Joint OSPAR-HELCOM workshop to examine possibilities for developing indicators for incidental bycatch of birds and marine mammals.

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

1. Introduction

The HELCOM Fish Group initiated a discussion in 2016 (FISH 5-2016) on the provision of fisheries data to facilitate assessment of the HELCOM core indicator "Number of drowned mammals and water birds in fishing gear" as well as the pre-core indicator "Cumulative impacts of fisheries on benthic biotopes", related to the assessment of Descriptor 1 and 6 of the Marine Strategy Framework Directive and taking into account the EU Data Collection Framework for the collection of fisheries and aquaculture data (DCF)[1] and its implementation regulation (EU-MAP)[2]. The aim is to facilitate an assessment of the indicators as part of the HOLAS III assessment planned to be developed by 2021, which will serve as an element for EU Member States to report nationally on MSFD Art. 8 and 9 assessment in 2024.

Furthermore, recognizing the role of the State&Conservation Working Group in coordinating work on the HELCOM indicators, HELCOM FISH invited State&Conservation to give advice on data necessary for assessing the impact of fisheries on marine ecosystems, in order to ensure that the collected data serve the scientific purpose of the HELCOM indicators (STATE&CONSERVATION 6-2017).

HELCOM FISH 7-2017 established a Correspondence Group for Fisheries Data (CG FISHDATA) tasked with developing a draft Roadmap on fisheries data in order to assess incidental bycatches and fisheries impact on benthic biotopes in the Baltic Sea to be submitted to HELCOM Fish. After several meetings and discussion the Fishdata group agreed that the Roadmap should identify available fisheries data that could be used to meet data needs for assessing the indicators (section 3); and propose potential options for addressing any remaining demands for data gaps or improved data quality (section 4). Section 5 describes how the Roadmap will be communicated and taken forward.

2. Context

Monitoring by-catch of marine mammals and sea birds as well as well as impact of fisheries on the sea bottom and benthic communities is important in order to assess the two indicators.

This Roadmap on collection of fisheries data, not only should deliver answers to the questions included in the two HELCOM core and pre-core indicators, but it also reflects several HELCOM and EU commitments which put an emphasis on a necessity to monitor by-catch of protected species as well as impact of fisheries on a sea bottom and benthic communities. These are especially:

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[1] REGULATION (EU) 2017/1004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2017 on the establishment of a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy and repealing Council Regulation (EC) No 199/2008 (recast)

[2] COMMISSION IMPLEMENTING DECISION (EU) 2016/1251 of 12 July 2016 adopting a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017-2019

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The HELCOM Baltic Sea Action Plan and Ministerial Declarations

The **Baltic Sea Action Plan** (BSAP) and HELCOM **Ministerial Declarations from 2010 and 2013** include commitments related to assessing different pressures on the marine environment, including fisheries, within the context of HELCOMs role as the coordinating platform for the regional implementation of the EU Marine Strategy Framework Directive (EU MSFD) in the Baltic Sea. By-catches of marine mammals and sea birds as well as the impact of fisheries on the benthic habitats in the Baltic Sea are an integrate part of these assessments.

The Marine Strategy Framework Directive, Habitats and Birds directives

The EU **Marine Strategy Framework Directive** (2008/56/EC) (MFSD), and specifically the Commission Decision COM 2017/848/EU, instructs Member States to establish threshold values and assess the status and pressures on the marine environment in accordance with several criteria.

Criterion D1C1 concerns bycatch of sea mammals, birds, and non-commercially exploited fish species[3]. The MFSD prescribes that Member states shall establish threshold values for the mortality rate from incidental by-catch of species of birds and mammals, which are at risk from incidental by-catch. Criterion D1C2 states that Member States shall establish a set of species representative of each species group according to the criteria laid down in the Commission Decision.

Criterion D6C2, D6C3 and D6C5 concerning sea-floor integrity and the impacts of physical disturbance to seabed requires Member states to assess the extent and distribution of physical disturbance pressures on the seabed.

Reporting under Art. 8 of the MFSD is currently based on national MFSD indicator assessments (where they exist) and otherwise on evaluation criteria according to other EU Directives.

The **Habitats Directive** (92/43/EEC), 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 species listed in Annex IV). 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 system of protection set out in Article 5 of the **Birds Directive** (2005/147/EC) requires clear, effective and well monitored measures to prevent deliberate killing or capture of birds, also from incidental catch in fishing gear. This applies to the whole territory of a Member State and additional rules apply in special protection areas (SPAs) which are part of the Natura 2000 network under the Habitats Directive.

The Common Fisheries Policy and related commitments

EU **Common Fisheries Policy** includes overarching commitments to be coherent with the Union environmental legislation, in particular with the objective of achieving a good environmental status by 2020 (EU 1380/2013, Art. 2.5.j). It also puts emphasis on assessing the impact of fisheries on marine environment (EU 1380/2013, Art.25.1.b). This includes for instance national data collection and monitoring activities, as well as data collection under the multiannual Union programme for the

[3] Non-commercially exploited fish species not part of the scope of this roadmap.

collection, management and use of data in the fisheries and aquaculture sectors (**EU-MAP**) for the period 2017-2019, for those countries which are EU members (EC Implementing Decision 2016/1251). The table 1D included into the EU-MAP, specifies which bird species and marine mammal species (also other groups of protected species such as fish and reptiles) have to be monitored as bycatch in fishing gears. The present EU-MAP has been rolled over for the period 2020-2021. Any new data collection under the DC-MAP will therefore only be considered in the preparation of a new programme starting 2022. In accordance with the EU-MAP, EU Member States collect data if these data are not collected in accordance with other EU regulations e.g. the EU Control Regulation (1224/2009) and its Implementing Regulation (404/2011). The EU Control Regulation specifies what type of fishing vessel tracking system is mandatory and how fishing effort shall be reported. Vessels ≥ 12 m in length must have a Vessel Monitoring System (VMS) and an electronic logbook. Vessels > 10 m in length (> 8 m in the Baltic Sea when they have a cod quota4) must have a logbook. Smaller vessels are not required to carry a logbook or fill out a landing declaration. For smaller vessels estimates of effort are derived by individual EU Member States in a variety of ways, such as monthly journals (Sweden), sales records (Denmark) or extrapolated sampling data.

In addition, according to Directive 2002/59/EC, vessels ≥ 15 m in length must carry Automated Identification System (AIS)5. VMS signals implemented by the **EU Control Regulation** including a vessel's position, speed and course are usually transmitted once every 2 hrs6, AIS system allows assessment of the vessels' position every few seconds.

Requirements concerning fishing gears and techniques allowed for the Baltic Sea, as well as other environmental monitoring requirements, are included into the **Technical Measures Regulation**[7] repealing, among others, EU Regulation 812/2004. According to this regulation, Member States shall design and implement monitoring schemes for incidental catches of cetaceans using observers on vessels ≥ 15 m in length providing representative data of the fisheries concerned. Observer reports shall include fishing effort (expressed as total net length x fishing hours for passive gear and numbers of fishing hours for towed gear). For vessels < 15 m cetacean bycatch data shall be collected by means of appropriate scientific studies or pilot projects8. Technical Measures Regulation also puts more emphasis on regional cooperation (under the Common Fisheries Policy regionalisation). That allows the development of specific solutions (e. g., for the Baltic Sea under the Baltic Sea Fisheries Forum BALTFISH), what can also include optimising bycatch monitoring of marine mammals and waterbirds.

Financing of the data collection under the DCF/EU-MAP has been already covered by **the European Fisheries and Maritime Fund** for years 2014-2020. In the new EMFF financial perspective for years 2021-2027, higher emphasis should be put on data collection and control activities and the

[4] According to Reg. 2016/1139

[5] According to Directive 2002/59/EC of the European Parliament and of the council of 27 June 2002 establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC.

[6] According to Implementing Regulation (404/2011)

[7] REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the conservation of fishery resources and the protection of marine ecosystems through technical measures, amending Council Regulations (EC) No 1967/2006, (EC) No 1098/2007, (EC) No 1224/2009 and Regulations (EU) No 1343/2011 and (EU) No 1380/2013 of the European Parliament and of the Council, and repealing Council Regulations (EC) No 894/97, (EC) No 850/98, (EC) No 2549/2000, (EC) No 254/2002, (EC) No 812/2004 and (EC) No 2187/2005

[8] from Reg. 812/2004. At the time of writing the revised Technical Measures Regulation has not been published.

perspectives are such, that at minimum 15% of the future EMFF allocation is to be given to this scope of support. Some Member States already allocate a much higher fraction of their EMFF funds for this purpose. After entry into force of the new EMFF for years 2021-2027, new monitoring requirements can be decided under EU-MAP. Whether, this new financial perspective provides additional monitoring opportunities for Member States, will also depend on decision taken in each MS, which will be given higher flexibility in deciding on their new EMFF financing priorities.

The indicators

HELCOM core indicators such as the Core indicator "Number of drowned mammals and water birds in fishing gear" and relevant seafloor and benthic habitats indicators (e.g. "Cumulative impacts on benthic biotopes") are relevant to the work of EG Fishdata. Furthermore, other processes such as the outcomes of ICES workshops WKBEDPRES1, WKBEDLOSS, the autumn 2019 WKBEDPRES2, and the work of WGFBIT may be relevant. These existing indicators will contribute to overall assessments of by-catch and seafloor integrity/benthic habitats for the purposes of the Baltic Sea Action Plan and in evaluation progress towards Good Environmental Status (GES) under the EU Marine Strategy Framework Directive9, for those HELCOM Contracting parties that are also EU Member States.

To support HELCOM indicator assessments and ensure that functional data flows are available, the HELCOM Monitoring and Assessment Strategy, adopted by the 2013 Copenhagen HELCOM Ministerial Meeting, exists, and is supported by Monitoring and Assessment Guidelines defining the best practices and acceptable data collection required to support each relevant indicator assessment. This strategy outlines that the core indicators are to be regularly updated, a process involving a lead/co-lead country approach, which allows for periodical thematic and holistic assessments, such as the State of the Baltic Sea second Holistic Assessment adopted in 2018, to occur. In order for each HELCOM core indicator to be fully regionally coordinated, each indicator should have common monitoring guideline, which is followed by Contracting Parties, quality assurance programme and working data flow arrangements including common database / access point where data resulting from monitoring programmes should be reported (doc. 3J-20, STATE&CONSERVATION 8-2018).

The existing by-catch indicator is generally descriptive due to the need for better data flows to support a full and operational assessment. Other relevant aspects that will follow, include defining and gaining approval on threshold values (e.g. via State and Conservation then HOD), and issues raised during the 'Future work on HELCOM indicators' process (HOD 54-2018 Outcomes paragraph 4.25, document 4-5), a process overseen by the GEAR Working Group. At the first HELCOM Indicator workshop in this process (HELCOM Indicator WS 1-2019) by-catch was considered to be a priority area on which developments should take place to have an operational indicator ready in advance of the third holistic assessment, with a deadline for development in autumn 2021. A supporting summary related to the topic of indicator development on by-catch is available as part of this ongoing process . One further issue discussed at the first indicator workshop was the potential need to consider by-catch of non-commercial fish and relevant regionally agreed lists of species to consider.

The pre-core HELCOM indicator "Cumulative impacts on benthic biotopes" is being further developed and with recent developments being presented at State and Conservation, providing an overview of test cases carried out in German waters. The topic of benthic habitats has also been identified as an

[9] http://www.helcom.fi/baltic-sea-trends/indicators/background

area of high priority by HELCOM Indicator WS 1-2019, with a view to defining what assessment can be developed in time for the third holistic assessment of the Baltic Sea. Further work on this topic is underway.

3. Meeting data needs with currently available fisheries data

State&Conservation has coordinated work on the development of indicator reports with descriptions of optimal monitoring (HELCOM INDICATORS)[10]. On the basis of these reports, Poland and the indicator lead for the bycatch indicator further outlined data that could be used for an assessment of the indicators, which was included in an inventory of HELCOM data needs[11] submitted to STATE&CONSERVATION 6-2017 and to FISH6-2017 for consideration.

Considering the indicator reports and the inventory, EG Fishdata has identified the following fisheries data that may be required for assessing the two indicators; the core indicator "Number of drowned mammals and water birds in fishing gear" and the pre-core indicator "Cumulative impacts on benthic biotopes".

For both indicators it is imperative to have information on the distribution of fisheries on an appropriate spatiotemporal scale, with what gear and with what effort in relation to the impact. Some of the key data sources for this information are:

- Logbook recordings, sales notes, monthly journals, coastal logbooks, etc.
- VMS, AIS or other sources of GPS data (Black box[12], etc.)
- Vessel register data (in some cases for assuming gear use)

In order to be able to produce a regionally comparable assessment of the indicators it would be useful if the metric of effort was comparable between all vessels fishing in the same métier, regardless of their size.

Section 3a and 3b describe fisheries data needs for the two indicators, how they could be addressed using fisheries data that is already being collected, and what issues remain to be addressed in terms of data gaps and data quality. Suggestions for how to address remaining issues are elaborated on in section 4. In cases where environmental data is required in order for the fisheries data to be useful, this is highlighted.

[10] CORE Indicator: Number of drowned mammals and water birds in fishing gear: http://www.helcom.fi/baltic-sea-trends/indicators/number-of-drowned-mammals-and-waterbirds-in-fishing-gear/

[11] Inventory of HELCOM data needs (last version): https://portal.helcom.fi/meetings/CG%20FISHDATA%201-2018513/MeetingDocuments/Document%205%20Inventory%20of%20HELCOM%20data%20needs%20to%20assess%20incidental%20by-catches,%20fisheries%20impact%20on%20benthic%20biotopes.pdf.

[12] Black box is used in a Danish mussel dredge fishery as a precise vessel tracking system, especially in Natura 2000 sites.

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

Overview of data needs

For both marine mammals and water birds, drowning in fishing gears is considered a significant pressure for some populations.

The indicator "Number of drowned mammals and water birds in fishing gear" aims to estimate the mortality of mammals and birds due to fisheries bycatch. The indicator is to deliver a bycatch rate. Data on bycatch in order to assess whether the mortality of marine mammals and seabirds due to bycatch in fishery is at a level threatening the population status are necessary. Such an assessment allows for decisions on if further management actions in fisheries management are required. For such assessments, it is essential that bycatch numbers are related to monitoring or sampling effort (ICES Advice 2017). Otherwise, no extrapolations to total bycatch numbers are possible.

Data needs in relation to temporal and spatial distribution of passive fisheries (e.g. gillnets, trammel nets, traps) is dependent on availability and resolution of VMS, AIS, logbook data and vessel register data.

In order to use available data in the best possible way and to assess ways to gather additional data in a cost effective manner different initiatives are relevant.

Since 2018, the ICES Working Group on bycatch of protected species (WGBYC) issues an annual data call on total fishing effort, monitoring/sampling effort and protected species bycatch incidents. The data supports ICES annual advice on the impact bycatch on small cetaceans and other marine animals to answer a standing request from the European Commission for advice on the impacts of fisheries on the marine environment. The majority of the countries submitted data but the quality and quantity of the data provided varies widely among nations. There are also difficulties in estimating the total effort of all vessel segments (different size classes) as their effort is reported in different metrics

It is important to note that to assess the conservation threat posed by fishery bycatch to a particular protected species three bits of information are required, these are:

1. the susceptibility of that population to bycatch in particular fisheries (based on sufficient observed effort data and recording of bycatch incidents for each fishing gear);
2. the spatiotemporal scale of the fisheries concerned (based on total fishing effort for each fishing gear);
3. the resilience of the population to bycatch (based on population abundance and recovery potential and other pressures). This analysis is outside the scope of this Roadmap but is however very important when estimating the threat to different species related to incidental bycatch.

The WGBYC data call gathers information to estimate 1) and 2). The WGBYC data call does not provide data to estimate 3), since resilience depends on the population abundance and its ability to grow and recover. Data to assess 3) is also needed to set targets for the indicator but is not the focus of this Roadmap and may originate from scientific studies on birth and mortality rates, as well as national and international scientific surveys to estimate trends of bird and mammal population abundances.

The ICES/OSPAR/HELCOM JWGBIRD has initiated work to enable assessment of 3). The basis for the ICES advice on "Bycatch of cetaceans and other marine animals" is available online[13] .

In conclusion, the following types of data are needed to further operationalize this indicator the:

- data on bycatch
- regional, temporal and spatial overview of fishing effort for specific métiers, especially but not limited to gillnetters and fleet segments
- data on the distribution and population size of the relevant species (not dealt with within the context of this roadmap as not fisheries data)

Data on bycatch

ICES collects effort related information on bycatch of protected species from monitoring under Reg. 812/2004 and other monitoring programmes (currently mainly DCF). ICES Advice (2017)[14] [15]state that bycatch observations "are insufficient to enable any assessment of the overall impact of EU fisheries on [marine mammals]". But such assessments are required: COM DEC 848/2017 states that bycatch data needs to be on species level in order to assess the impact of fisheries on marine mammal and waterbird species. The species to be assessed under primary Criteria D1C1 and D1C2 are to be selected on the basis of scientific and other additional criteria. Therefore, it is important to record on species level in monitoring programmes that already exist and also take this into account when designing new monitoring programmes or scientific studies.

It has been highlighted in the ICES Advice (2017) that EU Member States need accurate bycatch rates to assess whether or not species are at risk from fisheries. Monitoring effort must concentrate on relevant fisheries. E. g., for seabirds in the Baltic Sea priority should be given to monitoring in trammel nets and set gillnets (ICES Advice 2015)[16]. Assessment of and Advice on the bycatch of protected species will also need information on both monitored and total effort in the relevant fisheries to allow for extrapolations (ICES Advice 2017).

The annual *ICES Advice on bycatch of small cetaceans and other marine animals* evaluates the bycatch of cetaceans in selected sea areas using a bycatch risk assessment approach (BRA). In their impact assessments, data from the ICES WGBYC database is pooled over many years. E.g., the bycatch of harbour porpoises in static nets in the Kattegat and the Belt Sea has been evaluated in 2015 and 2016 based on bycatch data pooled for the years 2006-2013 and 2006-2014, respectively (ICES Advice 2015,

[13] http://ices.dk/sites/pub/Publication%20Reports/Guidelines%20and%20Policies/16.3.3.2_Basis_for_the_advice_on_Bycatch_of_small_cetaceans_and_other_marine_animals.pdf

[14] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/byc.eu.pdf

[15] ICES 2017 ICES Advice (Ecoregions in the Northeast Atlantic and adjacent seas Published 29 August 2017). Bycatch of small cetaceans and other marine animals – review of national reports under Council Regulation (EC) No. 812/2004 and other information. 4 pp.

[16] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2015/2015/Bycatch_of_PETS_Advice_2015.pdf#search=wgbyc

2016)[17]. This is due to a very low observed effort in national bycatch monitoring programs. Observed effort could be significantly increased using Remote Electronic Monitoring (REM) (ICES WGBYC 2015)[18]. Often, ICES does not raise bycatch observations reported by Member States to assess total mortality due to uncertainties in fishing effort data (see section "overview of data needs", this chapter) and as a consequence, no assessments are possible (e.g., ICES Advice 2015, 2016). ICES reiterate that available information is insufficient to evaluate the impact of fisheries on seabirds and other vertebrates (ICES Advice 2018)[19].

The BRA approach explicitly recognizes the uncertainty in the overall bycatch rate estimate (its precision) by presenting estimates as 95% confidence intervals. This would result in a very wide range of annual bycatch totals where data are scarce (ICES WGBYC 2015). This limits the possibility to make precise statements about possible population consequences[20]. Sources for potential bias have been identified by ICES (observations cover a wide range of vessel types and métiers, sampling concentrates on larger vessels with higher fishing effort, smaller vessels not fully represented, data not representative of the nature and diversity of the gillnet fisheries) but are not specifically addressed. Further, no account is taken of spatial heterogeneity, mesh size or other gear characteristics (ICES Advice 2015) which would be extremely helpful to inform management as this would enable concentrating management action in the most relevant fisheries.

Sampling under the current DCF can contribute to the assessment of bycatch of Protected, Endangered and Threatened Species (PETS), but is largely insufficient on its own as currently implemented by Member States. Assessments carried out by WKBYC (2013) and WGBYC (2018) showed that bottom trawling is generally relatively oversampled with respect to monitoring of protected species bycatch, while in the Baltic Sea gears subject to under sampling include fyke nets (FYK), trammel nets (GTR), set gillnets (GNS), set longlines (LLS), pots and traps (FPO) (ICES WGBYC 2015, 2018, 2019)[21][22].

[17] . ICES 2015 ICES Advice (Ecoregions in the Northeast Atlantic and adjacent seas Published 15 April 2015). 1.6.1.1 Bycatch of small cetaceans and other marine animals – Review of national reports under Council Regulation (EC) No. 812/2004 and other published documents. 5 pp.
ICES 2016 ICES Advice (Ecoregions in the Northeast Atlantic and adjacent seas Published 15 April 2016). 1.6.1.1 Bycatch of small cetaceans and other marine animals – review of national reports under Council Regulation (EC) No. 812/2004 and other information. 6 pp.

[18] ICES WGBYC 2015. ICES ACOM COMMITTEE ICES CM 2015\ACOM:26 Report of the Working Group on Bycatch of Protected Species (WGBYC). 2-6 February 2015. ICES Headquarters, Copenhagen, Denmark. 80pp.

[19] ICES 2018. ICES Advice (Ecoregions in the Northeast Atlantic and adjacent seas Published 11 September 2018). Bycatch of small cetaceans and other marine animals – review of national reports under Council Regulation (EC) No. 812/2004 and other information. 4 pp.

[20] Further uncertainties are on the side of the population model which is not the focus of this document.

[21] ICES WGBYC 2018. ICES ADVISORY COMMITTEE. ICES CM 2018/ACOM:25. Report from the Working Group on Bycatch of Protected Species (WGBYC). 1–4 May 2018, Reykjavik, Iceland. 128pp.

[22] ICES WGBYC 2019. ICES ADVISORY COMMITTEE. ICES CM 2019/ACOM:xx. Report from the Working Group on Bycatch of Protected Species (WGBYC). 5-8 March 2019. Faro, Portugal. xxpp.

Regional, temporal and spatial overview of fishing

There is a need to improve recording of bycaught marine mammals and sea birds on vessel level in the Baltic Sea. In the meantime, assessments of the total amount of the different species, by-caught in fisheries effort related data on static gears and information from scientific projects and surveys are used in order to have best possible estimates. Currently, no comparable effort data from all vessels of different sizes is available (VMS: hours fished, logbook: days at sea). In reporting total effort of static nets to ICES, Member States choose between five different metrics (ICES WGBYC 2018). "**Days at sea"** (DaS) is the only aggregated unit of fishing effort that is consistently reported among Member States (mandatory for vessels >15 m but often provided also for some smaller vessels) and hence, ICES WGBYC is reporting bycatch rate estimates in units associated with DaS. ICES WGBYC (2019) however, concluded that due to inconsistencies the 2017 fishing effort data from the ICES Regional DataBase and Estimation System (RDBES) could not be used for their PETS bycatch estimates. RDBES is intended to be the data basis for future advice on bycatch of cetaceans and other marine vertebrates.

For describing bycatch risk, however DaS is only a very rough proxy for the dimensions of nets and thus a very inaccurate variable. This is because a day at sea could be either the setting or the recovery or both of any net of a few 100 m up to 21 km (9 km if vessel is ≤12m) length of the net. To increase the precision of extrapolations (from bycatch rate per effort to total bycatch) the preferred metric would be total "*soak time of nets in kilometer hours*" as required in Reg. 812/2004) for the observed effort already.

To that end, fishing effort needs to be measured sufficiently accurately to be able to make reliable assessments. Although soak time and net length may not be fully available for the necessary fleet segments. In the Baltic Sea a comparable methods across the region and across fishing fleet segments is important to be able to make coherent assessments.

The current obligations for the recording rate of fishing positioning systems give a limited view of where and when the fisheries takes place and with what effort. Furthermore, small vessels are not obliged to carry VMS equipment. These currently only report effort at the resolution of Baltic Squares (1/9 of the basic Baltic Sea ICES statistical rectangle). The positioning of fishing effort is especially important in relation to a hotspot approach to by-catch mitigation fisheries management measures.

Data aggregated on a monthly basis would enable extrapolations from observed bycatch rate per effort on total effort during months in which a species occurs in the area (especially important for overwintering birds) as an extrapolation to yearly effort could result in an overestimation of bycatch numbers (ICES WGBYC 2019).

3b Pre-core indicator on cumulative impacts on benthic biotopes

The HELCOM pre-CORE indicator "Cumulative impact on benthic biotopes", aims to assess the impact of fisheries on marine benthic habitats/biotopes, among the impacts of other human activities.

The benthic biotopes in the Baltic are adversely affected by several human activities causing physical disturbance to the sea floor. Fisheries with mobile bottom contacting gear is a widespread activity in many parts of the Baltic Sea. In order to assess the total cumulative impacts on benthic habitats in the Baltic Sea, data on the distribution and effects of mobile bottom contacting gear on the seabed is essential.

In general, the EG Fishdata finds that data is available to deliver on the indicator on cumulative impacts.

ICES has different Working Groups that work with sea floor impact from fishing gear (WGFBIT, WGSFD). On the basis of the work done in these working groups, ICES advises on the environmental impacts of fishing and the use of space in the North East Atlantic and Baltic Sea. VMS data from vessels, coupled with log book data, is currently the most practical and cost-effective way to describe the spatial dynamics of fishing activities (ICES 2018)[23].

Data flows and quantitative methodologies for assessing the physical disturbance from bottom fishing, currently exist within ICES and were deemed appropriate for EU, e.g. MSFD purposes for assessing the seafloor. The ICES assessment framework consists of three main components: fishing pressure (footprint), benthic habitat sensitivity and the resulting benthic impact. The framework is also capable of estimating trade-offs relating to the distribution of impact with other factors important for management (e.g. fisheries economics).

Regional impact assessments as well as further methodological development takes place within the three year (2018-2020) ICES Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT). On the basis of the WGFBIT work (see WGFBIT three-year work plan), ICES has the objective that the respective indicators become operational across the whole EU and ICES areas (also the Baltic).

The basis for ICES assessment on "sea bottom integrity" - is available within the WGFBIT report as "*Annex 4 Technical guidelines document for assessing fishing impact from mobile bottom-contacting fishing gears*".

The described methods build on ICES (2017a,[24] 2017b[25]) advice that has established a set of indicators to assess seafloor integrity, in terms of the spatial extent and distribution of pressures classed under both assessment criteria (physical loss D6C1 and physical disturbance D6C2) and their impact for each broad habitat type, within each ecoregion and subdivision. The seafloor assessment framework suggested by ICES (Figure 1, below) also allows for evaluation of trade-offs between catch/value of landings per unit area and the environmental impact and recovery potential of the seafloor

[23] *ICES. 2018. Report of the Working Group on Spatial Fisheries Data (WGSFD), 11–15 June 2018, Aberdeen, Scotland, UK. ICES CM 2018/HAPISG:16. 79 pp*

[24] *ICES, 2017a. Report of the Workshop to evaluate regional benthic pressure and impact indicator(s) from bottom fishing (WKBENTH), 28 February–3 March 2017, Copenhagen, Denmark. ICES CM 2017/ACOM:40. 233 pp*.

[25] *ICES. 2017b. EU request on indicators of the pressure and impact of bottom-contacting fishing gear on the seabed, and of trade-offs in the catch and the value of landings. ICES Special Request Advice - sr.2017.13. Published 6 July 2017*

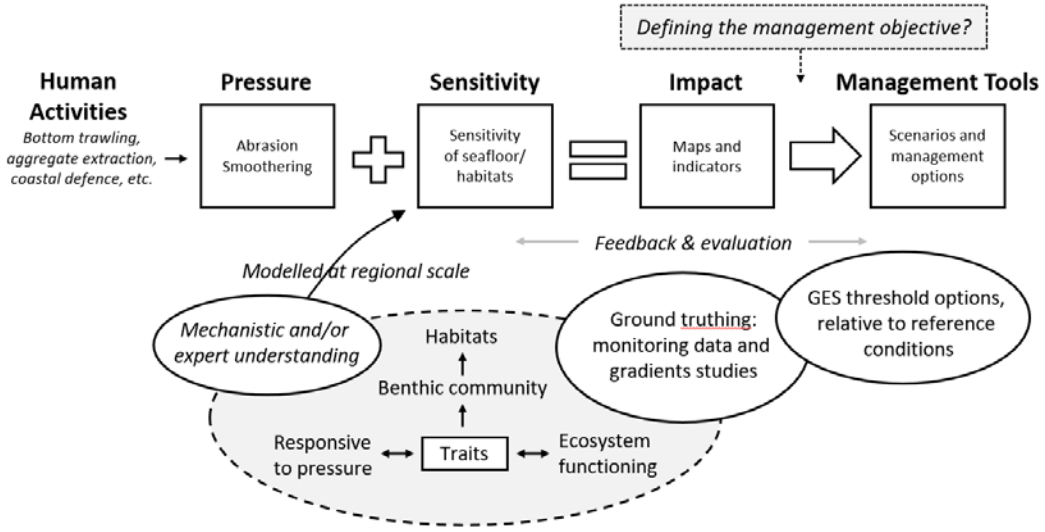

Figure 1. Conceptual diagram of the steps taken in developing management tools for assessing pressure and impact on the seafloor (ICES 2019).

ICES regularly calls for data from Member States in order to have the most relevant and up to date data for their work.

When interpreting fishing pressure maps for mobile bottom contacting gears, a number of factors are relevant with regard to the precision of the results of the work done by ICES:

Fishing vessels without VMS

The ICES data call requests VMS data, but part of the European fishing fleet is not covered by VMS. Fishing vessels smaller than 12 meters are not required to have VMS. According to EU (1224/2009, article 9) fishing vessels of less than 15 meters length fishing in territorial waters of the flag Member State or never spending more than 24 hours at sea from the time of departure to the return to port are not required to have VMS. Member States are implementing this article differently, some requiring VMS on all vessels above 12 m.

The vessels without VMS are often fishing in coastal areas, and many of the smaller vessels are using passive gears. Although there is currently no EU requirements for the vessels without VMS to have vessel position data, there are several examples of national legislation requiring part of this fleet to have vessel position data.

AIS data is only a requirement for fishing vessels larger than 15 m, but some smaller vessel are using the AIS security system, and these data can give information on fishing activity for a proportion of the fleet without VMS. One of the ToRs proposed for WGSFD 2019 is to evaluate inclusion of AIS data in the ICES data call.

For vessels, carrying VMS-equipment the frequency of a signal varies between different Member States (every 1 or 2 hours). A more frequent signal or cumulated position data packages and improving

the reporting concerning gear types and fishing effort in the logbooks would increase the accuracy of the pressure maps.

The EU GDPR regulation[26] puts some limitations on the use and publication of fisheries data. Agreements and systems for handling of fisheries data are needed in order to allow for the best possible use of this data.

4. Addressing remaining demands for improved data and data quality

Section 3 of this roadmap highlights that the existing data are not sufficient to give precise estimates of sea bird and mammal bycatches to operationalize the indicator "Number of drowned mammals and waterbirds in fishing gear". There are also some shortcomings in the data used for the indicator on "Cumulative impact on benthic biotopes".

Generally, logbook and VMS data (>12 meter) are available. For vessels above 15 meter, AIS is also available. Several smaller vessels (<12 meter) may carry AIS although this is not mandatory.

ICES has for years issued data calls on fishery effort. Hence, data is available at diverse temporal resolutions. Overlaying data layers on fisheries with other anthropogenic data layers may be challenged by 'scale', which several studies have and is currently addressing in relation to MFSD.

In general, data is available to deliver on the indicator on cumulative impacts. 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. In this section, the Roadmap outlines what is required in relation to data collection, if HELCOM Contracting Parties and/or EU Member states are to deliver on this indicator.

A number of possible actions are suggested to improve the data availability and data quality. These initiatives will also contribute to fulfilling requirements under the MSFD and the Habitats Directive.

Actions related to fisheries effort

- Increase precision of monitoring fisheries effort. E.g. by changes in reporting intervals (VMS) or using aggregated position information in transmissions.
- Expand the obligation to keep a logbook which would contain the most needed information for all vessels independent of their size: Essential information are length, height (drop) and soak time of the net.

Actions related to bycatch data

- Initiate dedicated research projects to collect data on bycatch in relevant fishing métiers coordinated between Contracting Parties.
- Initiate dedicated bycatch monitoring of protected species (marine mammals and relevant sea bird) or research projects dedicated to estimate bycatch rates and /or for identifying hot-spot bycatch areas.

[26] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)

- Bycatch monitoring can be conducted with onboard observers or - more cost-effective - with Remote Electronic Monitoring (REM)
- Focus of bycatch monitoring of most relevant métiers (gill- and entangling nets)
- Main focus should be on regions identified as hotspots
- Identifying possible national and international funds for bycatch data collection especially in the new EMFF financial perspective for years 2021-2027

Increase precision of tracking

- The current revision of the EU 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.
- With respect to locating effort using passive gears such as gillnets, the use of smartphone apps by fishermen would provide the opportunity to enhance data quality and quantity. This is especially the case for small vessels.

Possible actors involved: fisheries authorities of HELCOM Contracting Parties, BALTFISH to discuss possible regional initiatives, MEP's, DG Mare, DG Environment.

The Commission has presented a proposal for a new EU Control Regulation in May 2018. Negotiations expected continue during the coming 1-2 years.

Increase precision of effort monitoring

Harmonisation of data entries in logbooks with respect to a metric more useful than "days at sea" (DaS) would increase the precision of effort assessments. To increase the precision of extrapolations (from bycatch rate per effort to total bycatch) the preferred metric would be total "**soak time of nets in kilometer hours"**. This simple but very effective improvement in logbook requirements can be addressed in the revision process of the control regulation and also at BALTFISH in order to harmonise this at a regional level. It is useful that vessels of all sizes record the same metrics. In order to make use of ICES WGBYCs database covering a long time but based on DaS it would be desired to keep DaS as additional variable for reporting.

The drop of the net is also relevant information with respect to bycatch risk but this is not required to be recorded in logbooks. The current Control Regulation 1224/2009 (Article 14) does not specify how the dimensions of a net must be recorded in a log book. From the perspective of bycatch risk it should be length and height (drop) of a net.

Since logbooks are only kept on fishing vessels >10 m (or 8 m if vessels have a cod quota), a large number of vessels using gillnets and other passive gear do not provide the information needed for a precise effort estimation. Expanding the obligation to keep a logbook which would contain the most needed information to be used specifically to estimate by-catch would further increase the precision of bycatch estimates. This can also be addressed in the revision process of the control regulation and also at BALTFISH.

Actors involved: fisheries authorities of HELCOM Contracting Parties, BALTFISH, MEP's, DG Mare, DG Environment

Initiate research projects to collect data on bycatch in relevant fishing métiers coordinated between Contracting Parties

Regionally coordinated research projects on bycatch would much enhance the data quality and be a first step to fulfill the data requirements according to the Habitats- and Bird Directive and the MSFD. This can be achieved with onboard observers or - more cost-effective - with remote electronic monitoring (REM) (Kindt-Larsen et al. 2013). As the main focus of DCF on-board sampling is on different metiers than those known to produce most of the bird and mammal bycatch in the Baltic Sea, additional bycatch information is needed especially for passive fishing methods such as gillnets and trammel nets in order to have better by-catch data. If this has to be done in a cost-effective way, it is possible to do this in a cycle of e.g. 3 or 6 years[27]. A longer than annual cycle could provide added value as the monitored effort in a particular year could then be larger using less money compared to a regular monitoring (e. g., in the DCF at-sea-sampling programme) in which bycatch is only one of many aspects observers have to deal with. In order to get the best benefit out of this it would be desirable to coordinate such projects between Contracting Parties and include as many Contracting Partiess as possible. This is because e.g., harbour porpoise by-catch rates are expected to differ along a gradient of density/occurrence and also with respect of regional/local differences in fishing practices.

Actors involved: fisheries and environmental authorities of HELCOM Contracting Partiess, funding agencies, scientific institutions

Dedicated bycatch monitoring of protected marine mammal and relevant sea bird species

A comparison of bycatch data collected by dedicated[28] observers with data obtained through other monitoring programmes (such as DCF) revealed that bycatch rates in programmes dedicated to bycatch, resulted in much higher bycatch estimates. Although the monitoring programmes compared were not in the same fisheries or precisely the same areas or at the same time, the scale of the difference has been so large that ICES advises that specifically designed monitoring schemes including dedicated observers or REM are required if good estimates of protected species bycatch are required (ICES Advice 2016). Reasons for this could be that in DCF monitoring bycatch (e.g., bycaught animals slipping out of a net before entering the vessel) can be overlooked by observers when performing other tasks (ICES WGBYC 2018, 2019).

Actors involved: fisheries and environmental authorities of HELCOM Contracting Parties, funding agencies, scientific institutions, RCG Baltic

Give the DCF Observer programme a stronger focus on métiers more relevant for bycatch

Currently, DCF Observer programmes focuses mainly on trawl fisheries. If DCF monitoring were to provide data on bycatch of mammals and birds in a quality suitable for precise bycatch assessments, it would be necessary to increase the observer coverage in gillnet and trammelnet fisheries as well as

[27] MSDF and HBD reporting is every 6 years.

[28] The term “dedicated monitoring” is used to define programs that are specifically aimed (through sampling design and data collection protocols) to obtain data for the typically rare bycatch events of protected, endangered or threatened species.

traps, longlines and other passive gear (ICES WGBYC 2018). It may be challenging to include a large number of small vessels, which cannot carry an additional person on board into the programme. For this purpose, additional monitoring using REM-schemes can provide a cost-effective solution. Further, including bycatch monitoring into DCF monitoring will require very careful consideration of sampling regimes and, as such, monitoring will require significant adjustments from that used for commercial fish bycatch (ICES Advice 2016). E. g., the observed effort must have to be corrected for times during which the observer was focused on different tasks than observing bird or mammal bycatch (for details see ICES WGBYC 2018 and 2019). It should though be noted that the EU funding for carrying out the national DCF programs for several years have been fully utilized and already today prioritization of what can be done in order to fulfill the CFP article 25 obligations are made.

ICES suggest that Regional Coordination Groups will need to adapt at-sea sampling designs to include data on frequency of protected species bycatch events in all relevant fisheries. In particular, gillnet fisheries are currently receiving little observation overall (ICES Advice 2017).

It is important that EU and national funding for collection of data on protected marine mammal and relevant sea bird species are made available. Collection of data for the MSFD monitoring in addition to the DCF monitoring could be made available through the new EMFF program period 2021-2027. This is important, in order to enable additional monitoring to the DCF-monitoring with a focus on bycatch of birds and mammals, fulfilling relevant MSFD monitoring requirements. EMFF negotiations are currently in progress.

Actors involved: fisheries and environmental authorities of HELCOM Contracting Parties, funding agencies (EMFF and co-funding), DG MARE, DG ENV, RCG Baltic.

Improve regional co-ordination on data collection for Union policies through EMFF direct management funding

EMFF provides a possibility for the European Commission to finance various measures through Integrated Maritime Policy (IMP). The purpose of such possibilities, among others, is to increase co-operation between different policy sectors. IMP enables a number of measures to address issues where different Union policies interface with each other and the stakeholder interest are common in different policy areas.

IMP direct management funding possibilities could improve regional co-operation on data collection for the purpose of the CFP and MSFD simultaneously. Such co-operation could consist e.g. developing or improving regional databases and assessments, pilot projects and studies and promoting dialogue between stakeholders. HELCOM, together with other regional actors such as BALTFISH and BSAC, could take the lead and form a partnership to advance such initiatives.

It is essential to maintain and preferably, improve the financing possibilities through the IMP direct management in the ongoing discussion in EU institutions on the new EMFF.

Actors involved: fisheries and environmental authorities of HELCOM Contracting Parties, BALTFISH, BSAC, funding agencies (EMFF and co-funding), DG MARE, DG ENV.

Joint OSPAR-HELCOM workshop to examine possibilities for developing indicators for incidental bycatch of birds and marine mammals.

The document below is a draft agreed by HELCOM FISH 10-2019 (Outcomes paragraph 6.1-6.5 and Annex 3). Further review within HELCOM State & Conservation, and HELCOM HOD is still expected, so the current draft document represents the latest draft to date. The draft Roadmap is provided to the workshop as a background document.

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5. Follow-up and Communication

Process towards promotion and communication of the Roadmap within HELCOM

- **Contribution from work done by the HELCOM ACTION project.** HELCOM ACTION to examine/look into data availability according to the data needs identified in the Roadmap (mainly fishing effort for smaller boats) and suggest what should be done to be able to identify bycatch hot spots of harbour porpoise, as well as matters related to seabed disturbance, which is currently in the focus of the ACTION Project which is going to terminate**by 2020**). There is a link between the ACTION Project and the update of the BSAP (see below and **Annex**).
- **Ensure relevant input to the updated Baltic Sea Action Plan.** The adopted Roadmap should be used to identify, in the updated Baltic Sea Action Plan, future actions related to bycatch and seabed disturbance. Such new actions are to be adopted in the updated BSAP by 2021. The exclusive competence of the European Union in conservation of marine biological resources under the Common Fisheries Policy, should be taken into account as appropriate.
- **HELCOM work on indicators**. Using information from the Roadmap to initiate actions to make the bycatch and seabed disturbance indicators operational by the planned HOLAS III assessment in 2021.

Process towards coordination and communication of the Roadmap outside HELCOM

- **OSPAR**: In general it is very important to coordinate work with OSPAR. Due to the fact that the Kattegat area will be assessed by OSPAR and the overlap of bird and sea mammal populations between HELCOM and OSPAR area, it is necessary to harmonise OSPAR and HELCOM indicators. A first opportunity to discuss the draft Roadmap and further joint indicator work will be the Joint *OSPAR/HELCOM Workshop to examine possibilities for developing indicators for incidental bycatch of birds and marine mammals*, (3-5 September 2019).
- **BALTFISH:** Communicate and present the Roadmap to the BALTFISH forum in the context of the envisaged communication process between BALTFISH and HELCOM regarding closer cooperation between fisheries management and the protection of the marine environment. Some technical issues connected with data needs identified in the Roadmap (e.g. to increase precision of effort monitoring) may be suggested to BALTFISH **in the first half of 2020.**
- **Regional Coordination Group (DCF) for the Baltic Sea:** Submit the Roadmap to the RCG meeting with the aim for RCG to discuss it **by first half of 2020**. RCG is suggested to discuss possible improvement of bycatch monitoring, and note the seafloor disturbance assessment in Chapter 3b of the Roadmap.
- **BSAC:** the Roadmap should be presented during discussions at upcoming meetings of the groups: (BSAC Working Group on Ecosystem based Management **by second half of 2020**, and possibly EXCOM **by first half of 2020**. Advice on solutions to address remaining data needs should be sought.
- **ICES:** HELCOM should communicate to the Advisory Committee of ICES (ACOM) and the ICES data centre on ongoing work of HELCOM FISH to harmonize a data collection roadmap to operationalize a bycatch and seafloor disturbance indictors for the Baltic Sea. Communication

should note HELCOMs wish to cooperate to find solutions on existing data gaps in the Baltic Sea, in particular for bycatch monitoring for a "Number of drowned mammals and waterbirds in fishing gear" indicator. HELCOM could enquire how to best support the work of ICES working groups WGSFD and WGBYC to help resolve existing gaps in data. The intention is to harmonize ongoing work with regard to ICES' seabed assessment framework (WGFBIT) for the Baltic Sea. This can be used to provide options on how to reduce the environmental impact of bottom fishing on seafloor habitats and marine protected areas in a cost effective way.

- **ASCOBANS:** The Roadmap should be shared with the Joint bycatch Working Groups of ACCOBAMS and ASCOBANS, ASCOBANS Advisory Committee and the JASTARNIA group, as well as the ASCOBANS Meeting of Parties in 2020.
- **European Union institutions:** Communicate the Roadmap to relevant bodies of the EU (e.g. DG Environment and DG MARE) **by the first half of 2020.**
- **EU Marine, Nature and Fisheries Directors:**. Aim to present the Roadmap at the next meetings, preferably in 2020, to ensure linkage between MSFD and CFP processes.

Annex

ICES contribution to the draft Roadmap on fisheries data in order to assess incidental bycatches and fisheries impact on benthic biotopes in the Baltic Sea

ICES notes that the data requirements may be very different in order to operationalize the respective indicators being put forward by HELCOM-FISH, 1) bycatch of mammals/birds and, 2) sea bottom integrity. We note that the FISHDATA draft roadmap is well developed with regard bycatch of mammals/birds, and provide some further input as to ongoing work within ICES. For sea bottom integrity the roadmap is underdeveloped, and we thus provide some more substantive input on the ongoing ICES work.

Bycatch assessment data and methods

The basis for the ICES advice on "Bycatch of cetaceans and small marine mammals" is available online:

http://ices.dk/sites/pub/Publication%20Reports/Guidelines%20and%20Policies/16.3.3.2_Basis_for_the_advice_on_Bycatch_of_small_cetaceans_and_other_marine_animals.pdf

Since 2018, the ICES Working Group on bycatch of protected species (WGBYC) issues an annual data call on total fishing effort, monitoring/sampling effort and protected species bycatch incidents. The data supports ICES annual advice on the impact bycatch on small cetaceans and other marine animals to answer a standing request from the European Commission for advice on the impacts of fisheries on the marine environment. Data are requested from 18 ICES countries and six additional Mediterranean non-ICES countries. The majority of the countries submitted data but the quality and quantity of the data provided varied widely among nations.

It is important to note that to assess the conservation threat posed by fishery bycatch to a particular protected species three bits of information are required, these are:

1. the susceptibility of that population to bycatch in particular fisheries (based on observer effort data and number of bycatch incidents recorded by fishing gear);
2. the scale of the fisheries concerned (based on total fishing effort by fishing gear);
3. the resilience of the population to bycatch (based on population abundance and recovery potential).

The WGBYC data call gathers information to estimate 1) and 2). The WGBYC data call does not provide data to estimate 3), since resilience depends on the population abundance and its ability to grow and recover. Data to assess 3) may originate from national and international scientific surveys to estimate bird and mammal population abundances.

Sea floor assessment data and methods

Joint OSPAR-HELCOM workshop to examine possibilities for developing indicators for incidental bycatch of birds and marine mammals.

The document below is a draft agreed by HELCOM FISH 10-2019 (Outcomes paragraph 6.1-6.5 and Annex 3). Further review within HELCOM State & Conservation, and HELCOM HOD is still expected, so the current draft document represents the latest draft to date. The draft Roadmap is provided to the workshop as a background document.

The basis for ICES assessment on "sea bottom integrity" - is available within the WGFBIT report as "*Annex 4 Technical guidelines document for assessing fishing impact from mobile bottom-contacting fishing gears*".

http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/HAPISG/2018/01%20WGFBIT%20-%20Report%20of%20the%20Working%20Group%20on%20Fisheries%20Benthic%20Impact%20and%20Trade-offs.pdf

The described methods are bases on ICES (2016, 2017) advice that has established a set of indicators to assess seafloor integrity, in terms of the spatial extent and distribution of pressures classed under both assessment criteria (physical loss D6C1 and physical disturbance D6C2) and their impact for each broad habitat type, within each ecoregion and subdivision. This work builds on from the old DCF Annex XII indicators 5, 6, and 7 (see 2015 ICES advice), but now also includes benthic impact estimate (biomass relative to carrying capacity) indicators. The suggested seafloor assessment framework by ICES (Figure 1, next page) also allows for evaluation of trade-offs between catch/value of landings per unit area and the environmental impact and recovery potential of the seafloor (see e.g. 2017 ICES workshop WKTRADE). Such information will be required in the exploration of management scenarios under different policy requirements (e.g. MSFD, CFP, and the deep-sea access regulation EU 2016/2336).

Based on this ongoing (2018-2020) work, ICES is working to operationalize the suggested seafloor assessment framework (see WGFBIT three-year work plan), with respective indicators becoming operational across the whole EU and ICES areas (also the Baltic). The indicators and data collected need to be appropriate to the assessment of benthic habitats (D1) and seafloor integrity (D6) as set out in the Commission Decision 2017/848/EU. The Marine Strategy Framework Directive (MSFD) sets the broad requirement under Descriptor 6 that sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected (Directive 2008/56/EU), and the indicators will also need to serve this purpose.

Assessing the seafloor?

A newly established ICES working group WGFBIT, who met in November 2018, will be taking forward (2018-2020) the operationalizing of the ICES seafloor assessment framework (see WGFBIT three-year work plan) - with respective indicators across the whole EU, ICES areas, including the Baltic.

In addition to the established and suggested pressure data flows (see below section), WGFBIT has in their draft report recommended the integration of benthic datasets that are linked to specific functional traits (longevity/biomass) of the species. These data are required not only for a wider range of taxa, but also across a specific range of habitats within for example Barents Sea, Celtic Sea, Baltic Sea, Norwegian Shelf and the Mediterranean Sea (and others). Where data does not exist, targeted gradient studies – rather than traditional monitoring - will be required. Some data does exist via EMODnet biology data portal, but this needs to be greatly expanded. With this in mind there may be

a need in the near future to establish new initiatives and/or project to target some of the identified gaps.

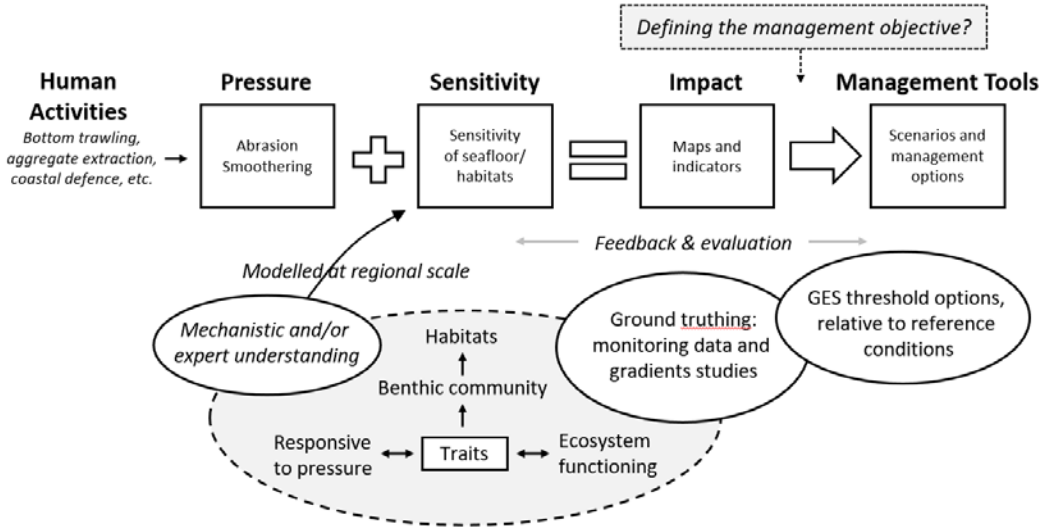

Figure 1. Conceptual diagram of the steps taken in developing management tools for assessing pressure and impact on the seafloor.

Activities to pressure data, service seafloor assessment indicators?

Pressure data gaps and requirements

Parallel to the process of indicator development, ICES has received a number of EU advice requests to map out the data needs necessary to the service seafloor assessment framework and to demonstrate its operationality. This work has already highlighted some specific data needs to service the underlying methods of the indicators. If these data needs are met, this would ensure the overall assessment of the seafloor (impact and pressure) can be featured in the future iterations of, for example, the ICES Fisheries Overviews and Ecosystem Overviews for each ecoregion (e.g. in 2020).

A recent ICES workshop (WKBEDPRES1, October 2018) has identified the benthic physical disturbance (D6C2) pressure layers available within ICES and the European and wider marine community across four EU regions – including the mapping of pertinent data flows and the establishment of criteria needed to ensure the practical use of the data in assessing benthic impact. See conclusions and recommendations page 44-46 of the WKBEDPRES1 workshop report.

Preliminary analysis indicated that the key human activities that resulted in physical disturbance on the seabed are very similar for the 4 EU regions examined (Baltic Sea, North East Atlantic, Mediterranean and Black Sea). Here fishing was found to be the most extensive cause of physical

abrasion, with aggregate extraction and dredging also of relevance in most regions, but much less extensive.

Data flows and quantitative methodologies for the processing of physical disturbance from bottom fishing currently exist within ICES and were deemed appropriate for EU e.g. MSFD purposes for assessing the seafloor. These methodologies are in line with previous ICES advice on indicators (ICES 2016, 2017). However, similar data flows are yet to be established for the Mediterranean and Black Sea. Future calls should also take into account other sources of data reflecting activity causing seabed abrasion to allow for better coverage (e.g. AIS). Relevant data from HELCOM, OSPAR and the EMODnet human activities data portal may also be of use in the assessment and should be explored. Similar to the ICES VMS/logbook data call, data flows for other pressure (e.g. aggregate extraction and dredging) need to be better established to ensure consistent collation at the regional scale from national level. This needs to done using data management practices, for which ICES's TAF (transparent assessment framework) is an integral part of.

In addition to physical disturbance pressures data, ICES has in 11-13 March 2019 run a similar workshop (WKBEDLOSS) to identify data flows for activities resulting in physical loss (D6C1/C4) pressures, i.e. permanent alteration of the habitat from which recovery is impossible, such as construction activities (e.g. offshore windfarms).

What about the trade-offs? To ensure more realistic scenarios will be developed under the assessment framework, a series of workshops are planned to bring together experts from ICES working groups WGFBIT, WGMARS, and WGECON. These management scenarios will have cross policy relevance (e.g. MSFD, CFP, and the deep-sea access regulation (EU) 2016/2336). Data improvements will also be at the heart of these workshops: for example, where countries might agree on standard methods in assigning landings values when answering the ICES VMS/logbook data calls.