complete specimens	TL

- Prey weight (g)
  -> Digestion stage 1
  Individual mass of prey items; Preferred accuracy: 0.001g

  -> Digestion stages (2+3)

  Weight of group of the same taxon within the same digestion stage; accuracy: Preferred 0.001g

- Data are recorded in the ICES exchange format (Table 3). **Note**: The ICES Fish stomach database is under review (April 2023).

Table 1. DCF Stomach Analysis Protocol

DCF Stomach Analysis			Date :		Analysed by :				Reocrd No:	
Sample information	Vessel	Cruise-No.	Survey	Sampling Date		Station #	Haul #	Gear	Fish	Stomach
Predator information	Species									
	Fish ID		Total length (cm)		Predator weight (g)		Gutted weight (g)			
Stomach information	Full stomach weight (g)		Empty stomach weight (g)		Stomach content weight (g)			Stomach Full / Empty		
Prey information	Stomach ID			Nematodes:						

Species / Taxon	Digestion stage	Prey Numbers	Prey Size (mm)	Measurement type	Prey weight (g)	Comments

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Table 2. Prey codes (Aphia ID)

Taxonomic level	Prey group	Code
Phylum	Ctenophora	1248
Phylum	Cnidaria	1267
Phylum	Annelida	882
Species	*Aphrodita aculeata* (sea mouse)	231869
Phylum	Mollusca	51
Class	Gastropoda	101
Species	*Buccinum undatum* (common whelk)	138878
Class	Bivalvia	105
Species	*Aequipecten opercularis* (queen scallop)	140687
Species	*Pecten maximus* (king scallop)	140712
Class	Cephalopoda	11707
Phylum	Echinodermata	1806
Phylum	Arthropoda	1065
Subphylum	Crustacea	1066
Order	Mysida	149668
Order	Euphausiacea	1128
Order	Isopoda	1131
Species	*Saduria entomon*	293511
Order	Amphipoda	1135
Order	Decapoda	1130
Infraorder	Caridea	106674
Family	Crangonidae	106782
Species	*Crangon crangon* (brown shrimp)	107552
Family	Palaemonidae	106788
Species	*Palaemon adspersus* (Baltic prawn)	107613
Species	*Pandalus borealis* (northern prawn)	107649
Infraorder	Astacidea	106672
Species	*Nephrops norvegicus* (Norway lobster)	107254
Infraorder	Brachyura	106673
Species	*Cancer pagurus* (edible crab)	107276
Infraorder	Anomura	106671
Species	Pagurus bernhardus (hermit crab)	107232
	Other invertebrates	9990
	Plastic	9991
	Litter other than plastic	9992

Table 3. ICES data exchange format for stomach data (https://www.ices.dk/data/data-portals/Pages/Fish-stomach.aspx)

Field	Description
Dataset	Dataset name
RecordType	SS for single stomach
Country	Country that collected the data
Ship	Vessel that collected the data
Latitude	Data sampling position – latitude
Longitude	Data sampling position – longitude
Estimated_Lat_Long	Flag whether the sampling position based on the reported area
ICES_StatRec	ICES statistical rectangle
ICES_AreaCode	ICES area code
Year	YYYY
Month	MM
Day	DD
Time	Sampling time: HHMM
Station	Station reference
Haul	Haul number
Sampling_Method	Predator sampling method code
Depth	Sampling depth
Temperature	°C
SampleNo(FishID)	Predator reference code – Fish ID unique for country, year, quarter and ship
ICES_SampleID	ICES predator reference
Predator_AphiaID	Predator WoRMS AphiaID
Predator_LatinName	Predator taxon Latin Name
Predator_Weight(mean)	(Mean) predator weight
Predator_Age(mean)	(Mean) predator age
Predator_Lengh(mean)	(Mean) predator length
Predator_LowerLengthBound	Predator´s length lower bound
Predator_UpperLengthBound	Predator´s length upper bound
Predator_CPUE	Predator catch per hour
GallBladder_stage(class)	Gall bladder stage
Stomach_METFP	Method of stomach preservation
Stomach_TotalNo	Total number of stomachs in the pool. Should always be 1.
Stomach_WithFood	Number of stomachs with food. Can be 0 or 1.
Stomach_Regurgitated	Number of stomachs regurgitated. Can be 0 or 1.
Stomach_WithSkeletalRemains	Number of stomachs with skeletal remains. Can be 0 or 1.
Stomach_Empty	Number of empty stomachs. Can be 0 or 1.
Stomach_ContentWgt	Stomach content weight
Stomach_EmptyWgt	Stomach empty weight
Stomach fullness	Stomach fullness (This field is in historical data but no longer considered necessary)
Stomach_Item	Stomach item name
ICES_ItemID	ICES stomach item ID

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Field	Description
Prey_AphiaID	Prey WoRMS AphiaID
Prey_LatinName	Prey taxon Latin Name
Prey_IdentMet	Prey identification method
Prey_DigestionStage	Prey digestion stage
Prey_TotalNo	Total number of preys
Prey_Weight	Prey weight in grams
Prey_LengthIdentifier	Prey length identifier
Prey_Length	Prey length in mm
Prey_LowerLengthBound	Prey length lower bound
Prey_UpperLengthBound	Prey length upper bound
Prey_MinNo	Minimum number of preys (This field is in historical data but no longer considered necessary)
Remarks	Any relevant comments

ANNEX 15.3 – 5-year rolling stomach sampling plan

Year	Quarter	Species	expected no. of stomachs	Sum of all stomachs per year	"Minor" species sampled each year	Species to be sampled opportunistically each year (dead specimens; live specimens are generally released)
1	1	Whiting	1727	3547	Turbot Brill Pollack Tusk Ling Tub gurnard	Starry ray Cuckoo ray Thornback ray Spotted ray Common skate-complex Spurdog Tope Halibut
	3		1350			
	1	Anglerfish	75			
	3		67			
	1	Megrim	148			
	3		180			
2	1	Cod	1257	3346		
	3		1208			
	1	Horse Mackerel	306			
	3		575			
3	1	Hake	505	3856		
	3		934			
	1	Plaice	1206			
	3		1211			
4	1	Haddock	1362	3665		
	3		1221			
	1	Mackerel (Q3 only)				
	3		1082			
5	1	Saithe	534	4112		
	3		820			
	1	Red gurnard	159			
	3		58			
	1	Grey gurnard	1373			
	3		1168			

ANNEX 15.4 – Minutes from the ISSG "Stomach sampling" virtual meeting on 28 April 2023

Members of the ISSG Stomach sampling met virtually on 28 April 2023 between 9:00 and 15:00 CET. The agenda included a discussion of the work done since the Technical RCG meeting in June 2022 on the three TORs, and already presented in the dedicated sections of the following report. General discussions were also held after addressing specific discussions about TORs outcome.

The meeting gathered 14 participants from 10 countries.

Participants

Pierre Cresson (Ifremer - France)

Matthias Bernreuther (Thünen Institute, Germany)

Athanasios Evangelopolous (Greece - Fisheries Research Institute)

Dave Stokes (Marine Institute Ireland Galway)

Dominique Stolk (WMR Netherlands)

Izaskun Preciado (IEO Spain)

Joanna Pawlak (Fisheries research Poland)

Kai Wieland (DTU Aqua Denmark - coordinator of IBTS Q3)

Karolina Wikström (SLU-Sweden)

Laura Lemay (ILVO)

Oriol Canals (AZTI)

Marzenna Pachur (Fisheries Research Poland)

Nis Sand Jacobsen (DTU Aqua Denmark)

Voula Karachle (HCMR-Greece)

NB: speakers will be referred by their initial letters, with the exception of Kai Wieland and Karolina Wikström, who will be referred by their full names, as they share similar letters

Minutes

09:00 Start of the meeting (Pierre, Matthias)

- **Welcome, house rules, Introductions**
- **Adoption of the agenda**

MB: Stomach sampling governance group at ICES?

NSJ: not heard about this group.

Working on new upload format for stomach inclusion in ICES database - up and running mid-may

800 stomach for Baltic and North Sea - finish by November,

MB: should contact Cecila Kvaavik to work on stomach governance

09:30-10:15 Manuals (Pierre, Matthias)

- **On-board stomach sampling - manual**
- **Laboratory stomach - content analysis manual**

Discussion:

Kai Wieland: small horse mackerels could be taken - we had them in the survey but did not collect. Did we miss something?

MB: no, this was a protocol to start from somewhere, and have sth up and running. If results show, that smaller individuals of certain species need to be sampled, then they will be included in the sampling plan.

Kai Wieland: go down -> complex to get the stomach in small fish so get the entire fish

MB: ok, already included in the protocol

PC: important to keep the option to collect stomach or entire fish

IP: 15 cm threshold is regionally dependent

MB: ok. This protocol is already applicable to NANSEA, but we can consider this suggestion for future application in other areas.

DS: guidance on record on the everted stomachs on deeper hauls?

MB: we ask people at IBTSWG to collect stomachs, everything is set in the survey manual. Complex (impossible?) to ask them for specific protocol as we join on something already up and running

Karolina Wikström: where to place the stomach is not specified - add step 1 - 2 - 3 etc. to illustrate what part of the text the figures refer to.

PC: gallbladder status? Mandatory or not?

MB: leave it in when sampling but not mandatory to analyze it

JP: gall bladder is important notably for gadoids - will add pictures from Robb 1992 that will help to analyze bladders

Karolina Wikström: general question. Do you think the pictures illustrate the sampling correctly? Are correctly applicable at sea?

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MB: not that gentle during sampling

PC: OK to sample stomach but we have to pass after the usual protocols (otoliths and maturity). Change in protocol will take some time. In addition, no funding so not having too much asks

DS: add gear code on table 3 information

Karolina Wikström: what protocol for minor and rare species if they are not minor and rare - same for rays and sharks? Issue with computer assisted sampling - pop up to say collect/do not collect

PC: proposition; sample all if not abundant; 2 per 5 cm if too abundant

Karolina Wikström: need to be specified in the manual. That is what a manual is used for.

LL: if 50 spurdogs collect it but if they are all from the same area isn't it an over representation of this area?

MB: yes, but according to earlier studies we expect that only 10% die normally - If all die, sadly - collect it all

=> postpone and further discussed when Matthias will talk about numbers

JP: question about weight - are all weigh needed?

PC: yes, needed for model

LL: what type of length -add other measurement (tip length for elasmobranchs, fork length)

10:30-11:15 DCF funded test study on genetic analyses of stomach contents (Oriol)

- **15 min presentation on background and preliminary results followed by a 30 min discussion**

LL: difficult to estimate biomass via these methods. Able to do so?

OC: Not easy, but possible to use with "hard to detect" prey species like cnidarians.

PC: yes, DNA requires less systematic knowledge and this means that we have to be careful with the results. Weakness: No prey length can be determined by this method. And if no information in the gene databanks on specific prey species, then they are just not detected.

OC: Yes, regarding the length that is true, but could be valuable for stages like larvae and eggs. But in European waters, most species have been genetically identified.

PC: Fish diet experts should be involved in the interpretation of the results.

OC + PC: Both methods should complement each other (genetics + visual).

PC: Important to express that no method is perfect by itself, each method has strength/weaknesses

IP: genetic is another tool complementary to others, no panacea method - useful to address multispecies interactions - trophic matrices but to be completed by numeric data

MB: continue as a complementary method - not allowed in the future to catch as much samples as we has taken so far - complementary method should be useful. DNA is powerful to detect

How much does the analysis cost?

OC: preparation at lab, send to external lab for analyses - 400€ for up 600 samples

MB: problem regarding the cleanliness of the samples to be applied onboard

Kai Wieland: can't detect secondary prey. Visual inspection is missing cnidaria. Did you try visual inspection first and DNA then?

OC: prey of the prey of our target- theoretically DNA of the prey of the prey is more degraded so less observed

11:15-12:00 Stomach samples 2025 to 2027 (update) + potential annual costs (Matthias + Pierre)

- Update on the expected numbers of stomach samples 2025 to 2027
- Potential costs for one "Stomach analysis center (SAG)", 3 "SAG" etc.

JP: minimum cost is for Poland has to be increased 8€ -> 11€

Kai Wieland: why mackerel not included in Q1? WGSAM said mackerel eat only zooplankton at Q1 but this change with GW; this year KW checked at mackerel had fish in their stomach

Should be included in the sampling and in the list for 2025

MB: Agree but will it possible to include it in the list until Wednesday but OK for the list in 2025

Karolina Wikström: we only sampled minor species and the numbers are way lower than the theoretical numbers --> overestimation of the cost

Kai: number cannot be precise and it is not necessary

MB: overestimation is better than having to ask for more money, the costs are not really bad

12:00-13:00 Lunch break

13:00-14:00 Meeting with IBTSWG

- Short narrative about the meeting with IBTSWG (Pierre)

Kai W: motivation is being lost - is it useful to collect new stomachs if not analyzed after 3-4 years. Freezers can break down. How to motivate teams if nothing is done with stomachs

Matthias: extra-work, time, bags, for nothing then. Tell the NC that they have to push for something. Are NC the right person? Not sure

Karolina: Sweden get DCF money for the 2022-2024 to send the stomach to Poland (to be checked with Maria-NC)

Voula: How much money was allocated to the stomach sampling and analyses in Sweden (as an example)

DS: zooplankton sampling 20 years ago and never analyzed

Dave: Do you have a sampling program in the Celtic Sea (as France)?

Kai: Denmark stop collecting until decision is not taken regarding stomach destination and analyses - we need DCF money for other stuff (including fuel increases) and not possible to allocate to stomachs. Analyzing these stomachs would require stopping other programs

IBTSWG is not able decide but will strongly push for this postpone

==> presenting a straightforward message at the Technical Message that the motivation is lowering and that collection will be stopped until decision; not that much money

Specify in each national WP that each country should allocate money to collect and analyze stomach or it will stop soon

Karolina Wikström: we [in Sweden, NB] assumed that this analysis is mandatory so we include money to do so

Voula: same situation in the Mediterranean; people are complaining because they spent time during surveys to collect stomach, but they do not know the rationale for the collection, nor the future use of this samples, and who will analyze it.

- Discussion: how to push a decision from the RCG and move out of the "status-quo" strategy?

Poland is OK to analyze 8000 stomachs annually for 11-12€ depending on the amount.

14:00-14:15 Coffee break

14:15-15:00 The future and stuff

- Continue discussion on the future
- Issues to be decided by the RCG?
- Next steps
- Open questions

16 ISSG National correspondents

16.1 Progress during 2022/2023

The group met in spring 2023 to prepare the session for the technical meeting in June. One of the issues addressed it was assessing the viability of making ISSG work more pan-regional.

16.2 Roadmap/follow-up

1. Find a solution for the long-term support of the Secretariat. [*Already agreed to find a solution for the long-term financing and that the intention is to have a solution on the table by the Decision Meeting, September 2023.*]
2. Initiate a process for revising the combined RoP (RCG Baltic & RCG NANSEA)
   a. depending on Secretariat or not
3. Look into the process/mechanism for proposing chairs for both RCGs and ISSGs
   a. Suggest a candidate for chairing the RCG Baltic - to be presented at TM 2024
4. Look into the need of liaison between different RCG – to make ISSG work more pan-regional.

16.3 SG Participants

Name	E-mail	MS

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