Document title	Comments on the draft Roadmap on collection of fisheries data in order to assess incidental bycatches and fisheries impact on benthic biotopes in the Baltic Sea
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Background

As further detailed in document 6-1, the HELCOM FISH Correspondence Group on fisheries data for operationalizing indicators used for the purposes of MSFD implementation for the CPs which are also EU Members (CG Fishdata) has been developing a Roadmap on collection of fisheries data in order to assess incidental bycatches and fisheries impact on benthic biotopes in the Baltic Sea. CG FISHDATA 3-2018 agreed in November 2018 that while the draft Roadmap (set out in document 5 + attachments of CG FISHDATA 3-2018) contains much of the information needed, its current structure was not fit for purpose. The Workshop consequently developed a new structure for the Roadmap, as set out in Annex 2 of the Outcome.

As agreed by the CG FISHDATA 3-2018, the Chair has developed a first draft Roadmap using the new structure, for consideration by FISH 9 (Document 6-2). The Chair left open section 7 and 8 for joint development. In the attached document, annexes cross-referenced by the Chair and already developed by the CG were better indicated and a proposal for amendments is made.

Action requested

The meeting is invited to take note of the amendments to the draft roadmap and decide whether this document can be used as a starting point for the next CG Fishdata meeting. If the meeting decides that this can be done, the meeting is invited to comment on the document.

DRAFT Roadmap on collection of fisheries data in order to assess incidental bycatches and fisheries impact on benthic biotopes in the Baltic Sea

Note to reader

Yellow text indicates the structure agreed upon at CG FISHDATA 3-2018 in Copenhagen.

Sections highlighted in green, are to be drafted jointly by the CG:

- Section 7 and 8 has not been written – take note that section 7 is the road map for how data needed can be collected. This section is to be developed jointly. All other sections are background to the roadmap.

1. Introduction – aim and scope

- ~~aim for Roadmap (operationalize the two indicators)~~
- ~~intelligent / fit for purpose approach for the two indicators (note to us: taking into account population sizes, fishing effort fishing gear, general knowledge level of species concerned etc.)~~
- ~~guide the reader to and setting the context for the 'Roadmap' section (in the end)~~

State & Conservation is the responsible HELCOM Group for the operationalisation of indicators. The HELCOM Group on Ecosystem-based Sustainable Fisheries (HELCOM FISH) has been given the task to to aid in operationalizing the two HELCOM core indicators "Number of drowned mammals and water birds in fishing gear" as well as the pre-core indicator "Cumulative impacts of fisheries on benthic biotopes" as required for assessment of Descriptors 1 and 6 of the Marine Strategy Framework Directive. The work is coordinated in the established Correspondence Group for fisheries data (CG FISHDATA).

For HELCOM FISH the operationalisation of ~~Operationalizing~~ the two indicators involves the task of identifying data needs and data gaps, but mainly find a way how to obtain the relevant and needed data. This exercise also involves the assessment of data already being collected through EU legislation such as the EU Fisheries Control Regulation and EU's data collection regulation and other various data collection schemes, how to make these available, and whether this can be used for the intended purpose. Identifying any additional data needs includes, among others, a discussion of level of ambition, e.g. ~~should bird bycatch be given as bycatch of birds and/or at the number of species~~what fishing effort must be covered by a monitoring program and which bird species should be the main focus. Statistical power must be sufficient and thus, rare species would require relatively more coverage compared to species commonly found as bycatches. Also suitable bycatch monitoring methods must be identified as remote electronic monitoring methods (using CCTV cameras) may require additional measures for species identification (e.g., smartphone photo or landing of specimen/wings). ~~As a starting point, additional data needs could be seen as a variable on the total number of birds, where the requirements to the level of detail change over time? With time, information on bycatch could be given at the level of species id.~~ These questions are important when discussing data needs and identifying possible other sources of additional data collection – especially in relation to bycatch data. Furthermore, any additional data collection must be organized in an intelligent cost effective way, whereby a fit for purpose approach governs which and what data are to be collected.

Commented [A1]: We cannot decide this because it is clearly required at the species level (Table 1d DC-MAP). It would not operationalize the indicator to collect only total number of birds bycaught without species information. It is no extra work for observers to note the species (also including rare species).

Data needs are described in section 3. In order to assess data gaps, an inventory of data already being collected and are available for assessing the two indicators, must be made. This task is described in section 4. The assessment of data gaps is given in section 5. Section 6 contains information about possible ways of how this additional data can be collected and ~~be~~ made available ~~be collected~~, e.g. through existing EU-regulation etc.

Commented [A2]: All the attachments including tables etc. Should finally be added to the inventory of data already being collected nad Roadmap should be kept simple.

Therefore, the overall aim of the road map is to describe the different tasks required in order to operationalize the core and pre-core indictor in terms of data (fishery data and environmental data). The

first sections (section 2-6) serve as background to the roadmap on data gaps. The road map itself (including actions and timeline taking into account the work of other groups such as OSPAR and ICES and the current relevant EU legislative procedures) is given in section 7, which is followed by closing remarks.

2. Background

- ~~MSFD~~
- ~~related commitments~~

According to the EU's Marine Strategy Framework Directive, EU Member States are requested to establish thre~~d~~shold values for by-catch, including sea mammals, birds and non-commercial~~l~~y exploited fish species, and for sea floor integrity. This document solely focus~~es~~ on bycatch of sea mammals and birds and sea floor integrity in relation to fisheries.

Marine Strategy Framework Directive ~~(text copied from previous document)~~

Repealing Decision 2010/477/EU, Member States should establish threshold values for biodiversity criterion D1C1 (bycatch) including sea mammals, birds, and non-commercially exploited fish species, as well as for Descriptor D1/D6 (Benthic habitats/Sea ~~sea~~ floor integrity), especially D6C3. Reporting under Art. 8 and 9 of the MFSD is currently based on regional (HELCOM) and national MFSD ~~indicator~~ assessments ~~(where they exist)~~ and otherwise on evaluation criteria according to other EU Directives, including the Habitats Directive (92/43/EEC, HD) and the Birds Directive (2009/147/EC, BD). The HD and the Birds Directive (2009/147/EC, BD). The HD ~~which~~ obliges EU members to monitor bycatch of protected species (Art. 12: Member States shall establish a system to monitor the incidental capture and killing of the animal ~~speices~~ species listed in Annex IV and under the BD).

COM 2017/848/EU defines D1C1 as: "*The mortality rate per species from incidental bycatch is below levels which threaten the species, such that its long-term viability is ensured." In the specifications and standardized methods for monitoring and assessment states that: "[…] data shall be provided per species per fishing métier for each ICES area …, to enable its aggregation to the relevant scale for the species concerned, and to identify the particular fisheries and fishing gear most contributing to incidental catches for each species*".

According to the COM 2017/848/EU "[…] *The extent to which GES has been achieved shall be expressed for each area assessed as follows: - the mortality rate per species and whether this has achieved the threshold values set."*

Within criterion D6C3 the Spatial extent of each habitat type which is adversely affected should be assessed.

The decision also put an obligation on the EU Member States to establish threshold values for this indicator. For this it is a prerequisite to collect proper data.

Other EU legislation (Habitats and Birds Directives, Regulation 812/2004, Data Collection Multiannual Plan)

The EC Council Regulation 812/2004 imposes monitoring of cetacean by-catch, for vessels longer than 15 m, whereas significant effort is taking place from smaller vessels, with unknown contribution to the overall by-catch. In addition, there are obligations for monitoring under the EU Data Collection Multiannual Plan (DC-MAP).

Due to HD Art. 12 (4) Member States shall establish a system to monitor the incidential capture and killing of the animal species listed in Annex IV HD and BD annex. In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.

The Birds Directive (2009/147/EC, BD) Art.3 prescripes that *The preservation, maintenance and re-establishment of biotopes and habitats shall include primarily the following measures: (a) creation of*

protected areas; (b) upkeep and management in accordance with the ecological needs of habitats inside and outside the protected zones… .

With the introduction of the Habitats Directive (92/43/EEC, HD), all registered protected areas under BD are subject to the Natura 2000 protection regime (Art. 7 HD) and thus to the prohibition of deterioration (Art. 6 (2) HD) as well as to the Impact Assessment.

Baltic Sea Action Plan ~~(text copied from previous document)~~

Therefore, **WE AGREE** to increase knowledge on and protection of Baltic Sea marine habitats, communities and species

- ~~By~~ by 2010 develop in co-operation with ASCOBANS, a coordinated reporting system and database on Baltic harbor porpoise sightings, bycatches and ~~mammals~~strandings.

- by the promotion of research aiming at developing additional methods for the assessment of, and reporting on, the impacts of fisheries on biodiversity;- by the development and implementation of effective monitoring and reporting systems for by-caught birds and mammals;

Ministerial Declaration 2010 ~~(text copied from previous document)~~

DECIDE

- to establish, for those HELCOM Contracting States being also EU-Member States, the role of HELCOM as the coordinating platform for the regional implementation of the EU Marine Strategy Framework Directive (EU MSFD) in the Baltic Sea including striving for harmonised national marine strategies for achieving good environmental status according to the HELCOM Baltic Sea Action Plan and the EU MSFD; and

ALSO DECIDE

- that core set of indicators with quantitative targets shall be developed for each of the segments of the HELCOM Baltic Sea Action Plan, while ensuring that the indicators can also be used for the other international monitoring and reporting requirements inter alia the EU Marine Strategy Framework Directive, and that a full indicator-based follow-up system for the implementation of the HELCOM Baltic Sea Action Plan be further developed and placed on the HELCOM website by 2013;

- that the already initiated revision of the HELCOM monitoring programmes be finalized by 2013 and that it results in cost-effective joint monitoring, which fully supports the indicator-based assessment approach and monitoring of the implementation of the HELCOM Baltic Sea Action Plan, and is in line with other international monitoring and reporting requirements;

ACKNOWLEDGE

- that with the activities and programmes of the HELCOM Baltic Sea Fisheries and Environmental Forum, HELCOM took a step towards the implementation of an ecosystem- based approach allowing for improved coordination and cooperation between fisheries and marine environment protection authorities, and insofar has begun to develop the Baltic Sea as a model of good management of human activities;

Ministerial Declaration 2013 ~~(text copied from previous document)~~

WE DECIDE *to implement on a regional level the Strategic Plan for Biodiversity for the 2011–2020 period of the UN Convention of Biological Diversity, including the Aichi Biodiversity Targets, taking into account the special characteristics of the Baltic Sea, bearing in mind that the implementation of the Plan in the EU and its Member States is carried out through the EU Biodiversity Strategy, and more specifically* **DECIDE** *to:*

- *take decisive action to work towards a favorable conservation status of the harbor porpoise based on implementation of the CMS ASCOBANS Jastarnia Plan for the harbor porpoise in the Baltic Sea, in particular by addressing the pressing problem of by-catch;*

WE SUPPORT *the further development and testing of the HELCOM generic decision-support tool to map possible negative impacts of specific gear types on threatened or declining species and habitats, and which helps to develop and/or recommend measures to address these;*

WE DECIDE *to take action to reduce the negative impacts of fishing activities on the marine ecosystem and to this end,* **SUPPORT** *the development of fisheries management and technical measures to minimize unwanted by-catch of fish, birds and mammals in order to achieve the close to zero target for by-catch rates of the Baltic Sea Action Plan and minimize damage to sea bed habitats;*

WE AGREE *to continue to work to develop common procedures to facilitate the sharing of aggregated data on fisheries activities in the Baltic Sea in an applicable format for the purpose of assessing pressures on marine and coastal ecosystems e.g. to be applied in maritime spatial planning.*

RECOGNIZING *that recreational fisheries conducted e.g. from boats using commercial gears at a certain scale may contribute to fishing mortality of certain commercially exploited fish stocks and impacts on biodiversity,*

WE AGREE *to ask for advice from Regional Coordination Groups within the EU Data Collection Framework and ICES on how to improve data collected on such recreational fisheries, with a view to evaluate the impacts of such recreational fisheries on the marine environment;*

WE SUPPORT *the first set of core indicators of environmental status and pressures with the intention that they will form the basis of an indicator-based follow-up system for measuring progress towards achieving good environmental status with a full set of operational core indicators, and further STRESS that the joint coordinated monitoring by the Contracting Parties should provide the data necessary for regular updating of the HELCOM core indicators and assessments.*

3. Data needs

~~- by-catch indicator~~

~~- indicator for impact on benthic biotopes in the Baltic Sea~~

Data needs for the core indicator on "Number of drowned mammals and water birds in fishing gear" as well as the pre-core indicator "Cumulative impacts of fisheries on benthic biotopes" is given per indicator in Annex A (Inventory of HELCOM data needs Annex 5~~XX~~ in previous document). The two sections below describe data needs for the two indicators.

Sections 3a and 3b describe~~,~~ which data needs have been identified for the two indicators. Improvement of data quality is also described, since poor data quality can affect the analyses which are to be carried out in the assessments on whether fisheries has an impact not in compliance with the conservation targets.

In general, data is available to deliver on the indicator on cumulative impacts on benthic biotopes. Work can be done to improve data quality (VMS data for vessels <12 m etc.) as well as data availability to data users. As for the indicator on bycatch, available data will not deliver on the indicator, and a road map to ensure, that data will be collected and made available, is needed.

3a Core indicator ~~on bycatch –~~ "Number of drowned mammals and water birds in fishing gear"

The indicator on number of drowned mammals and water birds in fishing gear aims at estimating the mortality of mammals and birds due to fisheries bycatch. The indicator is to deliver a bycatch rate, whereby number of drowned animals is seen in relation to population size.

Commented [A3]:
It would be helpful to stucture this along the questions in the HELCOM indicator questionnaire:

- What is lacking that makes the indicator incomplete (not fully operational)?
- Please define further work needed to make the indicator fully operational.
- Please define any obstacles or issues that need to be addressed to ensure successful development/adjustment of the indicator.
- Please outline a brief plan/suggestion on how to further the work required, and the workload/resources related to this.

Additional data on bycatch is required in order to assess whether the mortality of mammals and seabirds due to bycatch in fishery is at a level threatening the population status, whereby management actions are required. Data is needed in three main fields:

- regional, temporal and spatial overview of fishing effort within specific métiers, especially but not limited to gillnetters and fleet segments <12 m
- data on actual observed and/ or monitored bycatch which can be related to fishing effort within specific métiers
- data on the distribution and population size of the relevant species (no issue for HELCOM FISH)

For cost-efficient monitoring, risk maps could help defining the spatial and temporal scale of bycatch monitoring. ~~Data needs are centered around~~Such a "hot-spot approach", where temporal and spatial information of both, current fishing pressure ~~overlayed with information on the spatial~~ and distribution of ~~the population~~mammals and birds ~~etc.~~could be overlayed, ~~defines~~ can help defining when and where to concentrate bycatch monitoring. Such an approach will ensure a cost effective use of available funds and furthermore ensure that marine mammals and sea birds could be specifically ~~are~~ protected where bycatch currently takes place.

3b Pre-core indicator ~~on c~~"Cumulative impacts on benthic biotopes"

The indicator on cumulative impacts aims at assessing the impact of fisheries on marine benthic habitat/ biotopes, among the impacts from other human activities. The indicator is not operational yet, but the general assessment procedure is agreed with ongoing adjustments according to the Commission Decision (EU) 2017/848 and therefore in principle applicable in all areas of the Baltic Sea.

To ~~operationalize~~ optimize this indicator data and information in the following fields is needed:

- regional, temporal and spatial overview of fishing effort for fisheries with mobile bottom contacting gears
- Habitat maps (no issue for HELCOM FISH)

In specific there is a need to gather the data on gear type/size, location of trawling (the highest resolution possible while ensuring confidentiality of data sources, see section 4c), fishing effort, including length and width of the trawl track. Regardless of fisheries data, environmental data and especially underwater habitat mapping has an important role in the performance of this indicator.

In general. l~~L~~ogbook and VMS data ~~is~~ are available, see section 4. ICES has for years issued data calls on fishing~~ery~~ effort. Hence, data is available at diverse temporal resolutions. Overlaying data layers on fisheries with other anthropogenic data layers however, may be ~~challenged~~ challenging ~~by~~ due to 'scale'.

4. Existing data and data sources

4a Available data sources (outcome from meeting in Copenhagen need to be included)

Existing data and data sources contains information on commercial and recreational fishery. For the indicator on cumulative impact, only commercial fishery is relevant. Whereas recreational fishery is also relevant in relation to the indicator on bycatch as marine mammals and seabirds are also bycaught in nets set by recreational fishermen.

Existing data and data sources are therefore given below for both types of fisheries.

Commercial fishery

For commercial fishery, CP's ~~has~~ have assessed data already being collected through EU legislation, which can be made available through the DCF, see Annex ~~XX~~ B (previous~~old~~ Appendix 1). Templates were drafted

and circulated to CP's with the overall aim to assess if and to which extend, data already being collected is collected, its' quality and whether additional data is being collected.

Denmark, Sweden, Germany and Poland has described data availability in relation to VMS and logbook data, AIS data and its coverage, data on bycatch of marine mammals and water birds as well as recreational fishery Annex D~~E~~ (previous Appendix 2). For this exercise to be comprehensive, all CP's are to fill out the two templates on commercial and recreational fishery.

Accurate estimates of total effort are a vital component in producing a realistic picture of the risk associated with bycatch mortality. However, Member States can choose between five different metrics in reporting total effort of static nets to ICES. Days at sea (DaS) is the only aggregated unit of fishing effort that is consistently reported among Member States and hence, ICES WGBYC reports bycatch rate estimates in units associated with DaS. For describing bycatch risk, however DaS is not a meaningful variable. Since a day at sea could be either the setting or the recovery or both of any net up to 21 km (9 km if vessel is ≤12m) this metric is in fact very inaccurate. The preferred metric would be total soak time of nets in kilometer hours. The drop of the net may also be relevant but this is not recorded in logbooks.

WGBYC (2018a) has produced initial bycatch estimates for the Kattegat/Belt Seas based on bycatch rates calculated from data from a Danish Remote Electronic Monitoring (REM) project. A prerequisite for such estimates is that bycatch numbers can be related to monitored effort and then scaled with total fishing effort per metiér.

Recreational fishery

In order to assess the effort from recreational fishery, a review on gillnet fishery in CP's has been carried out, see filled in templates in Annex ~~XX~~ D~~C~~ (previous~~old~~ Appendix~~nnex~~ 2) ~~for the template sent out~~. The review also contains information about number of recreational fishermen using gillnets, type of nets, temporal and spatial extend of the fishery.

4b Data quality (outcome from meeting in Copenhagen need to be included)

In order to review data quality on the data already being collected through EU legislation etc., CP's agreed to carry out a quality validation analyses of their national commercial data. For this analysis, the two reporting tables in Annex ~~XX~~ D~~E~~, previous Appendix 2 (Danish tables serve~~s~~ as an example) ~~previous old Appendix 1), was~~ were used.

A comprehensive list of mandatory and optional EU reporting requirements have been drawn, see Annex ~~XX~~ C~~D~~ (previous ~~old~~ annex 4). Improving the data quality of these data, could be a good starting point.

ICES databases contain various data sets on fishing effort which however have large variations between and within. WGBYC has historically mainly used fishing effort data for static nets and midwater **trawls provided through Member States' annual Regulation 812/2004 reports** for contextualising reported bycatch rates of cetaceans and to form the basis of bycatch risk assessments. Because this regulation is being repealed by a revised Technical Regulation in the near future, ICES WGBYC looked into other available data sources for total effort. It was agreed at the 2017 WGBYC meeting that as an exploratory exercise, it would be useful for members of the WGBYC Database Subgroup (DbSg) to compare the suitability of other sources of fishing effort data to ensure that WGBYC can continue to undertake analyses to meet its annual Terms of Reference that rely on using total fishing effort data (ICES 2017a). At present, there are three other possible sources of effort data available through the ICES Data Centre: **logbooks, vessel monitoring systems (VMS) and the Regional Database (RDB)**. For the purpose of ICES WGBYC the consistency of data series is a major factor, and thus data sources using a different metric (such as VMS) were omitted from further considerations due to the fact that conversion factors may be difficult to derive and also may be metiér specific. For this purpose, at the 2018 WGBYC meeting datasets from two databases were compared: their formerly used own database containing information from national Regulation 812/2004 reports and the

ICES Regional Database (RDB) (ICES 2018a). Several discrepancies were found between the two effort datasets. Also within databases, there is a considerable amount of variation between years which likely reflects data submission differences rather than actual significant changes in netting activity. This further reduces confidence in total effort data used for estimates of bycatch numbers (ICES 2018a). Problems highlighted by WGBYC were i. a. the use of different metrics in each data set and the different coverage of data bases which receive data from different "populations" of vessels (related to data collection methodology: VMS, logbooks), see table 1.

Table 1. Basic differences between different datasets containing fishing effort data (source: ICES 2018a).

DATA SOURCE	EFFORT RECORDED AS	VESSEL POPULATION
WGBYC	Days at-sea	>15 m mandatory, <15 m often provided
VMS	Hours fished	>12 m only
Logbook	Days fished	>10 m all areas, >8 m in Baltic
RDB	Days at-sea	All vessels

For the majority of areas the RDB is populated with the most effort data (in terms of DaS). The RDB dataset in theory contains data for all vessel sizes in national fishing fleets, some of which originate from logbook submissions and/or VMS for relevant vessel sizes. For smaller vessels estimates of effort are derived by individual MS in a variety of ways, such as monthly journals, sales records or extrapolated sampling data. This is impossible to compare. None of the data sets includes effort of recreational fisheries using static gear (ICES 2018a).

For the purpose of operationalising the HELCOM indicator "Number of drowed mammals and waterbirds in fishing gear" ICES' considerations about consistency of data sets are not important. The most meaningful metric with respect to bycatch is total soak time of nets in kilometre hours.

Population information on birds

For the CORE indicator Number of drowned mammals and waterbirds bycatch numbers are related to population size. Available information on populations is summarized in table 2.

Table 2: Overview of population information on bird species wintering in the Baltic Sea

	HELCOM Red List	flyway population	flyway population size	source	year of population size estimate	proportion of population wintering at sea	proportion of population wintering in Baltic Sea
black-throated diver	CR	N Europe & W Siberia/Europe	250.000-500.000	1	1990-2000	high	low
red-throated diver	CR	NW Europe (win)	150.000-450.000	1	1990-2000	high	intermediate
long-tailed duck	EN	W Siberia / N Europe (bre)	1.600.000	1	2007-2009	exclusively	very high
razorbill		Baltic Sea (bre)	55.000	2	?	exclusively	very high
greater scaup		N Europe / W Europe	310.000	1	1991	high	
common guillemot		Baltic Sea (bre)	50.000	2	?	exclusively	very high
black guillemot	VU	Baltic Sea (bre)	75.000	2	?	exclusively	very high
goosander		NW & C Europe (win)	266.000	1	1995-1996	intermediate	intermediate
red-breasted merganser	VU	NW & C Europe (win)	170.000	1	1995-1996	high	high
smew		NW & C Europe (win)	40.000	1	1995-1996	intermediate	low
common goldeneye		NW & C Europe (win)	1.000.000-1.300.000	1	1990-2000	intermediate	
velvet scoter	EN	W Siberia & N Europe / NW Europe	450.000	1	1993	very high	high
common scoter	EN	W Siberia & N Europe / W Europe	550.000	1	1993	very high	intermediate
common eider	EN	Baltic, Denmark, Netherlands	976.000	1	2009	exclusively	intermediate
Steller's eider	EN	W Siberia / NE Europe	27.000	1	2009	exclusively	low
tufted duck		NW Europe (win)	1.200.000	1	1995-1996	intermediate	intermediate
common pochard		NE Europe / NW Europe	300.000	1	1995-2005	intermediate	low
Slavonian grebe	NT	NE Europe (small-billed)	14.200-26.000	1	1990-2000	high	high
red-necked grebe	EN	NW Europe (win)	42.000-60.000	1	1990-2000	high	intermediate
great crested grebe		NW & W Europe	290.000-420.000	1	1990-2000	intermediate	intermediate
great cormorant		sinensis, N & C Europe	380.000-405.000	1	1990-2000	intermediate	low
source population estimate							
1: Wetlands International 2018							
2: Kube et al. 2005 in Mendel et al. 2008							

4c General Data Protection Regulation (GDPR)

SECTION TO BE WRITTEN BASED ON INPUT FROM DTU AQUA (as presented in the last meeting in the CG – to be quality checked by GDPR experts).

The ICES Working Group on Spatial Fisheries Data (WGSFD) i. a. develops pressure maps which can be used to assess overlap of fishing effort in certain metiérs and distribution of habitats/biotopes or animal groups such as mammals and birds. Fishing effort maps are currently based on VMS and logbook data. Data confidentiality is an issue with respect to the General Data Protection Regulation (Regulation (EU) 2016/679, hereafter GDPR). Thus, the level of detail in the recent ICES data call on fishing effort was discussed during Regional Coordination Group meetings in 2018. As a general rule of thumb it was stated that aggregated data containing data from at least 3 vessels is suitable for publishing data as it cannot be related to personal data of natural persons (i. e. fishermen). In the present data call 80% of the rows in Danish data contained less than 3 vessels and this is potentially problematic. To solve this issue, Regional Coordination Groups suggested including the number of vessels in the data. Further, that all national data is submitted to ICES and that when publishing data, ICES makes sure that there are at least 3 vessels in the aggregation level.

4d ICES advice and associate data products

ICES has in recent years repeatedly advised on various aspects in the focus of this document, e. g., :

"The impact of fisheries on seabirds and other vertebrates have not been evaluated due to insufficient available information." (ICES 2018 b)

"Observations are insufficient to enable any assessment of the overall impact of EU fisheries on these animals." … "It is hoped the EU Multiannual Programme will improve consistency of bycatch data at a regional scale and improve the ability of ICES to advise on the impact of fisheries." (ICES 2017 b)

"ICES continues to advise that any move to integrate monitoring of the bycatch of protected species in all EU waters within the Data Collection Framework will require the very careful consideration of sampling regimes and, as such, monitoring will require significant adjustments from that used for commercial fish bycatch." (ICES 2016 b)

ICES has issued several data calls in relation to the two indicators. Several data calls have been forwarded in relation to effort (VMS, logbook data etc.). Effort maps at various scales have been produced. The official ICES data call from 2018 on fishery data for 2009-2017 is given in Annex ~~XX~~ E (previous Annex 3). ~~This~~ These data requested in this data call, are the data needed for carrying out the analyses of "Cumulative impact of fisheries on benthic biotopes" for vessels above 12m in length.

In February 2018, ICES issued a data call on bycatch to WGBYC, see Annex ~~XX~~ F (~~old~~ previous Annex ~~3~~1). According to the ICES request, Member States/ CP's were also requested to provide information on recreational fisheries and how this fishery is monitored.

Since ICES issues the data calls used in relation to MFSD, additional data collection should be coordinated with the relevant working groups, such as WGBYC and the Working Group on Spatial Fisheries Data (WGSFD)~~working group on cumulative impacts~~.

5. Data gaps ~~(fill in the data gaps identified in the CG FISHDATA 1-2018)~~

In the process of identifying data needs and data availability in order to deliver on the two indicators on incidental bycatches and cumulative impact on benthic biotopes, several data gaps have been identified. Currently, there are different ways of collecting fishing effort data which is related to vessel size, as regulated in the EU Control Regulation (1224/2009) and its Implementing Regulation (404/2011).

Commented [A4]: The suggestion below is based on the information from Presentation 3 from FISHDATA-3.

Commented [A5]: A question relevant here is whether fishing **companies** would also fall under this, because they are not natural persons. As many vessels are owned and operated by large (sometimes multinational) fishing companies, the 3-vessel approach might not apply to these data.

Unfortunately the information content of the data collected varies between vessel size groups and thus is difficult to compare.

The current revision of the Control Regulation could provide an opportunity for some harmonisation between data sets and for increasing the applicability of effort data for the purpose of MSFD indicator assessments.

The CP's ~~has~~ have identified the following data gaps as important data sources needed, if Member States are to deliver on the two indicators:

- Lack of VMS for vessels < 12 m and lack of AIS for vessels < 15 m

  There is a need for information on fishing effort for the entire commercial fleet. This information is important when assessing fishing effort as well as when identifying hotspot areas for bycatch. To address data gaps for smaller vessels, Contracting Parties have conducted a national ~~analyses~~ analysis on combining logbook information and available AIS data, see Annex D Danish example ~~table 1~~ (previous Appendix 2~~document~~) in order to assess the potential of AIS-systems to provide high quality data on vessel location. AIS can serve as a good data source for vessel location. For vessels also carrying VMS, AIS can support the information on vessel location and thereby improve the analysis of fishing effort.

- Lack of logbook data for vessels < 8 m

  Lack of logbook data challenge the analysis of fishing effort. Logbook data gives information about target species and fishing ~~spots~~ area (at a resolution of ICES ~~squares~~rectangles), which is important information when assessing fishing effort. However, an analysis of by-catch hotspots (section 3a) would require a higher resolution.

- Lack of bycatch data

  Bycatch data is, at the moment, not collected in a harmonized way among Member States, nor is bycatch data collected for the entire fleet both in relation to the commercial and recreational fleet. ~~Total number of b~~Bycatch data which can be related to fishing effort is needed in order to extrapolate to total bycatch number per species/population. ~~as is some information on species, when looking at seals and water birds.~~

  ~~Hotspot~~ A hotspot approach (as described above), ~~and~~ statistically sound sampling schemes and remote electronic monitoring are possible ways to focus data collection in a cost-effective way.

- Data gaps in relation populations (e.g. birds)

  ~~*In relation to water birds, the level of ambition need to be agreed upon. As a starting point, information on number by birds bycaught need to be collected. Once data collection schemes have been designed and implemented, focus can shift to how data and information can be collected at species level*~~

  Population size and identity is not available for all bird species for the assessment period (table 2). In order to avoid comparing recent bycatch numbers with out-dated abundance data it may be needed to concentrate on a number of representative bird species. Statistically sound sampling schemes (see above) require that a sufficient number of specimens is collected in a monitoring scheme. Thus, species rarely encountered as bycatch are not suited for a cost-effective monitoring due to high coverage needed.

  The established and widely accepted method used for abundance estimates of cetaceans and birds is the line transect distance sampling method (Buckland et al. 2001). Especially in diving animals it produces relatively wide confidence intervals which might be unsatisfactory for management.

Commented [A6]: Denmark, which others?

Commented [A7]: Species information needed for operationalising the indicator; all species are different with respect to reproduction, habitat, feeding behaviour and bycatch risk.

Increasing the sampling interval could increase data quality but would counteract the aim of a cost-effective monitoring.

- Access to data and data availability at national level

For some Contracting Parties, access to data at a national level can be a challenge. The focus of this roadmap is to address additional data needs and data gaps. Increased information about which data is available, will hopefully help on data sharing and data availability at a national level.

(outcome from meeting in Copenhagen need to be included in this section)

6. Possible sources to fill the gaps

~~- revision on control regulation (VMS, AIS, REM, GPS, etc.)~~
~~- landing obligations~~
~~- data collection framework~~
~~- relevant directives (Birds and Habitat directives)~~

Fishing effort by means of AIS data

The use of AIS data in order to get a more precise assessment of gillnet effort is possible as the AIS data are of high quality, can be generated at low cost and are easily available, especially taking into account that HELCOM has a very good AIS database. The main limitation of the AIS system is that it is system introduced for security reasons (not fisheries control). Also, smaller vessels may not be equipped with the AIS system as it is obligatory for all ships above or equal to 15 m.

HELCOM FISHDATA 2 has indicated that AIS system can be used also on smaller vessels than 15 m for security reasons. However, the coverage of smaller vessels by AIS system differs in different countries (e.g. in case of Poland only few small, coastal fishing vessels below 12 m are equipped with AIS).

Fishing effort by means of a smartphone app

In Germany a smartphone app, the so-called MoFi App has been developed for collecting effort data and for compliance monitoring with respect to cod fishery closure in spawning areas during April. This app is a cost-effective and simple method to collect data on the type of net, net length, soak time, and (with some adaptations) even by-catch events. But this would also rely on the willingness of fishermen to use it. Incentives to use it would be desirable, but should not create additional costs. A way forward would be to include effort monitoring using smartphone applications into the Control Regulation currently under revision.

PL also has a monitoring based on smartphone app but mainly to report catches (including volume of the catch and species) and also including information concerning the time when the vessel is going to enter the harbour with the catch, for control purposes. The system is not designed to monitor fishing effort, but it is connected to the electronic logbook so the fishing effort can always be taken out from the logbook. An app can be developed further and take all necessary information, including net length, soak time and bycatch. The app can be used and is used regardless of the vessel size. However, currently we need to rely on the willingness of the fishermen to report all necessary information.

Bycatch data by means of landing obligations

Landing obligation put several obligations on EU Member States. Implementation of CCTV on board of the fishing vessels were considered in order to control the catch and eliminate discards. It also obliges countries

to do additional monitoring and random control of the catch called “last haul” where full catch including bycatch in the haul or set net is being controlled. Data form “last haul” could potentially be used to complement data from dedicated bycatch monitoring. However, the priority of the last haul control are trawls, and only to minor extend static gears.

There are differences between Member States in the ways how last haul controls are carried out. In the coastal waters of Schleswig Holstein, the water police are responsible for last haul controls which are carried out in the trawl fishery only. With respect to set nets, there is another fisheries control by the water police. It is done when a police vessel accidentally comes across a hauling gillnetter. A disadvantage is that during these controls only a fraction of the hauling process can be viewed. To avoid underestimation of bycatch due to the fact that bycatch can easily be overlooked (e.g. while slipping out of the net before entering the vessel and the field of vew of an observer) ICES (2018a) reviewed data fields for the ICES Regional Database and Estimation System (RDBES) and recommended that the fraction of time should be given in which full attention of the observer was on possible by-catch of Protected, Endangered and Threatened Species (PETS). Also, water policemen are less well-trained compared to scientific observers.

As a consequence, monitoring of the compliance with the landing obligation could potentially be also used for complementation of the bycatch monitoring almost without additional cost but would require some adaptations in the methods used and training of the staff involved.

Bycatch data by means of DCF monitoring

In the implementation of the MSFD, the operationalisation of scientific indicators also requires to accept Regional Sea Conventions as an end-user of DCF. Therefore, HELCOM should participate in the relevant processes for coordination of data needs at the level of the marine region.

ICES WGCATCH in collaboration with WGBYC evaluated current sampling programs under the DCF (ICES 2016a) [FishPi project]. A conclusion was that an improved regional sampling of relevant variables would allow improving the understanding of fisheries impacts on the ecosystem and aligning the DC-MAP with obligations under other existing EU legislative instruments such as EU MSFD which highlights the relevance of the ecosystem approach for ensuring the conservation of the marine systems and reform of the Common Fisheries Policy which emphasizes the importance of the existing trophic relations between species and the need for including specific alternative conservation measures based on ecosystem approaches for an appropriate assessment of fish species. Current information taken under the DCF is insufficient to achieve these goals. New requirements have been proposed by end users i.a. focused on the collection of bycatch information of PETS.

The EU funded FishPi project is a collaboration involving scientific institutions in 13 EU Member States, ICES and external experts aimed at developing regional fisheries sampling designs. A work plan for by-catch of PETS developed under the FishPi project includes many of the questions raised in the context of this Roadmap (table 3). One conclusion was that a combination of scientific observers’ at-sea programmes and REM methodologies will be probably the best approach when directed PETS bycatch monitoring is needed as cost effective and optimised sampling programmes (MASTS 2016).

In a systematic approach, ICES WGBYC analysed the relative sampling effort of various fishing metiérs in the Baltic Sea with respect to species and gear specific bycatch risk and total effort (ICES 2018a). The result of that analysis is that fishing metiérs such as midwater otter trawls (OTM) are over-sampled. Concomitantly there is the need to increase sampling effort in static gears such as fykenets (FYK), trammelnets (GTR), set gillnets (GNS), set longlines (LLS) in order to derive good quality bycatch data which will meet end users’ needs.

Table 3. Work plan for by-catch of PETS for the different stages on future regional sampling programs

	Description	PETS by-catch
Decision making	1. Identify and classify main end users and their role in the decision making process. *Link to WP1	1. End user table.
Regional objectives & Estimates needed	2. Consultation 3. Justification of the data collection 4. Define the target population 5. Define the objectives and estimates required at a regional level. Indicate minimum precision needed. 6. Prioritizing. Identification of core and additional variables. *Link to WP1	2. List of PETS. Definition of different PEST groups 3. Different needs. Define estimates needed and precision.
Type of data needed	7. Define the type of data which needs to be collected to get the estimates required	4. Table of data needs by each of the different PETS groups (marine mammals, sea birds, sharks…) 5. Need for high spatial and temporal resolution data
Data collection methods & design	8. Review of data collection methodologies and data sources. 9. Calibration studies and harmonization of techniques 10. Coverage of the current sampling 11. Sampling design: Apply the principles of probability based sampling (link to WP2)	6. Methodologies: a. Surveys and at sea sampling programs b. CCTV cameras c. Combination of discard and by-catch sampling programs 7. Current at sea sampling coverage (discard and by-catch monitoring). Map spatial coverage 8. Data availability (WGBYC and others) 9. General data gaps 10. Templates describing fisheries (only for selected scenarios) 11. MS involved 12. Lessons learned 13. Sampling design:
Sampling intensity; optimization	12. Sampling effort allocation 13. Feasibility study. Cost vs precision. Cost effective sampling design	14. Cost of by-catch data collection: a. Combined with current on board discard sampling b. Dedicated by-catch sampling c. Other methodologies as CCTV 15. Examples of cost effective sampling
Data collection	14. Review and define data collection protocols	16. Review existing data collection protocols (different by-catch monitoring programs) 17. Practical implementation of combined discard and by-catch sampling
Data archiving: DB	15. Data handling 16. Use of harmonized formats 17. Need for a common Data Base *Link to WP2	18. Thinking the characteristics of a common DB. Different exam Formats 19. Historical data: quality needs to be assured
Quality evaluation.	*Link to WP4	20. examples
Assessment/ Analysis/ estimation	18. This point is part of the process but we don't have the resources to develop it during this project	
Scientific advise/ report/ Statistics	19. This point is part of the process but we don't have the resources to develop it during this project	

Bycatch data by means of Birds and Habitat directives

In Article 12 (4) Habitats Directive it is laid down that "Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a)." Taking also into account EU-regulation 812/2004, an adequate monitoring of marine mammal and seabird bycatch must be identified as insufficient or not be carried out by EU Member States.

7. Roadmap to deliver and actions fill the data gaps

~~- taking into account the ICES work~~
~~- relevant EU legislative procedures (technical measures, EMFF, control regulation, etc.)~~
~~- cooperation with OSPAR~~

With respect to the operationalisation of the CORE indicator "Number of drowned mammals and waterbirds in fishing gear" ICES have in their work raised identical questions as are in the scope of CG FISHDATA. Data gaps and problems in obtaining missing data identified have also been addressed by WGBYC and WGCATCH.

The current revision of the Control Regulation provides an opportunity to ensure better monitoring and control of fishing operations, including implementation of a tracking system for vessels below 12 m and harmonise data entries in logbooks and landing declarations with respect to a metric more useful than days at sea.

As HELCOM has no possibility to be involved in the legislative procedures, the only way forward in this respect is developing recommendations for the actors involved (e.g. HELCOM CP's, DG Mare, and DG Environment).

Tasks and timeline for HELCOM to help operationalising the indicators:

Indicator should be operationalized before the HOLAS III assessment, because all EU Member States have to use the HELCOM **2022 or 2023** State of the Baltic Sea report for their national MSFD Art. 8 and 9 assessment in 2024.

Until xx.xx.2019, develop recommendations for the revision of the Control Regulation in order to harmonise fishing effort data sets (from logbooks and tracking systems) between vessel size classes due to different legal requirements and thus increasing the applicability of effort data for the purpose of MSFD indicator assessments.

In 2019, develop recommendations underlining the importance of ensuring relevant amount of EU money for data collection in the new EMFF financial perspective for years 2021-2027, in order to enable fulfilling relevant MSFD monitoring requirements, where data coming from fisheries are needed.

In 2019, HELCOM FISH and FISHDATA should finalise the draft Roadmap and inventory of available fisheries data (taking into account also a discussion and work done at the joint OSPAR-HELCOM workshops for indicators for incidental bycatch in September 2019.

HELCOM State &Conservation 10/2019 scheduled for 6-10 of May 2019, should provide final comments and suggestions to the draft Roadmap, and comments, amendments to the draft inventory of available fisheries data which can be used for MSFD purposes.

HELCOM HOD 56/2019 scheduled for 18-19 of June 2019, should finally adopt the Roadmap and endorse draft inventory of available fisheries data, which can be used for MSFD purposes.

The Roadmap and inventory of available fisheries data should be presented to the Meeting of Baltfish in autumn 2019 with request to provide comments and suggestions how this issue can be developed further on a basis of regionalisation within CFP.

The Roadmap and inventory of available fisheries data should be also presented to the RCG Baltic Meeting in autumn 2019 (?) to initiate the discussion on possibilities for enhancement of fisheries monitoring which can be used for MSFD purposes in the future, (taking into account new financial perspective and enhanced amount of EU money for data collection).

Final Inventory of available fisheries data can be developed in cooperation with ICES/BALTFISH/RCG.

In 2019 HELCOM will develop a recommendation for the EMFF negotiations for additional data collection and control purposes with regard to needs identified in this roadmap, e.g. to fix a sufficient proportion of the budget in the EMFF funding period 2021-2027 for data collection and control purposes.

Closing remark/Summary

~~how this work can feed into other processes (e.g., update of the State of the Baltic Sea report);~~

The work on the roadmap and an inventory should be used for the update of the State of the Baltic Sea Report. Additionally it should enable a formation of an important part of the updated Baltic Sea Action Plan where the proposals for future operationalisation of the HELCOM indicators should be included.

The FISHDATA work on the Roadmap and the inventory should be done in cooperation with the HELCOM ACTION project (which should contribute to the developments of methods for relevant fisheries monitoring and approach to the bycatch hot spots).

~~identifying future needs for updating the Roadmap~~

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Annex A

[data needs = “inventory”?]

Annex B
[=previous appendix 1]

Data availability, information and data quality issues in relation to i) Cumulative impact of fisheries on benthic biotopes and ii) By-catch of marine mammals and sea bird.

Annex C
[previous annex 4]

Proposal for transversal data file to be used at national level

BALTFISH has agreed that fishing position (start and end) for each fishing event should be reported in a logbook.

Type of data	Mandatory/Optional
CAPACITY DATA REG(EC)26/2004	
Country of Registration	M
CFR	M

…

Annex D

Data availability, information and data quality issues in relation to i) Cumulative impact of fisheries on benthic biotopes and ii) By-catch of marine mammals and sea bird

DENMARK

ICES VMS logbook data

…

POLAND

Impact of fisheries on the sea bottom

…

GERMANY

Description of marine recreational gill net fisheries

…

Sweden

Coverage of VMS and AIS number of trips

Annex E

18 January 2018

Data call: VMS/log book data for fishing activities in the North Atlantic and Baltic Sea for the provision of ICES management advice on the spatial distribution and impact of fisheries 2009 to 2017.

Rationale:

…

Annex F
[previous annex 1]

Data call: Data submission for ICES advisory work of the Working Group on Bycatch of Protected Species (WGBYC)

1. **Scope of the Data call**