

Human Activities, Pressures and Impacts Steering Group EGs Resolutions

Human Activities, Pressures and Impacts Steering Group EGs Resolutions	i
Resolutions approved in 2020	1
Working Group on Bycatch of Protected Species (WGBYC)	1
ICES/NAFO Joint Working Group on Deep-water Ecology (WGDEC).....	2
Working Group on the Ecosystem Effects of Fishing Activities (WGECO)	4
Working Group on Economics (WGECON).....	7
Working Group on the History of Fish and Fisheries (WGHIST)	10
Workshop on Transboundary issues in marine spatial planning (WKTBIMP).....	14
A series of two Workshops to develop a suite of management options to reduce the impacts of bottom fishing on seabed habitats and undertake analysis of the trade-offs between overall benefit to seabed habitats and loss of fisheries revenue/contribution margin for these options (WKTRADE3)	15
Workshop on the Use of Predictive Habitat Models in ICES Advice (WKPHM).....	18
ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS)	20
Workshop on the Socio-economic implications of offshore wind on Fishing Communities (WKSEIOWFC)	21
Working Group on Marine Habitat Mapping (WGMHM).....	22
Joint ICES/ NMTT Workshop exploring the establishment of a Nordic Climate Change Forum for Fisheries and Aquaculture (WKNCCFFA)	25
Workshop on estimation of MOrtality of Marine MAMmals due to Bycatch (WKMOMA)	27

Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT)	28
Working Group on Offshore Renewable Energy (WGORE).....	32
Workshop on Geo-Spatial Data for Small-Scale Fisheries (WKSSFGE0)	35
Working Group on Marine Litter (WGML)	36
Methods Working Group (MGWG)	36
Resolutions approved in 2019	37
Working Group on Introduction and Transfers of Marine Organisms (WGITMO).....	37
Working Group on Marine Planning and Coastal Zone Management (WGMP CZM)	40
Working Group on Offshore Wind Development and Fisheries (WGOWDF)	46
Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT).....	49
Stock Identification Methods Working Group (SIMWG)	51
Resolutions approved in 2018	54
Working Group on Marine Benthic and Renewable Energy Developments (WGMBRED).....	54
ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors (WGBOSV)	57
Working Group on Spatial Fisheries Data (WGSFD)	59
Working Group on Biological Effect of Contaminants (WGBEC)	64
Marine Chemistry Working Group (MCWG)	67
Working Group on the Value of coastal Habitat for Exploited Species (WGVHES).....	70
Working Group on Multispecies Assessment Methods (WGSAM).....	72
Working Group on Cumulative Effects Assessment Approaches in Management (WGCEAM).....	74

Working Group on Shipping Impacts in the Marine Environment (WGSHP)	76
Resolutions approved in 2017	80
Working Group on Marine Sediment (WGMS)	80
EGs DISSOLVED in 2020	83

NB: The following group has been transferred to the resolutions file for **Data Science and Technology Steering Group (DSTSG)** Expert Groups, although it formally belongs to HAPISG until 1 January 2021:

- **Working Group on Spatial Fisheries Data Governance (WGSFDGOV)**

Resolutions approved in 2020

Working Group on Bycatch of Protected Species (WGBYC)

The WGBYC resolution was edited in March 2021 to include new meeting dates and a new ToR related to a special request.

Only experts appointed by national Delegates or appointed in consultation with the national Delegates of the expert's country can attend this Expert Group.

2020/OT/HAPISG01 The **Working Group on Bycatch of Protected Species (WGBYC)**, chaired by Allen Kingston*, UK, and Guðjón Már Sigurðsson*, Iceland, will meet in La Rochelle, France¹ 28 September-1 October 2021 to:

- a) Review and summarise data submitted through the annual data call and other means, and other data assembled by ICES WGs to collate protected species bycatch rates and mortality estimates;
- b) Collate and review information from WGFTB national reports, other WGs and other recent published documents relating to the implementation of protected species bycatch mitigation measures and ongoing bycatch mitigation trials;
- c) Evaluate the range of (minimum/maximum) impacts of bycatch on protected species populations, where possible, to assess likely conservation level threats, including feedback to the results from the Workshop on estimation of MOrtality of Marine MAMmals due to Bycatch (WKMOMA);
- d) Review ongoing monitoring of different taxonomic groups in relation to spatial bycatch risk and fishing effort to inform coordinated sampling plans;
- e) Coordinate with other ICES WGs to ensure complete compilation of data on protected species bycatch and to develop and improve on methods for bycatch monitoring, research and assessment;
- f) Identify data requirements on fishing effort, monitoring effort, and bycatch incidents, by considering spatial, temporal and gear type aspects, for the special request advice on bird bycatch in the NEAFC Regulatory Area;
- g) Identify potential research projects and funding opportunities to further understand PETS bycatch and its mitigation;
- h) Continue, in cooperation with the ICES Data Centre, to develop, improve, populate through formal Data Call, and maintain the database on bycatch monitoring and relevant fishing effort in ICES and Mediterranean waters (Intersessional).

¹ Tentatively scheduled, depending on further developments in relation to the COVID-19 disruption.

WGBYC will report by 29 October 2021 for the attention of ACOM.

Supporting Information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
Scientific justification	<p>a–b) This is essential to use in answering part of the European Commission annual request to “provide any new information regarding the impact of fisheries on marine mammals, seabirds...”;</p> <p>c) ICES Member Countries are required to reduce levels of bycatch under several pieces of legislation; the response to this ToR will help meet that aim;</p> <p>d–e) Bycatch monitoring and assessment is fundamental to the work of the group; in light of significant changes in legislation that will impact monitoring programs for PETS any improvements in coordination and methods will help the group and other workers in this field;</p> <p>f) NEAFC has requested ICES to compile and aggregate available data on bird bycatch in the NEAFC regulatory area to explore the significance of bird mortality due to bycatch.g) Improving scientific understanding how target and non-target catches interact with commercial fishing gear is fundamental to developing effective mitigation measures to reduce bycatch on vulnerable species;</p> <p>g) Improving scientific understanding how target and non-target catches interact with commercial fishing gear is fundamental to developing effective mitigation measures to reduce bycatch on vulnerable species;</p> <p>h) An operating database allows for more efficient response to future advice requests and an audit trail for information used in the Group’s reports; remaining intersessional ToR’s all aim to increase efficiency of WGBYC’s tasks in providing advice to various groups;</p>
Resource requirements	None beyond usual Secretariat facilities
Participants	15–25
Secretariat facilities	Secretariat support with data call and meeting organization, database maintenance, and final editing of report
Financial	No financial implications.
Linkages to advisor committees	ACOM
Linkages to other committees or groups	JWGBIRD, WGFTFB, WGMME, WGSE, WGEF, WGCATCH, WGMIXFISH, WGSFD, WGNSSK, SCICOM, WGHARP, HAPISG
Linkages to other organizations	NAMMCO, ASCOBANS, ACCOBAMS, GFCM, OSPAR, HELCOM, RCGs

ICES/NAFO Joint Working Group on Deep-water Ecology (WGDEC)

Only experts appointed by national Delegates or appointed in consultation with the national Delegates of the expert’s country can attend this Expert Group.

2020/OT/HAPISG02 The Joint ICES/NAFO Working Group on Deep-water Ecology (WGDEC), chaired by Laura Robson, UK, will meet in Flødevigen Research Station, IMR, Norway, 7–11 June 2021 to:

- a) Collate new information on the distribution of vulnerable habitats as well as important benthic species and communities in the North Atlantic and adjacent waters, archive appropriately using the ICES VME Database, and disseminate via the Working Group report and ICES VME Data Portal;
- b) Provide all available new information on the distribution of vulnerable habitats (VMEs) in the NEAFC Convention Area. This should also include information on the distribution of vulnerable habitats in subareas of the Regulatory Area that are closed to fishing for other purposes than VME protection. In addition, provide new information on location of habitats sensitive to particular fishing activities (i.e. vulnerable marine ecosystems, VMEs) within EU waters;
- c) To support the use of the VME weighting algorithm outputs within future ICES advice, and considering known limitations, identify and trial approaches to improve the weighting algorithm method, and continue to explore alternative options for identifying areas where VME are likely to occur;
- d) Review existing definitions of, and ongoing work to define, VMEs to develop a clear procedure for combining the FAO criteria for the assessment of taxa as VME indicators and develop pragmatic definitions of VME habitats for specific use by WGDEC and the ICES VME database.
- e) Assess the outcomes and proposed next steps made by WKPHM (and the review of the report) on the use of predictive habitat models in ICES advice and identify what role WGDEC could have over the next few years in implementing these steps and furthering the use of predictive habitat models to support ICES advice.

WGDEC will report by 18 June 2021 for the attention of ACOM.

Supporting Information

Priority	The current activities of this Group will enable ICES to respond to advice requests from a number of clients (NEAFC/EC). Consequently, these activities are considered to have a high priority.
Scientific justification	<p>ToR [a]</p> <p>The Joint ICES/NAFO Working Group on Deep-water Ecology undertake a range of Terms of Reference each year; the scope of these cover the entire North Atlantic, and include aspects such as ocean basin processes. Therefore, collating information on vulnerable habitats (including important benthic species and communities) across this wide geographic area (and adjacent waters) is essential. To this end, a VME data call will be run in 2021, facilitated by the ICES Data Centre. Data will be quality checked/prepared at least one month in advance of WGDEC 2021 by the ICES Data Centre and a newly formed intersessional subgroup of WGDEC. New data will be incorporated into the ICES VME database and data portal. This ToR includes any development work on the ICES VME database and data portal, as identified by WGDEC, with support from the ICES Data Centre.</p> <p>ToR [b]</p> <p>This information and associated maps are required to meet the NEAFC request “to continue to provide all available new information on distribution of vulnerable habitats in the NEAFC Convention Area” as well as part of the European Commission MoU request to “provide any new information regarding the impact of fisheries on sensitive habitats”. The location of newly discovered/mapped sensitive habitats is critical to these requests.</p> <p>ToR [c]</p> <p>The VME weighting algorithm was developed in 2015/2016 to utilise data in the ICES VME database from a range of survey types, to determine likelihood of VME presence and associated confidence. However, a number of limitations to the weighting algorithm have been identified, including those detailed in the WGDEC 2017 report.</p>

Furthermore, in 2019, new methods of determining VME likelihood were explored via kernel density estimation (KDE) and predictive habitat models. This ToR will focus on developing improvements to the method to the VME weighting algorithm, and will further explore alternative methods for assessing likelihood of VME presence, including considerations of outputs of the WKPHM.

ToR [d]

VMEs are currently defined within ICES work following the five FAO criteria; uniqueness/rarity; functional significance; fragility; slow recovery; and structural complexity. When multiple criteria are used, a clear procedure for deciding how to assess these in combination is needed, to avoid subjectivity introduced by individual understanding. Furthermore, to increase confidence in use of accumulated information on VME distributions from the ICES VME database, clearer definitions of the VMEs need to be developed. This ToR will therefore focus on the review of existing definitions of, and ongoing work to define, VMEs to develop a clear procedure for combining the FAO criteria for the assessment of taxa as VME indicators and to develop pragmatic definitions of VME habitats for specific use by WGDEC and the ICES VME database.

ToR [e]

WKPHM met 1-5 Feb 2021 and developed standards for data and modelling approaches for predictive habitat models (PHMs) that could be accepted for use in supporting ICES advice, together with a set of criteria for model outputs that would be most useful in communicating ICES advice. Recommendations and next steps for this work were proposed, and these need to be reviewed by WGDEC to establish how the use of PHMs in ICES advice could be taken forward.

Resource requirements	Some support will be required from the ICES Secretariat.
Participants	The Group is normally attended by some 15–20 members and guests.
Secretariat facilities	None, apart from WebEx and SharePoint site provision.
Financial	No financial implications.
Linkages to advisory committees	ACOM is the parent committee and specific ToRs from WGDEC provide information for the Advice Committee to respond to specific requests from clients.
Linkages to other committees or groups	While there are currently no direct linkages to other groups, WGDEC should develop stronger links (ideally through the establishment of joint Terms of Reference) with WGSFD, WGMHM, WGDEEP and WGFBIT.
Linkages to other organizations	As a Joint ICES/NAFO group, the work of this group links to work being undertaken by Working Groups under the NAFO Scientific Council; specifically, WGESA.

Working Group on the Ecosystem Effects of Fishing Activities (WGECO)

Only experts appointed by national Delegates or appointed in consultation with the national Delegates of the expert's country can attend this Expert Group.

2020/OT/HAPISG03 The Working Group on the Ecosystem Effects of Fishing Activities (WGECO), chaired by Tobias van Kooten, NL and Brian Smith, USA, will meet in VENUE (tbc), DATE (tbc) 2021 to:

- a) Investigate the ecological consequences of stock rebuilding, with particular emphasis on benthivorous fish and invertebrates:
 - 1) Make first-order estimates of predation pressure on benthos;

- 2) Examine evidence of food limitation and density-dependent growth;
- 3) Compare the footprints of trawling to the footprints of predation pressure on benthos.
- b) As potential input for the Ecosystem overviews, WGECO will develop spatial distribution indicators for survey data (fish and benthos) across marine ecosystems and analyse trends in these indicators in relation to climate change, abundance change and large-scale fisheries closures.
- c) Conduct a “reality check” and horizon scanning survey within WGECO. The aim is to develop a consensus view of the major emerging issues in relation to fisheries and ecosystems, and on which WGECO could focus future work. WGECO members will provide a list of emerging issues (horizon scanning), that would benefit from scrutiny by WGECO. This list will be collated and used as material for a plenary discussion, and with the aim of producing a perspectives paper in the ICES JMS or Fish and Fisheries.
- d) Prioritize indicators (one or more than one) from a set of indicators from current and earlier work by WGECO or its participants (including particularly those from ToR d of WGECO 2018), which can be estimated on a routine basis and are applicable across several ecoregions. For each prioritized indicator, supply a short explanatory text for justification of the prioritization, identify the required steps to operationalize their use in the ICES fisheries and/or ecosystem overviews, and outline how WGECO or ICES can support their implementation over the next three years.

WGECO will report by DATE (tbc) 2021 for the attention of ACOM.

Supporting Information

Priority	<p>The current activities of this Group will enable ICES to respond to advice requests from member countries. Consequently these activities are considered to have a very high priority.</p> <p>It will also lead ICES into issues related to the ecosystem affects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.</p>
Scientific justification	<p>Term of Reference a)</p> <p>Many stocks are rebuilding and will likely have higher abundance and biomass than we have seen in recent times. This in turn will likely have effects through trophic interactions both up and down the foodweb. At ICES, WGECO and WGSAM have been tasked previously with similar ToRs. WGECO will investigate the potential consequences of stock recovery of benthivorous fish and invertebrates, their ensuing risks for fish stock management and the use of MSFD indicators. It is hypothesized that a large increase in benthivorous fish will have an impact on benthic productivity and biodiversity. This ToR requires data on the spatial distribution of benthivorous predators, their prey consumption rates and diet composition. It also requires data on the abundance and production of benthic faunal. This ToR links to ToR c.</p> <p>Term of Reference b)</p> <p>WGECO has traditionally had a leading role in developing and testing indicators, and their use for provision of advice. The work of this ToR facilitates operationalization of these indicators, by identifying data sources, refining, evaluating their strengths and weaknesses and gaps in indicator availability. Indicators that are evaluated to be promising will be applied to fish and benthic invertebrates species in the ICES region.</p> <p>Term of Reference c)</p> <p>The ICES Strategic Plan seeks to incorporate a wider range of scientific knowledge into advice to inform decision-makers and society about the state of our seas and oceans, the consequences of human use, and option for conservatoin and mangement. This ToR will allow WGECO to contribute strongly to the development of future ICES strategy. We</p>

intend to seek input across the national and disciplinary range of WGECO members, many of whom are operating at a high level in the field and in the home institutes. We aim to publish the results of this initiative as a perspective paper in one of the key journals, and this will be available to inform future progress for this important and centrally positioned Expert Group.

Term of Reference d)

WGECO has over consecutive years (e.g. 2016, 2017 and 2018) proposed and reviewed indicators. For ICES producing a set of quantitative indicators linked to existing data, that can be estimated on a routine basis and are applicable across several ecoregions is of high priority. Given the overarching role of the group, WGECO is in a good position to provide steer in terms of a priority set of indicators using criteria (see e.g. Rice and Rochet 2005 or WGBIODIV 2015 on OSPAR indicators). This TOR also offers WGECO or ICES the opportunity to work in a structured fashion over a 3 year period towards operationalizing a set of prioritized indicators for use in ICES advice products, namely for the ICES fisheries and/or ecosystem overviews.

Term of Reference e)

During their previous meeting at ICES HQ (8–16 April 2019) WGECO provided initial input on an EU DGMARE request to ICES relating to the EU's Deep Sea Access Regulations. The suggested ACOM approved process (phase 1 and phase 2) is designed to ensure ICES's scientific integrity while at the same time ensuring required dialogue with the managers so that what ICES can offer (in terms of data, VMEs and VMS) can contribute towards the deep sea access regulation for regulatory purposes. WGECO offered to provide further scientific input during their 2020 meeting as a review of the workflow and the set of criteria to propose a set of regulatory area options to managers. More specifically to provide scientific input on the associated trade-offs between different areas selected (an integral part of Phase 2). As such, WGECO is tasked to review a working document describing a workflow to be used by WKEUVME to come up with a set of regulatory area options using available ICES data. Specifically, WGECO is tasked to:

- review the working document to provide input on whether the suggested workflow to identify regulatory areas options is suited for management purposes, and, in line with previous ICES work related to the deep-sea access regulation;
- suggest alternative options (if relevant) and/or improvements to the proposed workflow supported by relevant scientific literature
- provide scientific input on how to best estimate for each of the regulatory area options, how area closures will ensure VME protection and how the closures will affect fisheries (e.g. spatial footprint and intensity of bottom fishing).
- consider how the workflow can accommodate future updates of the assessment based on ICES VME and VMS data and data calls;
- consider whether the workflow can best conform to the ICES FAIR principles that data is fully documented.

Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 20–25 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	There are no current direct linkages with the advisory committees.
Linkages to other committees or groups	There is a very close working relationship with the groups of the Fisheries Technology Committee, JWGBIRD, BEWG, WGBIODIV, WGBYC, WGFBIT and WGSAM.

Linkages to other organizations OSPAR, HELCOM

Working Group on Economics (WGECON)

2020/FT/HAPISG04 The **Working Group on Economics (WGECON)**, chaired by Arina Motova, UK, J. Rasmus Nielsen, Denmark; and Olivier Thébaud, France, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2021	14–18 June	Online meeting		
Year 2022	DATE June (tbc)	In-person or online (TBD)		
Year 2023	DATE June (tbc)	In-person or online (TBD)	Final report by December to SCICOM	Potentially introduce additional chair(s) to ensure transition towards future WGECON

ToR descriptors

TO R	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Build additional capacity for economic science in ICES, giving consideration to research and institutional needs in all ICES member countries, as well as useful connections to international marine/ fisheries economics organisations such as IIFET, NAAFE and EAFE.	This builds on the initial scoping exercise within ICES carried out by WGECON, expands the capacity building efforts, and ensures coordination of activities with other international bodies and links to the wider scoping work in the Strategic Initiative for the Human Dimension (ICES SIHD).	6.3; 6.4; 7.3	Years 1, 2 and 3	Annual e-evaluation and final report sections on coordination activities
b	Identify and report on economic data-related needs and priorities for short and longer-term economic data collection, access and analysis; and where possible propose systems to collect missing data.	To aid prioritisation in data collection, management and analysis, to enable quantitative analyses and estimates of economic issues. The ToR links to ICES Data Centre and National and international economic data collection	3.1; 3.2; 4.2	Years 1,2 and 3	Final report section on prioritisation and continued scientific review paper

		requirements (e.g. EUMAP).			
c	Demonstrate the approaches, methods, tools and information flow needed to provide analysis of trade-offs relating to ecosystem-based management of fishing (EBFM).	To develop toolboxes, expertise and processes to support potential future advice requests and development of ecosystem overviews and integrated ecosystem assessments. This includes collaborations with WGSOCIAL.	5.3; 6.1; 7.6	Years 1,2 and 3	Final report section on developments and potential scientific manuscript
d	Assess and report on economic aspects of commercial fishing and its management for selected regions in the ICES area.	To support future potential advice requests and development of ecosystem overviews, using a case study approach. This requires identification of robust indicators to describe economic status and performance.	6.6; 7.1; 7.2	Years 1,2	Final report section on case-study based identifications and assessments, and potential scientific manuscript
e	Coordinate the provision of economic indicators and analysis as part of integrated socio-ecological evaluations in support of EBFM.	Building on results from ToRs b), c) and d), to contribute to the development of a framework for integrated assessment of alternative scenarios for marine fisheries, as part of broader ecosystem-based management approaches, within ICES.		Year 2, 3	Final report section on economic contribution to integrated assessment framework (case-study based)

Summary of the Work Plan

Year 1	<p>Continue work started by WGECON in 2018-2020 on identifying needs for economic science in ICES, data gaps and opportunities to provide trade-off analysis, building the ICES capacity to integrate economic dimensions in fisheries management advice:</p> <ul style="list-style-type: none"> - Initiate the case study work identified in 2020, and request data from ICES Member States to address these where necessary; - In collaboration with especially ICES WGSOCIAL, analyse possible ways to introduce human dimensions into Ecosystems Overviews (EOs) by e.g. mapping ports of fishing operation and bringing fisheries at sea to national territories dimensions to identify coastal / fisheries dependent communities; - Continue sharing methodologies of economic data collection / analysis and modelling, and integrated assessment with other ICES working groups and ICES SCICOM and ACOM. <p>Produce e-evaluation report.</p>
--------	--

Year 2	Progress case study work and inclusion of human dimensions in EOs and develop manuscript(s) presenting results. Continue sharing methodologies of economic data collection / analysis and modelling, and integrated assessment with other ICES working groups and ICES SCICOM and ACOM. Produce e-evaluation Report
Year 3	Finalise case study work. Finalize manuscript(s). Discuss and plan strategies and concrete steps for future work. Produce Final Report

Supporting information

Priority	<p>Nations are concerned about fish stocks and marine ecosystems not least of which because of their contribution to human wellbeing and economic welfare. The economic dimension should be an integral part of marine science and scientific advice regarding the use and conservation of marine resources.</p> <p>Demand for science and advice to address economic considerations is increasing, but ICES does not engage many economists or address economic issues in many member countries in its existing work. The efforts of the Strategic Initiative on the Human Dimension (SIHD) with ICES have served to raise the profile of economics and social aspects in relation to fisheries in the last few years, but, with a few exceptions, SIHD efforts are not comprehensively supported and informed by the work of the ICES EG. Further, among the ICES groups addressing economic issues, only WGECON focuses on the development of fisheries economic metrics and core fishery economic analyses that are demanded in parts of the ICES network (e.g. further development of ecosystem overviews) and, in some cases, by clients for ICES management advice.</p> <p>The need to expand the engagement of ICES in economics was also reflected in the outcomes of many recent meetings, especially the “Understanding marine socio-ecological systems” (MSEAS) Conference which ICES co-sponsored in Brest in 2016, as well as the results from the ICES working group on Integrating Ecological and Economic Models (WGIMM). Other drivers include high level aspirations for Blue Growth in European countries and globally, the interest in accounting for economic objectives such as Maximum Economic Yield as well as for the United Nations sustainable development goals in management advice, and a desire to understand economic consequences of human-induced changes in the sea (WGHIST). There is also recognition in ICES, and from our clients, that it would be desirable to add economic metrics to ICES ecosystem overviews and better recognise people and their livelihoods as part of the ecosystem.</p>
Resource requirements	The group will rely on ongoing international and national research projects with active involvement of WGECON members. The additional resources required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 20–30 members and guests.
Secretariat facilities	Standard support to EG.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are currently no linkages with ACOM, but the EG is working on providing standards for economic advice, on top of the biological advice, which should be relevant to ACOM. The EG will be ready to address advisory requests if these are forthcoming and possible to achieve with available efforts.
Linkages to other committees	The subject area of this EG has close linkage with at least the following ICES groups: WGSOCIAL, WGMIXFISH, WGSEDA, WGIMM, WGSPA, WGSEDA, WGRMES, WGNARS, WGHIST, WGBESEO and the Strategic Initiative SIHD, as

or groups	well as the ICES IEA groups. The working group has initiated strong cooperation and relationship with WGSOCIAL.
Linkages to other organizations	International Institute of Fisheries Economics and Trade (IIFET), North American Association, of Fisheries Economists (NAAFE), European Association of Fisheries Economists (EAFE), EU Scientific, Technical and Economic Committee for Fisheries (STECF), Food and Agriculture Organisation of the United Nations (FAO), Organisation for Economic Cooperation and Development (OECD).

Working Group on the History of Fish and Fisheries (WGHIST)

2020/FT/HAPISG05 The Working Group on the History of Fish and Fisheries (WGHIST), chaired by Bryony Caswell*, UK; and Camilla Sguotti*, Germany, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2021	21-25 June	Online meeting		
Year 2022	early Sept	tbc (possibly Newcastle, UK)		
Year 2023	early Sept	tbc	Final report by 1 December to SCICOM	

ToR descriptors

TO R	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Collect, assemble, and, integrate meta-data on marine social-ecological systems through time and develop links with historical data management bodies (within and beyond ICES) to: explore shared interests and compatibilities, and collaboratively develop data products to encourage the use, preservation, and maintenance of historical data.	Data from WGHIST supports the development of tools for marine living resource management and provides a resource of historical and long-term information for the global community via the ICES Data centre. In addition, WGHIST can work with the ICES Data Centre and others to identify further opportunities for promoting and facilitating access to historical and archival resources housed by other institutions (e.g. by collating and digitizing them). WGHIST can also work with other experts to develop guidelines for best practises in using of long-term data for research and management.	6.1, 7.7	3 years	Digital products, such as indexing WGHIST metadata on the ICES Spatial Facility. Guidelines on best practice within ICES and beyond for using and/or applying historical data to contemporary advice for management.

b	Explore the actual or potential synergies between different kinds of historical data and provide tools both for communicating, and for bridging disciplinary differences in data usage.	Historical data comes in many forms, and often requires an open and responsive approach to its usage. When 'traditional' (i.e. independently verifiable and/or quantitative) data is missing or incomplete, it may be supplemented by 'non-traditional' (i.e. anecdotal or less easily verified) data. These non-traditional data can be more challenging to integrate into management which predominantly focuses on using modern, quantitative data. However, WGHIST is uniquely placed to facilitate cross-disciplinary discussions on how to overcome these challenges, and on best practices for effective integration of 'traditional' and 'non-traditional' historical data for science and management.	7.7	3 years	Wiki providing resources such as: information on best practice and examples of how to understand and the overcome the challenges and constraints of using different kinds of data; with links to other relevant resources that can help to address the integration of different data types for effective and high-quality research.
c	Evaluate long-term changes within marine social-ecological systems, and explore how this knowledge can be applied to contemporary science and management.	The interdisciplinary nature of WGHIST, with expertise in marine ecology, fisheries biology, historical ecology, palaeo-ecology, social and environmental history, offers a unique forum for conducting transdisciplinary research into marine social-ecological systems. It may therefore provide unique data and knowledge that can be leveraged to improve our understanding of social-ecological systems and their dynamics (e.g., scale, direction and drivers of change through time).	2.2, 4.5, 5.4, 7.7	3 years	Submission of (1) manuscript for peer review which might explore the origins or impacts of 'technology creep' in social-ecological systems. OR opinion/perspective piece on the applications of historical data for contemporary science. Provide knowledge that could contribute important context for the ICES fisheries and ecosystems overviews.
d	Explore the utility of historical data for understanding the social-ecological outcomes of emerging management strategies.	WGHIST is unique in bringing together specialists from very different fields who have particular interests in using unconventional resources and approaches, and interdisciplinary methodologies to interpret social-ecological trends over long (decadal to centennial)	2.2, 2.7, 7.7	3 years	Work towards published outputs addressing the historical implications of subsidies and the political context for social-ecological change over time, and/or resource sustainability.

periods of time. With many new challenges becoming apparent in the 21st Century, so too are new ways of thinking and innovative solutions for how global society may continue to develop, and how we may in turn manage our resource use. WGHIST can provide valuable context on the possible outcomes from these strategies, in particular the response of human societies to past development. For instance, (a) attitudinal and behavioural shifts in effective resource management, and (b) changing patterns of access and use-rights.

Summary of the Work Plan

Year 1	<p>In Year 1, WGHIST will work with the ICES Data Centre and external bodies to explore the opportunities for developing data products that encourage use of and enhance the visibility of historical and long-term data (ToR a). Production of resources on best practice guidelines (ToRs a, b) will also commence during the Year 1 meeting, as will outlining of perspective/opinion pieces on the applications of historical data (ToR b). Potential areas of interest already identified by WGHIST members for ToRs c and d include: quantifying changes in ecosystem services over time, detailing fishing technology change and cumulative impacts upon fishing efficiency, and invoking cross- disciplinary knowledge to expand our understanding of linked social-ecological system change through time. Post-meeting work will involve soliciting contributions from the wider WGHIST membership list and continued development of manuscripts.</p> <p>The WGHIST 2021 meeting will discuss re-establishing links with the ICES SIHD and other WG with expertise relevant to WGHIST aims, through invitation of SIHD and WG Chairs to the WGHIST meeting, whether in person or remotely. These efforts aim to strengthen cross-disciplinary ties and enhance communication and learning among ICES WGs. Links with external groups will also be maintained (e.g. Oceans Past Initiative) and expanded (e.g. PICES, and the Ocean Biogeographic Information System) to enhance interdisciplinary learning and collaboration.</p>
Years 2 and 3	<p>In years 2 and 3 WGHIST will continue to develop digital tools for historical metadata, explore opportunities for improving the accessibility of historical data for use by the scientific community, and develop protocols for best practise when using historical data, potentially in collaboration with the ICES Data Centre and other WGs. While these tools will be finalised in year 3, it is our hope that progress will be ongoing throughout years 1 and 2, including the provision of digital updates to the ICES community during this time.</p> <p>Years 2 and 3 will also see progress on the proposed manuscripts and perspective pieces, and the WGHIST chairs will work to maintain and enhance connections with other relevant WG, and external bodies as above. Year 2 will forward manuscript and guidelines in our ToRs, specific research from WGHIST members will be used to expand this work. Deliverables will then be completed in Year 3.</p>

Supporting information

Priority	<p>The value of historical marine ecology and historical data for evaluating current ecosystem health has been well established in the literature. Understanding social-ecological change – and in particular, long-term trends in social-ecological interactions and their current impacts – has great potential for informing decision making and management of ecosystems and marine service industries in the future.</p> <p>Scientific Scope: WGHIST will continue to operationalize historical data for addressing contemporary scientific questions and future management needs. This iteration of WGHIST will prioritise the capture, assembly, and integration of data on ecosystem changes resulting from interactions between social and ecological systems over time, and it will conduct interdisciplinary research based on this data. In this way, it may inform the future management and decision-making of marine resource use.</p>
Resource requirements	<p>WGHIST will continue to consult with ICES Data Centre staff, as well as informally with data management experts and gatekeepers beyond ICES, in order to facilitate (and refine best-practice for) the assembly and integration of metadata within and beyond the organisation. New WGHIST Chairs will contact SIHD chairs to broaden still further the scope for intra-ICES collaboration on the collation, integration and best use of historical data in management and future decision-making.</p> <p>The lessons from this year’s remote WGHIST meeting, and the broader lessons to be taken from the impact of COVID-19 on organisational and administrative paradigms, suggest the high value in the future of operationalising remote meetings, conferences and consultations. Any assistance that ICES can offer for supporting remote consultation and meetings would be very much appreciated.</p>
Participants	<p>The chairs will review, and seek to enhance, group membership early in the new iteration of WGHIST. Currently, the members include ecologists, historians, social scientists, economists, policy experts and data analysts working in or connected to historical marine ecology, and we will seek to ensure that this diversity is maintained throughout the next group iteration. Past experience predicts attendance of 8-15 group members and guests at face-to-face annual meetings. However, the experience of this year’s remote meeting suggests that this core group could potentially be greatly enhanced with the further use of remote technologies – either for individual participants who are unable to attend in person, or for the organisation of the meeting as a whole.</p>
Secretariat facilities	Standard support (potentially meeting rooms & remote capabilities).
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	WGHIST will actively seek out connections within ACOM for the application of historical ecology work into scientific advice (e.g. stock baselines, change through time, context for IEAs, etc).
Linkages to other committee or groups	Potential links to ACOM, EPDSG, HAPISG, IEASG, SIHD as well as WGBIODIV, WGBFAS, WGECON, WGMARS, WGMIXFISH, WGRMES, WGSAM, DIG, WGSEDA, WGECON and WGSOCIAL depending on interest and availability of committee and group members to join in person or remotely.
Linkages to other organizations	Participants in the Oceans Past Initiative (OPI) will be interested in our work and outcomes, and WGHIST will further enhance existing links with this group. WGHIST has an international participation beyond ICES member countries (including Australia, South Africa and Italy) and these will be maintained and, where possible, further enhanced. We intend to work together with the Ocean Biodiversity Information System (OBIS) executive to make historical data (metadata as a minimum) on fish and fisheries available through the OBIS portal.

Workshop on Transboundary issues in marine spatial planning (WKTBIMP)

2020/WK/HAPISG06 **A Workshop on Transboundary issues in marine spatial planning (WKTBIMP)**, chaired by Roland Cormier*, Germany; Lodewijk Abspoel*, the Netherlands; and Andrew Minkiewicz*, United States, will hold an online meeting on 29–31 March 2021 to:

- a) Identify the key issues in transboundary collaboration and coordination in marine/maritime spatial planning within a regional sea context ([Science Plan codes](#): 6.2);
- b) Review the different roles of marine planning and sector specific technical measures implemented to achieve common transboundary ecosystem, cultural, social and economic objectives outlined in marine plans ([Science Plan codes](#): 6.4);
- c) Review the science needed for effective and timely advice to planners involved in processes that have to address and integrate regional sea policies (e.g. EU Marine Spatial Planning Directive (MSPD) and Marine Strategy Framework Directive (MSFD)) including international conventions and agreements (e.g. UN Sustainable Development Goal 14 and targets); ([Science Plan codes](#): 6.3).

WKTBIMP will report by 1 May 2021 for the attention of SCICOM and WGMPCZM.

Supporting information

Priority	<p>The current activities under the ToRs of WGMPCZM are related to the review and reporting of transboundary issues and marine planning processes as the means to facilitate collaboration in management approaches across coastal zones, sea basins and areas beyond national jurisdiction, including the deep sea. EEZ based MSP is under rapid development administered by individual national jurisdictions and policies while acknowledging the need to address human activities and their pressures across sea basins and land-sea boundaries.</p> <p>Transboundary issues are also of primary concern for advancing regional sea marine planning policies in Europe as well as addressing the Sustainable Development Goal 14 targets and Biodiversity targets for 2030 while moving forward on the UN Decade of Ocean Science initiative.</p> <p>WKTBIMP is a direct outcome of the work lead by WGMPCZM regarding marine planning and coastal zone management (ToR d) building upon the series of workshops, cooperative research report and papers produced by this working group.</p>
Scientific justification	<p>Term of Reference d)</p> <p>Review and report on transboundary issues and collaboration in planning, i.e the coastal zone, across sea basins and in areas beyond national jurisdiction, including the deep sea. EEZ based MSP is under rapid development, but human activities, pressures and impacts cross jurisdictional (multilevel governance systems), sea basins and land-sea boundaries and need to be acknowledged and managed accordingly. The present institutional systems, data collection and information flows are not necessarily suitable and need to be redesigned. Hence the ongoing work to improve ocean governance from local to global level (e.g. UN BBNJ process).</p>
Resource requirements	<p>The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible. WK participants will finance their own participation.</p>
Participants	<p>The workshop is expected to be attended by 15–20 WGMPCZM members and guests.</p>
Secretariat facilities	<p>Standard support to WK.</p>

Financial	No financial implications.
Linkages to advisory committees	There are no obvious direct linkages with the advisory committees.
Linkages to other committees or groups	There is a need for working relationships with other groups, both as needs arise, but also more continuously. This includes not the least SIHD and WGSOCIAL and groups within HAPISG dealing with societal aspects and human activities in the sea, but also groups working on habitats (ToR b), integrated ecosystem assessments and on climate change (ToRc).
Linkages to other organizations	This workshop is closely aligned to current work regarding transboundary marine planning issues at the European level, other national initiatives and the Group of Experts on Risk Management in Regulatory Systems, Working Party on Regulatory Cooperation and Standardization Policies, United Nations Economic Commission for Europe.

A series of two Workshops to develop a suite of management options to reduce the impacts of bottom fishing on seabed habitats and undertake analysis of the trade-offs between overall benefit to seabed habitats and loss of fisheries revenue/contribution margin for these options (WKTRADE3)

2020/WK/HAPISG07 WKTRADE3 responds to a special request from DG Environment. The two Workshops will be chaired by Josefine Egekvist*, Denmark; and Jan Geert Hiddink*, UK, and will be held by correspondence, 4–5 March 2021 and 6–9 April 2021.

In preparation for the Workshops, a Core Group, consisting of the two Chairs of WKTRADE3, invited experts and members of the ACOM Leadership and the ICES Secretariat will be established. The Core Group will prepare a TRADE3 Working Document Draft 1, designed to describe the potential management options and the methodologies for undertaking the trade-off analysis. This Working Document will be built up incrementally to facilitate additions and modifications at each of the steps set out in the ToRs below.

TRADE3 Working Document Draft 1 will be based on the demonstration assessment contained in the 2017 ICES advice, “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” ([sr.2017.13](#)). It will receive input from WGFBIT, in particular on how the developing process described therein can be made operational. The document will be amended by the Core Group into TRADE3 Working Document Draft 2.

TRADE3 Working Document Draft 2, will be presented to the European Commission’s (EC) Technical Subgroup on seabed habitats and sea-floor integrity (TGSeabed) for comment and input. Following this, TRADE3 Working Document Draft 3 will be prepared by the Core Group. The TRADE3 Working Document Draft 3 will be peer-reviewed to ensure the best available, credible science has been used and to confirm that the analysis provides a sound basis for the developing advisory product.

TRADE3 Working Document Draft 3 will be used as the input to the first of the TRADE3 Workshops, the Stakeholder Workshop scheduled for 4-5 March 2021.

ToRs for the March 2021 WKTRADE3 Stakeholder Workshop are:

- a) Present TRADE3 Working Document Draft 3 to the workshop participants to inform them of the progress to date and the ICES process to finalise the TRADE3 Advice response to the EC.

- b) Review the management options identified to reduce the impact of Mobile Bottom Contacting Gears on seabed habitats (e.g. are there options missing) and the criteria used for their prioritisation.
- c) Input from the workshop participants on whether the proposed trade-off analyses in TRADE3 are informative and produce outputs that stakeholders need.

Participants for invitation to the Stakeholder Meeting will be selected in conjunction with DGENV.

Following WKTRAD3 Stakeholder Workshop, the Core Group will update the working document to TRADE3 Working Document Draft 4. This will be used as input to the TRADE3 Technical Workshop, scheduled for 4 days during April 2021.

ToRs for the April 2021 WKTRADE3 Technical Workshop are:

- a) Review TRADE3 Working Document Draft 4 to the workshop participants.
- b) Review and evaluate for each management option identified in TRADE3 Working Document Draft 4 any potential consequences to the ecosystem, including commercial fish stocks that could arise, if greater areas of seabed are left undisturbed by bottom fishing.
- c) Conduct an analysis of spatial and temporal variation in fishing intensity appropriate to assess the footprint of mobile-bottom contacting fishing gears in a six-year management cycle. The analysis should include an estimation of the proportion of 'core fishing grounds' and should determine the spatial variation in 'core fishing grounds' over time.
- d) Produce an estimate, where possible, of the revenue and contribution margin associated with the fishing activity per area by integrating fisheries economics data (e.g. STECF AER) with VMS/logbook data for all mobile-bottom contacting fishing gears and per gear grouping in (sub)regions.
- e) Produce regional-specific assessments of pressure and impact of bottom-contacting fishing gears on the seabed and of trade-offs in fisheries and seafloor habitats, based on available data and building on the 2017 demonstration advice "*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*" (sr.2017.13). The assessments will follow the methodology set out in the TRADE3 Working Document Draft 4. For data poor areas, only part of the assessment will be run, and key data/knowledge gaps will be identified. The assessments should include a trade-off analysis between fisheries and seafloor habitats, i.e. overall benefit to the seafloor, relative to loss in revenue/contribution margin, for prioritized management options identified in the TRADE3 Working Document Draft 4.

Experts from ICES WGs (WGSFD, WGFBIT, WGECON), as well as, other regional-specific experts will be encouraged to contribute to the Technical Workshop. Participants for invitation to the Technical Workshop will be selected by the Core Group.

In preparation for the workshop meeting, the Core Group will facilitate coordination and consolidation of work. The Core Group will also ensure that the workshop reports are finalized.

Supporting information

Priority	High, in response to a special request from DGENV on a set of management options to reduce the impact of mobile bottom contacting fishing gears on seafloor habitats, and to provide a trade-off analysis between fisheries and the seafloor. The advice will feed into ongoing efforts to provide guidance on the
----------	--

operational implementation of the MSFD.

Scientific justification

The demonstration assessment within the 2017 ICES advice (sr.2017.13) provided aggregate values for four types of bottom-contacting fishing gear groupings at the scale of the entire Greater North Sea region and in relation to the 2004 EUNIS habitat classification. In order to better understand the relationship between catch/value of landings and the levels of physical disturbance for MSFD purposes, this ‘trade-off’ analysis needs to consider the following two aspects: 1) Mobile bottom contacting fishing: at the level of fishing gear grouping, on the basis that this is likely to be a more appropriate resolution for management purposes. 2) Footprint/Impact on the seafloor: at the resolution of seabed habitat assessments required by the GES Decision (EU) 2017/848 (i.e. the MSFD broad habitat types, based on the EUNIS 2016 classification, and subdivisions of an MSFD (sub)region).

WKTRADE3 will review a suite of options to reduce impacts of mobile bottom contacting fishing gears on seabed habitats (ToR b in Stakeholder and Technical workshop). This review should include any wider benefits/consequences to the ecosystem, including commercial fish stocks that could arise, if greater areas of seabed are left undisturbed by bottom fishing. This should include an exploration of the empirical evidence of options presented in two recent publications (Collie et al 2017; McConnaughey *et al.* 2020). Potential consequences (positive and negative) to the wider ecosystem should be identified to provide some ecosystem perspective to the trade-off question. Based on the review, WKTRADE3 will produce a prioritized list of management options for trade-off analysis and include the criteria used to prioritize. WKTRADE3 will develop a methodology that explains how each option is implemented in the trade-off assessment.

WKTRADE3 will provide analyses of spatial and temporal variation in fishing intensity, catch and landings in a way appropriate to assess the footprint of mobile-bottom contacting fishing gears in a six-year management cycle (Technical Workshop ToR c-i). The analyses should be done for all mobile-bottom contacting fishing gears together and per métier grouping, covering different MSFD (sub)regions (Greater North Sea, Baltic Sea, Celtic Seas, Bay of Biscay and Iberian Coast) and the subdivisions of these MSFD (sub)regions. The analysis should summarize the results for the entire assessment region and per MSFD broad habitat type within the region, based on the EUNIS 2016 classification. The analysis should include an estimation of the proportion of area fished that covers 90% of value/landings (i.e. core fishing grounds) for each métier and per MSFD (sub)region/subdivision and should determine the spatial variation in ‘core fishing grounds’ over time. The analysis of fishing footprint and core fishing grounds will be estimated for (sub)regions and per métier grouping where VMS and logbook data is available.

WKTRADE3 will review available data that can be used to estimate the revenue and contribution margin associated with the fishing activity per area (Technical Workshop ToR c-ii). Revenue and contribution margin associated with fishing activity will be estimated for one region by integrating fisheries economics data (e.g. STECF AER) with VMS/logbook data for all mobile-bottom contacting fishing gears and per gear grouping. This analysis will also be done, where possible, for other (sub)-regions. Results will be incorporated in the trade-off assessment sheets, with recommendations on how to improve the dataflow.

WKTRADE3 will produce a prioritized list of management options, and for each option provide a trade-off analysis between fisheries and seafloor habitats, i.e. overall benefit to the seafloor, relative to loss in revenue and contribution margin

	(Technical Workshop ToR c-iii).
Resource requirements	ICES secretariat and advice process.
Participants	Stakeholder Meeting with relevant stakeholders from DG-Environment, DG-Mare, NGO's, National Fisher Organizations and representatives from national agencies. Technical Workshop with researchers and RSCs investigators. If requests to attend exceed the meeting space available ICES reserves the right to refuse participants. Choices will be based on the experts' relevant qualifications for the Workshop. Participants join the workshop at national expense.
Secretariat facilities	Data Centre, Secretariat support and meeting room
Financial	Covered by DGENV special request.
Linkages to advisory committees	Direct link to ACOM.
Linkages to other committees or groups	Links to WGFBIT, WGSFD, WGECON CSGMSFD and SCICOM.
Linkages to other organizations	Links to OSPAR and HELCOM.

Workshop on the Use of Predictive Habitat Models in ICES Advice (WKPHM)

2020/WK/HAPISG08 **A Workshop on the Use of Predictive Habitat Models in ICES Advice** (WKPHM), chaired by Chris Rooper*, Canada, will be established and will meet by correspondence, 1–5 February 2021 to:

- a) Based on existing approaches, identify the methods for modelling vulnerable marine ecosystems (VMEs) that would be most appropriate for use within ICES advice, detailing 'required' and 'desirable' criteria, with emphasis on the deep-sea environment greater than 200m (considering bias of preferential sampling), PHM techniques (including spatial display of uncertainty) and required validation steps for the modelled outputs);
- b) Develop clear standards for recording the caveats and assumptions inherent in the modelling method, for future use;
- c) Conduct a trial run for a small number of existing models to ensure that both the approach and outputs are fit-for-purpose;
- d) Review and recommend a set of criteria, similar to the existing ICES benchmarking system for regional fish stock assessments², under which new and existing predictive habitat models can be used for ICES scientific advice related to the distribution of VMEs.

WKPHM will report by 15 March 2021 for the attention of ACOM.

Supporting information

Priority	WGMHM and WGDEC have strongly advocated for the inclusion of predictive habitat models in ICES advice related to the distribution of VMEs. In order for ICES to utilize such models in their advice an agreed set of standards is required. With recurring requests from NEAFC and the EU, regarding the best scientific advice on where VMEs are known or likely to occur, this workshop is of a high
----------	--

²<https://www.ices.dk/community/Documents/Advice/Introduction%20to%20Benchmarks%20at%20ICES.pdf>

	priority.
Scientific justification	<p>Term of Reference a)</p> <p>Predictive habitat models (PHMs, also known as habitat suitability models, species distribution models or environmental niche models) are models that predict the likely distribution of a species or habitat using environmental variables as predictors. WGMHM and WGDEC have identified that PHMs which meet specific quality thresholds, represent the best available evidence for estimating where VMEs are likely to occur at a broad scale. However there is no agreed upon standard for what those quality thresholds should be. This ToR is aimed at providing benchmark standards for the use of such models in ICES advice related to the distribution of VMEs. Science Plan code 6.2. Plans are in progress train to recommend to the Benchmark Oversight Group (BOG) in 2021 to undertake a benchmark of the VME advisory process in early 2022 and report in time for WGDEC 2022. BOG was established by ACOM in March 2020, see section 4.6 of the Minutes of the ACOM March 2020 meeting.</p> <p>Term of Reference b)</p> <p>WGMHM recommended in its 2019 report (ICES 2019) that guidance on the data sources, resolution and modelling approaches to be used would help to standardize ICES advice using PHMs and allow for direct comparison of outputs. This will render the data, methods and results from ICES assessments easy to find, explore and re-run and contribute to a Transparent Assessment Framework for PHM-related advice. Science Plan code 3.2</p> <p>Term of Reference c)</p> <p>Any modeling approach has associated caveats and assumptions. Standards on what should be reported will avoid misuse or misinterpretation of model outputs and will give greater credibility to PHM model-based advice. Science Plan code 6.2.</p> <p>Term of Reference d)</p> <p>Having agreed on a common set of standards it will be necessary to conduct trial runs, using existing VME models, to make sure that the anticipated model outputs are fit for purpose. This approach will also allow for testing of the impacts of the recommendations from ToRs a and b.</p>
Resource requirements	None
Participants	The Group will likely be attended by some 20–25 members of WGMHM and WGDEC and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	ACOM
Linkages to other committees or groups	There is a very close working relationship with Working Groups on Benthic Ecology, Marine Planning and Coastal Zone Management and Spatial Fisheries Data. Data products will be used by WKEUVME in future.
Linkages to other organizations	FAO, NEAFC, EC, EMODnet.

ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS)

2020/WK/HAPISG09 The ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS), chaired by Ellen Kenchington*, Canada, and Jake Rice*, Canada, will hold an online meeting on 15–24 March 2021 to:

- a) Consolidate and test the available elements of the guidance in Garcia et al. (2020) on identification, use, and performance assessment of Other Effective Area-Based Conservation Measures (OECMs) for marine capture fisheries, drawing on case studies using Area-based Fisheries Management Measures (ABFMs), in line with the CBD Decisions and general guidance regarding Aichi Biodiversity Target 11.
- b) Identify factors (e.g., data availability, knowledge gaps) that affect the ability of experts to evaluate areas against the four CBD OECM criteria, particularly Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity, and Criterion D: Achieves associated ecosystem functions and services and upholds, where applicable, cultural, spiritual, socio-economic, and other locally relevant values.
- c) Identify types of information of particular value for evaluation of areas against the CBD OECM criteria, in particular Criteria C and D noted above.
- d) Provide expert feedback on the utility of the step-wise approach presented in Garcia et al. (2020) as a framework for determining whether ABFMs may qualify as OECMs.

WKTOPS will report by 15 May 2021 for the attention of ACOM and SCICOM.

Supporting information

Priority	<p>A successful outcome of this workshop will be the operationalization of OECMs, an area-based management tool with potentially significant biodiversity benefits, taking examples from circum- North Atlantic/Mediterranean countries to a global setting. This workshop is considered a high priority as there is need to develop a systematic approach to the identification of OECMs prior to the next review of the CBD Aichi Biodiversity Targets and the UN SDGs in 2025 and 2030 respectively. The workshop fits within the ICES Science Plan – Conservation and Management Science, the goal of which is to develop tools, knowledge, and evidence for conservation and management – to provide more and better options to help managers set and meet objectives.</p>
Scientific justification	<p>There is considerable interest in the scientific community and among fisheries managers and policy-makers in exploring the extent to which ABFMs may contribute significantly enough to biodiversity conservation to be identified as OECMs, and included in States' reporting of their contribution to global biodiversity targets and Sustainable Development Goals (SDGs). Just as for other ABFMs, OECMs would be integrated in fisheries management plans, improving their likelihood to effectively generate the expected biodiversity benefits, reducing the risk of establishing "paper OECMs", and ensuring regular review of their performance. Hence there is a growing demand to operationalize the identification of OECMs. The IUCN-CEM Fisheries Expert Group (FEG) has led the development a guidance document for evaluating areas against the OECM criteria articulated in the CBD (CBD/COP/DEC/14/8/Annex III), to make the evaluation process efficient and scientifically sound, but the guidance has not been applied to actual cases that may be OECM candidates. This workshop will allow that guidance to be tested for clarity and efficacy of structuring the evaluation process and for the usefulness of the products in informing decisions of OECM eligibility of specific area-based fishery management measures.</p> <p>Preparation for the workshop</p> <p>A background document for the workshop has been prepared by the IUCN-CEM Fisheries</p>

Expert Group (FEG) entitled Systematic Approach to Identification, Use and Performance Assessment, of Other Effective Area-based Measures in Marine Capture Fisheries. Co-chairs from ICES (E. Kenchington) and the IUCN-CEM Fisheries Expert Group (FEG) (J. Rice) have been identified.

A second background document outlining the objectives of the workshop has been drafted and will be used to create the workshop announcement webpage. We anticipate posting the announcement and making a call for nomination of participants by 16th November, including a call for candidate areas to evaluate; invitations will sent at the same time as the meeting announcement is posted. Selection of participants and areas to be evaluated will be completed by 20 December 2020. Participants will be notified of their acceptance and given access to the WKTOPS Sharepoint where all background documents will be made available. Consolidation of information from the selected candidate areas by will be put onto the Sharepoint 2 weeks before workshop at the latest, in order to be available for review by participants of the meeting.

Expected outputs from the workshop

The outcome of this workshop will be an ICES Scientific Report which will address ToR a-d and elaborate on: (i) the eligibility of each selected area as an OECM; (ii) the properties of the biodiversity, fishery, and/or management procedures that were influential in the evaluation of eligibility (iii) the factors that were influential in each step of the identification, including data and scientific capacity available (iv) the effectiveness of the guidance in the Background document in structuring the evaluation, (v) the usefulness of the stepwise approach in the guidance document in evaluating the area relative to the OECM Criteria and Additional Considerations.

Resource requirements	All the preparatory work will be developed by web conferences.
Participants	Up to 30 participants, including 1-2 invited experts (TBD), 2 co-chairs
Secretariat facilities	None
Financial	No financial implications
Linkages to advisory committees	ACOM
Linkages to other committees or groups	SCICOM, HAPISG, EPDSG, IEASG; we anticipate strong interest from WGBIODIV, WGMPCZM, WGDEC, and linkages with WGECO and WGCERP.
Linkages to other organizations	NEAFC, NAFO, GFCM, CBD, FAO, OSPAR, DGMARE

Workshop on the Socio-economic implications of offshore wind on Fishing Communities (WKSEIOWFC)

2020/WK/HAPISG10 A Workshop on the Socio-economic implications of offshore wind on Fishing Communities (WKSEIOWFC), initiated by the Working Group on Offshore Wind Development and Fisheries (WGOWDF), and chaired by Tara Hooper*, UK; and Annie Hawkins*, USA, will hold an online meeting, 15–17 March 2021 to:

- a) Define the impact from offshore wind development for fishing behaviour, fishing communities and coastal economies;
- b) Review and report on fishing industry interactions with offshore wind development and document lessons learnt including effects on the distribution of fishing operations ([Science Plan codes: 2.2; 2.3; 2.7](#))

WKSEIOWFC will report by 1 May 2021 for the attention of SCICOM.

Supporting information

Priority	The activities of this workshop will lead ICES into issues related to the socio-economic effects of offshore wind farms on fisheries. In regard to the rapid expansion of the wind energy sector, these activities are considered to have a very high priority.
Scientific justification	<p>Term of Reference a)</p> <p>Europe has been operating offshore wind energy facilities for 20 years. North America is on the verge of large-scale development. The European experience can be used to document the effects of offshore development on fishery operations, fishing communities, and fishery economics. Existing knowledge on the impact of wind energy on fisheries is focused mainly on ecological impacts, there is a clear knowledge gap on the economic and socio-cultural impact of the expansion on the fishing behaviour, fishing communities and coastal economies. While there are distinct differences in the scale and scope of fisheries between the North American and European wind development areas; there is also the opportunity to identify common issues and promote research to address these issues.</p> <p>Defining and describing the effects and impacts from offshore wind development on fisheries and fishing communities will ultimately support to understand the fishing industry interactions with offshore wind development.</p>
Resource requirements	No specific resource requirement beyond the need for members to prepare for and participate in the meeting, this will provide the main input to this workshop
Participants	The workshop is expected to attract 25-30 WGOWDF members and guests from the field of fisheries economics, social science, fisheries, wind energy development, licencing/permitting authorities and other relevant stakeholders.
Secretariat facilities	Standard support.
Financial	No financial implications.
Linkages to advisory committees	There are no obvious direct linkages, but developing the expertise could link to ACOM in the future.
Linkages to other committees or groups	There is a very close working relationship with the WGMPCZM, WGECON, WGSOCIAL, WGMRE, WGM BRED, WGSEDA and WGMARS.
Linkages to other organizations	There are linkages to fishing organizations and wind developers in the USA and similar linkages in Europe, including wider links to licencing/permitting authorities and other relevant stakeholders.

Working Group on Marine Habitat Mapping (WGMHM)

2020/FT/HAPISG11 The **Working Group on Marine Habitat Mapping (WGMHM)**, chaired by Julian Burgos, Iceland, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2021	24–28 May	Online meeting		
Year 2022	TBC	TBC		

Year 2023	TBC	TBC	Final report by 1 August to SCICOM
-----------	-----	-----	------------------------------------

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Report on progress in international mapping programmes (including OSPAR and HELCOM Conventions, EMODnet, EC and EEA initiatives, CHARM, Mesh-Atlantic and other projects).	Capturing the presence and work of large international mapping projects is important because (i) the WGMHM report becomes a useful 'state of the art' summary of marine habitat mapping activity, (ii) the presentations from these projects helps spread best-practice, standardisation and collaborative working within the group, and (iii) other presentations highlight relevant mapping work that may benefit the large international programmes.	1.3, 1.4, 1.5 3.2, 3.4	Years 1–3	Meeting reports
b	Review and synthesise key results from national habitat mapping during the preceding year, as well as new on-going and planned projects focusing on particular issues of relevance to the rest of the meeting. Provide National Status Report updates in geographic format in the ICES webGIS.	The current extent of marine habitat mapping and modelling means that maps are meeting at international boundaries. It is important that maps are joined internationally and in a standardised manner. This requires an understanding of the extent and distribution of habitat mapping within nation states. Equally, WGMHM are often interested in specific habitats and wish to be kept informed of specific mapping exercises on these habitats, e.g. deepwater habitats or cold water corals. The reporting of national mapping is also the primary mechanism for encouraging WG members to submit survey metadata files to the various data archiving centres. The National Progress reports also states whether member countries have purchased significant	1.3, 1.4, 1.5, 3.2, 3.4	Years 1–3	Meeting reports

		survey items, such as ships, AUVs and sonars. This provides a good opportunity for others to identify useful resources for international collaboration.		
c	Review recent advances in marine habitat mapping and modelling techniques, including field work methodology, and data analysis and interpretation	This ToR provides the main avenue for mappers to communicate new or improved techniques to the other scientists present (and captured in the report). As such, this ToR is essential for spreading best practice and developing new methods.	1.3, 1.4, 1.5, 3.2, 3.4	Years 1–3 Meeting reports
d	Review use of habitat maps, for example mapping for the MSFD, marine spatial planning, and management of MPAs; and assess the ability (e.g. through the monitoring of the MSFD indicator 'extent') to use habitat maps for monitoring of the environment.	To encourage the diversification of the WGMHM, the group also consider how marine habitat maps are used for scientific and management purposes. Members of the group are often the creators of these maps and have important insights into how the maps can be used. Equally, it gives marine managers an opportunity to suggest how maps are best presented to support clarity and value for management purposes.	1.3, 1.4, 1.5, 3.2, 3.4	Years 1–3 Meeting reports
e	Identify sources of information (e.g. bathymetry, oceanography, fisheries or socio-economic) that can be used for the production and enrichment of marine habitat maps.	Many of the remotely sensed and modelled outputs that are of value to marine habitat mappers is available online. Although much of this information is centralised in large data archives, other information remains dispersed on the web. This ToR seeks to collate the important data sources that are of value for marine habitat mapping into one database.	1.3, 1.4, 1.5, 3.2, 3.4	Years 1–3 Meeting reports
f	Identify and advance theoretical aspects of habitat mapping (e.g. landscape ecology, supplyside ecology, implications of scale etc.).	This ToR is to provide an opportunity for EG members to address the theoretical aspects of marine habitat mapping. As a science in its infancy, it is important that underpinning concepts are challenged and re-evaluated.	1.3, 1.4, 1.5, 3.2, 3.4	Years 1–3 Meeting reports and scientific papers

Summary of the Work Plan

Year 1	Cover ToRs A-E. Support the 'Benchmark Workshop on the Use of Predictive Habitat Models in ICES Advice (WKPHM)' workshop to be held jointly by Working Group on Deep-water Ecology (WGDEC) and WGMHM.
Year 2	Focus on a specific ToR for in-depth analysis
Year 3	Focus on a specific ToR for in-depth analysis

Supporting information

Priority	Supporting the Benchmark Workshop on the Use of Predictive Habitat Models in ICES Advice (WKPHM). The WGMHM may choose to address some of the topics that are highlighted as necessities for further work in 2021 and 2022. Much of the initial work will feed into the work of WGDEC. Further work will also provide support for the species and habitat predictive models that are required for WGDEC advice.
Resource requirements	Other than the support for the Benchmarking Workshop, WGMHM do not need additional resource at this moment.
Participants	The Group is normally attended by some 10–15 members and guests.
Secretariat facilities	Standard support.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	Linkage to WGDEC (advice legacy group).
Linkages to other committees or groups	There is a very close working relationship with WGDEC. It is also very relevant to the Benthos Ecology Working Group (BEWG).
Linkages to other organizations	

Joint ICES/ NMTT Workshop exploring the establishment of a Nordic Climate Change Forum for Fisheries and Aquaculture (WKNCCFFA)

2020/WK/HAPISG12 The Joint ICES/ NMTT Workshop exploring the establishment of a Nordic Climate Change Forum for Fisheries and Aquaculture (WKNCCFFA), chaired by Carl-Christian Schmidt*, Denmark; and Arni M. Mathiesen*, Iceland, will meet in Elsinore, Denmark, 9–10 December 2021 to:

- a) Review and consider recent research and other initiatives relevant to challenges posed by climate change for fisheries and aquaculture in the Nordic region ([Science Plan codes](#): 1.1; 2.1; 3.6; 7.3);
- b) Synthesize expertise, practical experiences and lessons learned of stakeholders in meeting challenges of climate change ([Science Plan codes](#): 4.1; 5.2; 7.3; 7.7);
- c) Develop a collaborative platform to facilitate exchange among the Nordic fisheries and aquaculture stakeholders, science, civil society and policy makers ([Science Plan codes](#): 2.1; 3.6; 7.3; 7.5).

WKNCCFFA will report by 15 March 2022 (via HAPISG) for the attention of SCICOM and ACOM.

Supporting information

Priority	<p>Rising sea temperatures, changing salinity, acidification, pH and oxygenation are some of the effects that increasingly will be felt by the fisheries and aquaculture sectors. Some changes have already taken place. However, little has been done in terms of supporting the preparedness of the fisheries and aquaculture sectors to reduce their own climate impacts while adapting to the anticipated changing conditions. The Workshop, organized jointly by the Nordic Marine Think Tank (NMTT), ICES and with support from the Nordic Council of Ministers, will bring together fisheries and aquaculture stakeholders and scientists from the Nordic countries to advance collaboration on addressing challenges imposed by climate change.</p> <p>Consequently, the workshop is considered to have a very high priority in establishing a climate change forum for fisheries and aquaculture stakeholders which will act as a knowledge exchange platform with mutual benefits for industry, science and fisheries policy makers.</p>
Scientific justification	<p>Term of Reference a)</p> <p>The IPCC report (2019) notes that “ <i>A.5. Since about 1950 many marine species across various groups have undergone shifts in geographical range and seasonal activities in response to ocean warming, sea ice change and biogeochemical change such as oxygen loss, to their habitats (high confidence). This has resulted in shifts in species composition, abundance and biomass production of ecosystems, from the equator to the poles.</i>”</p> <p>It is important to synthesize the science on a regional scale and reflect on it with science, industry, NGOs and policy makers to identify relevant knowledge for decision making, specifically considering social and economic impacts and the future role of seafood production in the overall food producing sector.</p> <p>Term of Reference b)</p> <p>Industry is already challenged by climate change affecting the marine environment and the dynamics of the resources. In addition the sector needs to adapt to increasing regulations on emissions while reducing the environmental impact of their activities. Besides the scientific knowledge, sharing the lessons learned and knowledge within the sector will help to facilitate adaptation.</p> <p>Term of Reference c)</p> <p>The fisheries and aquaculture sectors urgently need to identify pathways to adjust to a changing climate (adaptation) while concurrently take up measures and techniques in both fisheries and aquaculture that will reduce the sectors’ impacts on the climate (mitigation). To facilitate the exchange among stakeholders, industry, civil society science and policy makers need a safe and trusted forum for discussion. The proposed Nordic Climate Change Forum for Fisheries and Aquaculture aims to provide this.</p>
Resource requirements	<p>The resource required in the framework of this workshop is marginal and is mainly organisational support for establishing a workshop programme and assistance for broadening participation from stakeholders.</p>
Participants	<p>The Workshop will be attended by 100-120 participants from across the Nordic countries. Participation will be broad and include industry, scientific community, fisheries policy makers and managers, and NGOs working in the field of fisheries and aquaculture.</p>
Secretariat facilities	<p>Standard EG support.</p>
Financial	<p>No financial implications.</p>

Linkages to advisory committees	ACOM
Linkages to other committees or groups	SICCME, SIHD, EPDSG, HAPISG, EOSG, FRSG, DSTSG, ASG, WGREIA, WGS2D, WGGRAFY, WGOOFE
Linkages to other organizations	The work of this Workshop is aligned with other international fora considering climate change in fisheries and aquaculture such as the FAO, IUCN, OECD, UN.

Workshop on estimation of MOrtality of Marine MAMMals due to Bycatch (WKMOMA)

2020/WK/HAPISG13 The **Workshop on estimation of MOrtality of Marine MAMMals due to Bycatch (WKMOMA)** chaired by Guðjón Már Sigurðsson*, Iceland, and Sara Königson*, Sweden, will meet on 26-27 September 2021 in La Rochelle, France, to: Address the special request from OSPAR on mortality of marine mammals (harbour porpoise *Phocoena phocoena*; common dolphin *Delphinus delphis*; and grey seal *Halichoerus grypus*) due to bycatch within the OSPAR maritime area by;

- a) Generate bycatch rates (e.g. specimens per day at sea) and associated confidence intervals for static and towed gears (at least Metier Level 4) for relevant species and assessment units;
- b) Generate assessment unit and metier specific bycatch mortality estimates for each species and their associated confidence intervals. For harbour porpoise the assessment units will correspond to those defined in NAMMCO_NIMR (2019)* report in OSPAR Regions II, III and IV. For common dolphin, assessment units are OSPAR Regions III and IV. For grey seal, assessment should be made for OSPAR Regions II and III.
- c) Compare the bycatch mortality estimates against thresholds for the relevant species/assessment units as provided by OSPAR and identify any critical issues (such as biases in the bycatch estimates) relevant for the comparison.
- d) Data available within OSPAR Region I will be evaluated and, if feasible, processed to generate bycatch rate and mortality estimates for harbour porpoise and grey seal using the relevant country/NAMMCO advised assessment units.

WKMOMA will report by 22 October 2021 for the attention of ACOM.

* NAMMCO (2019). Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise, 19- 22 March, Copenhagen, Denmark. https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf

Supporting Information

Priority	This workshop will provide the scientific basis to address OSPAR special request on mortality of marine mammals (harbour porpoise <i>Phocoena phocoena</i> ; common dolphin <i>Delphinus delphis</i> ; and grey seal <i>Halichoerus grypus</i>) due to bycatch within the OSPAR maritime area. Therefore, the priority is high.
Scientific justification	ICES Member Countries are required to ensure that bycatch of sensitive marine species are reduced so that they do not represent a threat to the conservation status of these species. The proposed work will help meet that goal. The ToR aligns with the Roadmap

	for ICES bycatch advice that aims to assess the risk of, and the impact of fleet activity on incidental bycatch.
Resource requirements	Secretariat facilities. Travel funds for relevant experts provided by OSPAR.
Participants	Around 15–20
Secretariat facilities	Secretariat support with data call and meeting organization, database maintenance, and final editing of report
Financial	No financial implications.
Linkages to advisory committees	ACOM
Linkages to other committees or groups	WGBYC, WGMME, HAPISG
Linkages to other organizations	OSPAR, RCGs, HELCOM, NAMMCO

Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT)

2020/FT/HAPISG14 The Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT), chaired by Gert van Hoey, Belgium; Jan-Geert Hiddink, UK; and Marija Sciberras, UK, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2021	11–15 October	Online meeting		
Year 2022	DATE September			
Year 2023	DATE September		Final report by DATE to SCICOM	

ToR descriptors

ToR	Description	Background	SCIENCE PLAN TOPICS ADDRESSED	Duration	Expected Deliverables
a	REGIONAL ASSESSMENTS Apply and improve theseafloor assessment framework developed by WGFBIT (2018–2020) to produce (sub-)regional assessments for the North, Celtic, Baltic, Arctic (Icelandic, Norwegian Barents sea), Mediterranean Seas and the Bay of	Produce a worked example of how science can operationalize EBM (ecosystem based management) and contribute towards IEAs (intergrated ecosystem assessment) as ICES advice products. I.e. develop an EU MSFD D6/D1 assessment with	1.9; 2.1; 2.4; 6.3	3 years	Year 1: a worked example for all regional seas, based on the preliminary achievements in the period 2018–2020. Initiating the 'pipeline process' for inclusion of relevant outputs to ecosystem overviews, starting with North and Baltic Sea.

	Biscay and the Iberian Coast.	management options that can be applied also by non-EU ICES countries. Links (avoiding overlaps) will be established with key experts also attending WGECO, WGDEC, WGSFD, BEWG, MHWG, WGIMM, WGMBCD, and WGMPCZM.			Year 2: Updating of the regional and sub-regional assessments for the different regions. Year 3: Final regional assessments of the impact of bottom abrading fisheries for all regions in the ToR, which can feed into the ICES fishery and ecosystem overviews.
b	UPDATES FOR ASSESSMENT FRAMEWORK Explore and potentially implement options to improve the parameterisation of the WGFBIT seafloor assessment framework components, in shallow waters and deep-sea areas.	These updates can focus on following aspects: E.g. through; i) standardisation of benthos data sampled with different gears, ii) development of methods to predict benthos longevity biomass in data poor areas, iii) integration of environmental drivers in the predictions, iv) improve the resolution of gear-specific depletion rates, v) estimation of parameter uncertainty.	2.3; 2.4	3 years	Year 1- 3: Stepwise progress for the different aspects that can be tackled. Updates or adaptations need to feed in Tor A, to improve the regional assessments. If appropriate progress or results, research paper(s) will be conducted.
c	WGFBIT AND THE WIDER WORLD Alignment of the WGFBIT seafloor assessment framework with other assessment methods for benthic habitats under relevant EU directives.	The WGFBIT seafloor assessment framework (based on assessing the relative benthic state) is not the only way to assess benthic impacts from physical disturbance. Therefore, alignment with other methods needs to be explored.	2.3; 2.4	3 years	Year 1-3: Research paper(s)
d	ECOSYSTEM FUNCTIONING Explore if ecosystem functioning can be incorporated more explicitly into the WGFBIT seafloor assessment methodology.	This can be done through examining the direct influence of bottom fishing on sediment parameters related to ecosystem functioning (e.g. apparent redox discontinuity potential layer). The link between total benthic	1.3; 1.9; 2.3	3 years	Year 1-3: Research paper(s)

community biomass
and/or particular traits
(e.g. longevity or
sediment position)
with biogeochemical
parameters that are
related to particular
benthic ecosystem
functions will also be
explored – for this part
links to work by BEWG
and WGECCO will be
sought.

Summary of the Work Plan

ToR a) **REGIONAL ASSESSMENTS.** Apply and improve the EU MSFD D6/D1 assessment framework related to bottom abrasion of fishing activity at the regional / subregional scale, which was developed by ICES WGFBIT (2018–2020). Priority will be given to improve the parameterisation of framework components at regional and sub-regional scale and with that also improve the overall assessment of benthic status and of alternative management options to achieve good environmental status (GES). The framework should remain generic enough that it allows cross regional comparison and specific enough that it addresses regional-specific trade-offs (i.e. incorporating other pressures than fisheries).

ToR b) **UPDATES FOR THE ASSESSMENT FRAMEWORK.** Explore and potentially implement options to improve the parameterisation of framework components. This can be done through the below action points.

- i) The default WGFBIT seafloor assessment framework uses data collected by grab or box corer and therefore targeting the infauna. For some regions, such infauna data is not always available, and assessments are therefore based on epi-benthic data from trawl samples. The use of different sampling methodologies, with subsequent assessment focus on different parts of the ecosystem, has influence on the outcome. Therefore, these differences or commonalities in a regional context, need to be investigated,
- ii) The determination of grid cell recovery values are based on longevity compositions sampled from unfished areas. In some regions this type of data is sparse, so alternative approaches/data are needed. A thorough investigation of this aspect will enlarge the WGFBIT assessment framework applicability and increase the confidence of the assessments,
- iii) Application of the WGFBIT assessment framework for regional areas requires the development of statistically robust relationships between the benthic biomass longevity distribution and environmental drivers, such as depth, sediment, bottom shear stress, salinity, temperature, primary production, etc. For some regions it has been difficult to obtain meaningful relationships that distinguish sensitive and less sensitive areas spatially, and improved modelling (inclusion of more and better environmental data across larger cross-regional scales) could potentially solve this,

- iv) The gear-specific depletion rate of the assessment method is currently based on only 3 different metiers; beam trawl, otter trawl and dredges. Recent approaches have provided the basis for having a finer gear resolution of the depletion rates (cf Rijnsdorp et al., 2020) and this should be pursued. Methodology to estimate the seabed disturbance area of passive fishing gears is on its way and inclusion of these gears in the assessment framework can be explored in alignment with ICES WGSFD, where these aspects are already being investigated,
- v) It is necessary to quantify the uncertainty in the risk assessment methodology developed by WGFBIT. This is required to a) identify which input parameters and modelling steps account for the majority of the uncertainty, and therefore will benefit from efforts to reduce it (e.g. by carrying out further studies), and b) to map the distribution of the overall uncertainty in the assessment area in order to consider it when evaluating management scenarios. The utility of a bootstrapping approach will be explored.

ToR c) WGFBIT AND THE WIDER WORLD

- i) Alternative EU MSFD D6/D1 assessment frameworks are under development. Comparing different methods has several advantages; 1) Multiple assessments with similar outcomes will increase the confidence of the assessment within a region, as locations with a low or high state/impact should be clearly distinguishable across assessment methods. Areas that differ between assessments, need more investigation, 2) Multiple assessments will help to improve approaches and the guiding of decision making. A more profound decision can be made, when it is based on several outputs.
- ii) Threshold Values for determining adverse effects (and loss) and GES is highly requested for policy purpose in relation to: 1) impacts of physical pressures (and bio-geo-chemical pressures); 2) specific indicators (and response value levels) and 3) areal protection – what, where, how much and how strict? (securing ecosystem functioning). The lack of empirically based threshold values is an upcoming and increasingly urgent concern internationally (TG Seabed, HELCOM, OSPAR) and at the national level concerning the implementation of the EU MSFD D6C3 and D6C5, as well as for the D1 and D5. The options to integrate GES threshold values in WGFBIT will be explored by looking to current practices under the WFD and NATURA 2000 management at the national level.

ToR d) ECOSYSTEM FUNCTIONING

The WGFBIT seafloor assessment framework uses total benthic community biomass as key metric to assess seabed impacts under the assumption of a strong correlation with ecosystem functions such as carbon mineralization and nutrient cycling. We propose to test this assumption and investigate how ecosystem functioning can be incorporated into the PD methodology. This will not only ascertain that RBS is a good way forward, but also help us in setting thresholds for acceptable ecosystem impacts. This can be done through examining the direct influence of bottom fishing on sediment parameters related to ecosystem functioning (e.g. apparent redox discontinuity potential layer). The link between total benthic community biomass and/or particular traits (e.g. longevity or sediment position) with biogeochemical parameters that are related to particular benthic ecosystem functions will also be explored – for this part links to work by BEWG and WGEKO will be sought.

Year 1	ToR a, b, c, d
Year 2	ToR a, b, c, d
Year 3	ToR a, b, c, d

Supporting information

Priority	The activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
Resource requirements	Experts that provide the main input to this group have been involved in successful EU funded projects (BENTHIS). It is envisioned that future funding will be available and that this ICES working group experts can also provide an international platform to establish a consortium. This would allow to commit future resources to the group's work.
Participants	The Group is normally attended by around 30 members and guests.
Secretariat facilities	Standard support
Financial	No financial implications
Linkages to ACOM and groups under ACOM	Advice products and working groups (e.g. WGECO and WGDEC)
Linkages to other committees or groups	There is a very close working relationship with all the groups under the Ecosystem Pressures and Impacts Steering Group. It is also very relevant to the Working Groups WGECO, WGDEC, WGSFD, BEWG, WGMHM, WGIMM, WGMBRED, WGMPCZM.
Linkages to other organizations	EU (DG-ENV, DG-MARE), RSCs (Baltic's HELCOM, North Atlantic's OSPAR, Mediterranean's Barcelona Convention and Black Sea's Bucharest Convention), JRC, STCEF.

Working Group on Offshore Renewable Energy (WGORE)

2020/FT/HAPISG15 The **Working Group on Marine Renewable Energy (WGMRE)** will be renamed **Working Group on Offshore Renewable Energy (WGORE)**, chaired by Daniel Wood, UK, and Bob Rumes, Belgium; will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2021	September/ December (tbc)	Online meeting		
Year 2022				

Year 2023

Final report by Date to
SCICOM**ToR descriptors**

TO R DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a Cumulative Effects Assessment of offshore wind, wave, and tidal farms in the ICES area.	a) Renewable energy devices are currently licenced on a farm by farm basis in most countries. There has been little work carried out to assess environmental effects at ecosystem and regional scales. The aim is to provide a detailed assessment of ORE at these scales.	2.1, 2.2, 2.4	3 years	Peer-reviewed journal paper
	b) Individual countries are largely focused on their ORE developments with regulatory systems only set up to deal with internal assessment but not cross border. The work would provide an ecosystem approach for dealing with cross border discussions between member states.			
	c) Link up with WGCEAM			
b Review of the use and environmental effects of chemicals in offshore wind, wave, and tidal farms	a) There is growing evidence that large quantities of chemicals and metals are being used in offshore renewables. The goal is to identify the chemical groups being used, quantify the usage and the environmental risk.	2.1, 2.4, 2.6	3 years	Peer-reviewed journal paper
	b) Chemical contaminants can impact all levels of receptor in the ecosystem. The widespread distribution of ORE means contaminants can have an impact across a very wide area. Understanding a new source of contaminants is key to effective management.			
	c) collaboration with the ICES WG Marine Chemistry and WGM BRED			
c Evaluate and report on the environmental effects of emerging marine renewable energy technologies and devices.	a) There is a growing number of new technologies being trialled to extract energy from the marine environment. These include floating solar farms, Ocean Thermal Energy Conversion (OTEC) and Pressure Retarded Osmosis (PRO). There is a need to understand what the environmental effects/impacts of these devices could be, and to identify research gaps.	2.1, 2.7	3 years	Peer reviewed journal paper. Most likely a review paper.
	b) Regulators and advisors require prior information on new devices so that they can firstly prepare for licensing deployment and secondly to prepare research funding for emerging issues.			
	c) Ad-hoc requests if required to other WG. Particularly WGM BRED.			

d	Review and report on (re)emerging environmental issues for offshore wind, wave, and tidal renewable energy technologies	<p>a) Offshore wind farms are now a well-established feature. Wave and tidal devices are being deployed in an increasing number of areas. New issues such as bat collision risk and the use of chemicals are emerging. Other pressures such as Electro Magnetic Fields (EMF) are re-emerging with the development of floating offshore wind.</p> <p>b) Issues often emerge because of individual interest within a member state. This work will allow transfer of knowledge across and beyond ICES member states.</p> <p>c) Link up with work from WKTBIMP, WGOWDF and associated groups</p>	2.1, 2.7	3 years	Short report with WG final report. (Possible journal paper if sufficient content)
---	---	--	----------	---------	---

Summary of the Work Plan

Year 1	<p>ToR A: Identify pressures to be included, data sets to be used and define methodology(ies) to be used. Link up with WGCEAM to help define the parameters. It is anticipated that the methodology will build on spatial approaches developed by Halpern et al., 2012 and used by HELCOM.</p> <p>ToR B: Refine scope of work, define data sources and chapter structure for reporting. Make contact with ICES WG Marine Chemistry to agree workload.</p> <p>ToR C: Define chapter structure, identify emerging technologies.</p> <p>ToR D: Review status on known and newly emerging environmental issues. Define chapter structure for reporting.</p>
Year 2	<p>ToR A: Compile datasets, carry out main analysis. Drafting of report e.g. methods, introduction etc.</p> <p>ToR B: Analyse the data and begin draft report.</p> <p>ToR C: Review emerging technologies in a workshop. Draft report.</p> <p>ToR D: Link up with WKTBIMP and associated groups via online workshop on cross border. Draft report.</p>
Year 3	<p>ToR A: Finalise analysis and complete reporting.</p> <p>ToR B: Finalise analysis and complete reporting.</p> <p>ToR C: Update and finalise report.</p> <p>ToR D: Update and finalise report</p>

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 20–25 members and guests.
Secretariat facilities	Standard EG support.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages currently.

Linkages to other committees or groups	There is a very close working relationship with MCWG, WGM BRED, WGCEAM and WGOWDF.
Linkages to other organizations	None currently.

Workshop on Geo-Spatial Data for Small-Scale Fisheries (WKSSFGE0)

2020/WK/HAPISG16 A Workshop on Geo-Spatial Data for Small-Scale Fisheries

(WKSSFGE0), chaired by Marta Rufino, Portugal; and Josefine Egekvist, Denmark, will be established and will meet in Lisbon, Portugal, 29 November – 3 December 2021 to:

- a) Discuss and apply methods for identifying trips/hauls in small-scale fisheries, including passive gears, using high resolution geo-spatial data. Participants need to bring their own data for case-studies to develop best practices and common methodologies;
- b) Based on the best practices identified, develop an R-script that can be used as a template for analysis of geo-spatial for small-scale fisheries;
- c) Evaluate how the use of high resolution geo-spatial data improve effort estimates and can help quantify the extent of small-scale fisheries.

WKSSFGE0 will report by 15 January 2022 (via HAPISG) for the attention of the ACOM and SCICOM.

Supporting information

Scientific justification	<p>In relation to spatial data within the EU, VMS are available for vessels larger than or equal to 12 m since 2012, with a maximum ping rate of 2 hours. The ICES VMS/logbook data call requests VMS-based spatial data, but is missing information on fishery from vessels that are not carrying VMS. It is identified as a caveat in relation to the data outputs used for ICES Advice (e.g. ADGTRADE) that the small-scale fishery is missing, resulting in an underestimation of the fishing pressure, especially in coastal areas.</p> <p>Some national initiatives have been implemented to obtain spatio-temporal data from vessels < 12 m (e.g. AIS, GPRS trackers), but the methods to deal with this highly temporally resolved data are not harmonized/standardized. Several ICES members, such as the UK, are proposing the use of appropriate vessel tracking systems for the whole inshore fleet (DEFRA< 2018; Marine Scotland, 2019). Additionally, at the EU level current negotiations between the EU Commission, Parliament and Council are underway for the tracking on small scale fishing vessels by all Member States (P9_TA(2021)0076).</p> <p>Therefore, it is necessary to produce standardised protocols to identify fishing trips and infer fishing activities in SSF.</p> <p>With regards to passive gears, no matter the type of vessel, measures of fishing effort are often missing. Two types of effort is requested in the ICES RDBES Effort statistics: number of hours the vessel is conducting fishing and handling related activity and the soaking time. The workshop will test the use of highly resolved spatio-temporal data to identify setting and hauling events during fishing trips to infer other measures of effort (such as number of pots/traps, length of the net and/or gear soak time).</p> <p>The workshop will aim to discuss and develop standard procedures for identifying trips/hauls in SSF using geo-spatial data that can be compatible with VMS derived outputs. Participants will bring their own data for the case-studies. Namely, the</p>
--------------------------	---

	workshop participants will explore the possibility of identifying the setting/hauling of passive gears. It will also be explored how different criteria applied affect the identification of fishing trips/hauls (e.g. through sensitivity analysis). The output will be an R-script for working with geo-spatial data for SSF.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resources required to undertake additional activities in the framework of this group are negligible.
Participants	The group will be attended by members of WGSFD, WGCATCH and other invited experts.
Secretariat facilities	Standard EG support.
Financial	Funding will be requested for on site review.
Linkages to advisory committees	There are no obvious direct linkages with the advisory committees.
Linkages to other committees or groups	WGSFD, WGCATCH, WGBYC, WGTIFD, SCICOM, HAPISG
Linkages to other organizations	EU Regional Coordination Groups Intersessional Subgroups on Small-scale fisheries and Metier and transversal variable issues.

Working Group on Marine Litter (WGML)

To be submitted at a later stage

Methods Working Group (MGWG)

Pending

Resolutions approved in 2019

Working Group on Introduction and Transfers of Marine Organisms (WGITMO)

2019/FT/HAPISG01 The Working Group on Introductions and Transfers of Marine Organisms (WGITMO), chaired by Cynthia McKenzie, Canada, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2020	4–6 March	Gdynia, Poland		Joint meetings with WGBOSV and WGHABD
Year 2021	1–3 March	Online meeting		
Year 2022			Final report by DATE to SCICOM	

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Advance research, develop collaborations and address surveillance and knowledge gaps in issues related to the introduction and transfer of marine organisms, through annual reviews of national/international activities and responding to advice requests.	Data, information and knowledge collated and synthesised ensures timely update of AquaNIS as well as national and international databases as appropriate. This information will be used as an underlying information source for other ToRs, responding to incoming advice requests as well as organising collaboration with other international science organisations (e.g. PICES and CIESM).	2.1, 2.4, 3.3	3 years	Annual reports to ICES. Further develop and advance AquaNIS database, and populate it with new data. Respond to incoming advice requests as requested.
b	Evaluate the impact climate change may have on the introduction and spread of non-indigenous marine organisms, including Arctic environments.	This work will be carried out jointly with WGBOSV. Contributes to SICCOME and ICES high-priority action areas 'Arctic research'.	2.5, 2.2, 3.6	3 years	Primary publication on the Arctic environment and the spread of non-indigenous species.
c	Investigate biofouling as a vector for the introduction and transfer of aquatic organisms on vessels and artificial hard structures, their pressure and impact on the ecosystem with a	Biofouling has been increasing recognized as an important vector in the introduction and transfer of aquatic organisms. Elements of this work will be carried out jointly with WGBOSV as a comparison vector in invasion pathways. Biofouling is an increasing	2.7, 2.1, 6.4	3 years	Input on the general applicability of preventive measures and selective mitigation technologies through a technical paper or manuscript submitted to a peer-reviewed scientific

	comparison of prevention or selective mitigation methodologies.	concern for aquaculture, energy installations, and coastal development as stressors on coastal environments.			journal. Input to IMO Biofouling guidelines.
d	Advance knowledge base to further develop indicators to evaluate the status and impact of non-indigenous species in marine environments	The aim is to develop a wider knowledge-base to more effectively address several legislative acts related to introductions of non-native species, such as EU IAS Regulation and EU MSFD (D2). Specifically, WGITMO aims to improve/develop metrics and critically evaluate the underlying uncertainties, including the on-going global trial of the Aquatic Species Invasiveness Screening Kit (AS-ISK) and a comparison of AS-ISK and the Canadian Marine Invasive Species Tool (CMIST).	2.2, 2.7, 6.1	3 years	At least one manuscript to be submitted to a peer-reviewed scientific journal.
e	Evaluate the development and utilization of DNA- and RNA-based molecular approaches to provide science-based tools for strategic planning, policy development, and operational processes regarding non-native species and biological invasions (including detection and monitoring, reconstruction of patterns and vectors of introduction and spread, assessment of establishment and impact risk, and application for invasive species control)	Molecular (DNA-based and RNA-based) approaches have been increasingly used in the past decades to uncover cryptic introduced species, understand underlying processes of population establishment and spread, and detect novel introductions and monitor existing ones. Recent innovations have increased the power of these approaches to understand invasion risk and offer possibilities for novel biotechnological solutions for control or eradication of invasive populations. With the advent of recent technologies, it is timely to assess and evaluate their potential applications as well as their limitations.	2.5, 1.6, 4.4	3 years	Input on the effective utilization of these methods for international and national policies and regulations through meeting participation, group correspondence, and/or development of technical reports or peer-reviewed papers.
f	Investigate the role of human-produced marine debris as a vector and facilitator for the introduction and spread of non-indigenous species (NIS). Advance research and identify knowledge gaps on marine debris-	The accumulation of debris in the ocean is severely affecting ocean and coastal ecosystems, as its ingestion and entanglement directly impacts marine organisms. Furthermore, recent research indicates that marine debris is both a growing vector for the	2.5, 2.6, 2.1	3 years	Review paper on NIS introduced to European waters via marine debris

	NIS interactions (eg. Marine debris as a facilitator for jellyfish blooms).	introduction of non-indigenous species (NIS), with transoceanic rafting already likely to intensify species invasions worldwide and a potential facilitator of marine diseases. Develop collaborations with other working groups (HELCOM-TGML; OSPAR ICG-ML, ICES-WGML, MSFD-ML; PICES; CIESM)			
g	Investigate best practices to minimize the role of aquaculture as a vector for the introduction and transfer of non-indigenous aquatic organisms. This would include both non-indigenous species targeted for aquaculture and hitchhikers (biofouling and interstitial, parasites and pathogens). Impacts of non-indigenous species on aquaculture and on ecosystems will be addressed.	Aquaculture has been recognized as an important vector in the introduction and transfer of aquatic organisms. ENSARS provided some baseline information on aquaculture risk analysis, including development and global testing of ENSARS' derivative, the AS-ISK. There are important social and economic impacts (positive and negative) of introductions related to aquaculture. Linkages with aquaculture working groups, and WGPDMO will be sought as well as a close collaboration with WGECON.	2.1,2.2, 5.6	3 years	Input on the general applicability of preventive measures (good practice codes) and selective mitigation technologies through technical guidance and/or a peer-reviewed paper.

Summary of the Work Plan

Year 1	Work on all ToRs with special focus on a, c, e, f, g
Year 2	Work on all ToRs with special focus on a, b, d, e, f
Year 3	Report on All ToRs

Supporting information

Priority	The work of the Group forms the scientific basis for essential advice related to the introduction and transfer of marine organisms, particularly non-indigenous species. Consequently these activities are considered to have a very high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resources required to undertake additional activities in the framework of this group are negligible.
Participants	The Group is normally attended by some 40-50 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	The group will serve as primary respondents to incoming advice requests on various issues relating to introduction and transfer of marine organisms, including non-indigenous species.

Linkages to other committees or groups	There is a very close working relationship with the Working Group on Ballast Water and Other Ship Vectors (WGBOSV). In addition to relevance to the Working Group on Harmful Algal Bloom Dynamics (WGABD), Biodiversity Science (WGBIODIV), and aquaculture focused working groups, WGITMO also contributes to Integrated Ecosystem Assessment EG's. Anticipate building linkages with the Working Group on Integrated Morphological and Molecular Techniques (WGIMT) during the next three years under these ToRs. Potential linkages with WGML, WGECON, WGPDMO.
Linkages to other organizations	PICES, CIESM, IMO, HELCOM, OSPAR

Working Group on Marine Planning and Coastal Zone Management (WGMPCZM)

2019/FT/HAPISG02 Working Group on Marine Planning and Coastal Zone Management

(WGMPCZM), co-chaired by Andrea Morf, Sweden; and Catriona Nic Aonghusa, Ireland, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2020	20-24 April	by corresp/ webex		physical meeting cancelled - remote work
Year 2021	19-23 April	Online meeting		
Year 2022		Copenhagen, Denmark (tbc)	Final report by <i>Date Month</i> to SCICOM	

ToR descriptors

TO R	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Review and report on progress of marine planning (MSP) and coastal zone management (CZM) in ICES member states and inform activities in other ToRs and working groups, especially in relation to the following key aspects: 1. Addressing conflicts and promoting synergies;	Many ICES countries' marine plans soon enter the implementation phase. Based on countries' global and regional commitments (e.g. Sustainable Development Goals, OSPAR, HELCOM, or the EU's Marine Spatial Planning Directive) both environmental, social and economic developments and their implications across the	2.7, 4.3, 6.2, 6.3 , 6.4, 6.6, 7.2, 7.3, 7.4 ³	Years 1,2,3	"ICES WGMPCZM Ambassador" guest lecturing module for WG members (year 1). Report or manuscript on the changes in evidence needed and other R&D requirements arising as planning practice evolves (year 3).

³ **Comment on science priorities:** WGMPCZM suggests that the **science priorities in bold are included in the database**. WGMPCZM is working in a very cross cutting way across many of the science priorities.

	<p>2. Treatment of culturally significant areas ;</p> <p>3. Development and use of decision support tools;</p> <p>4. Monitoring and evaluation approaches.</p>	<p>land sea interface in the seas need attention. Fast development of evidence, methods and practice is under way, but effective learning requires a systematic reflection and sharing across ICES countries and WGs. Science/ICES can facilitate systematic reflection and enhance institutional learning. Several areas are presently of significance:</p> <ol style="list-style-type: none"> 1. establishing effective, synergetic use of marine space and minimising conflicts, 2. Basic mapping and including of social and cultural dimensions, 3. Need for and occurring rapid development of decision support tools, 4. Driving ahead monitoring and evaluation of plans and planning. 			
b	<p>Define and report on the role of marine spatial planning (MSP) and coastal zone management (CZM) in facilitating marine and coastal ecosystem restoration.</p>	<p>Recognising biodiversity targets (SDG 14, CBD, Aichi agreement, etc.) and related concepts (natural capital, green infrastructure, habitat offsetting and managed realignment), MSP will become more important as a framework to deliver restoration and sustainable use.</p>	6.1, 6.2	Years 1,2,3	<p>Workshop to review current problems of implementing restoration, relevant approaches & solutions and the (current and potential) roles of MSP/CZM (Y2) based on resolution to be formulated in Y1.</p> <p>Review paper and proposals for concepts and strategies (Y3).</p>

c	Assess and provide guidance on how climate change (CC) is considered and incorporated in marine planning (MSP) and coastal zone management (ICZM).	Climate change and ocean acidification and their causes and effects include spatial dimensions in marine and coastal socio-ecological systems. Future CC-related impacts will require strategies and actions and related ICZM and MSP practice and method development will need to be proactive.	1.1, 1.3, 1.9 ⁴	Years 1,2,3	Workshop to define best practice (Y2), based on stocktake report of relevant approaches and frameworks for CC in ICZM/MSP and a workshop resolution formulated in Y1. Guidance paper on how to improve current MSP/ICZM practice (Y3).
d	Review and report on transboundary issues and collaboration in planning, i.e the coastal zone, across sea basins and in areas beyond national jurisdiction, including the deep sea.	EEZ based MSP is under rapid development, but human activities, pressures and impacts cross jurisdictional (multi-level governance systems), sea basins and land-sea boundaries and need to be acknowledged and managed accordingly. The present, historically grown institutional systems, data collection and information flows are not necessarily suitable and need to be re-designed. Hence the on-going work to improve ocean governance from local to global level (e.g. UN BBNJ process).	6.2, 6.3	Years 1,2,3	Synthesis report with a stocktake of reviews and problem analyses relating to MSP/ICZM addressing land-sea interactions and transboundary issues in marine basins, also taking into account insights from work on other ToRs (e.g. a, c; Y 3).
e	Develop	Need for capacity	6.3, 6.4, 7.4 ⁵	Years 1,2,3	Joint work session

⁴ Results from many sub codes within **code 1** can relate to CC but code 1 includes little on policy implications and translation into policy. This ToR tries to link results from work (also in other groups, if appropriate) with spatial management.

⁵ There is less in the science plan on capacity building & training & activities and developing ICES science policy interface, but to us this appears highly important. So, this ToR is less based on the science plan but on the ICES vision and mission:

Vision= Be world-leading marine science organization, meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans

Mission= Advance & share scientific understanding of marine ES & ESS they provide & use knowledge to generate state-of-the-art advice for meeting conservation, management, and sustainability goals

	<p>educational/training materials to promote understanding of marine spatial planning (MSP) and coastal zone management (ICZM) processes:</p> <ol style="list-style-type: none"> 1. Map and if possible address education and training needs for MSP. 2. Work with the ICES secretariate to develop and deliver training materials / courses as required. 3. Act as scientific steering group for the MSP Challenge serious game. 4. Promote MSP and ICZM processes as a platforms for enhancing Ocean Literacy within society. 	<p>development within ICES, science/practioners. Need to modernise marine graduate and postgraduate education and train current work force (authorities & consultancy). Low awareness and collaboration of dispersed, transitory initiatives (projects) but emerging courses on different levels. Need to network and create synergies across ICES countries and beyond, remaining country/region relevant.</p> <p>Building on earlier period's experiences with education and training develop relevant input to training (building on e.g. MSP Challenge).</p>			<p>on board game organised by NL gov/IOC-UNESCO (training for trainers) (Y 1).</p> <p>“WG-MPCZM ambassadors” Guest lecturing module for WG members (Y 2).</p> <p>Chapter for MSP Challenge handbook on ICES knowledge and experience (Y 2).</p> <p>Joint WK MSP Challenge simulation platform with NL gov/Buas (Y 2).</p> <p>Continue to provide training based on needs as identified by ICES secretariate as before.</p>
f	<p>Assess and report on the social impacts of marine spatial planning (MSP) and integrated coastal zone management (ICZM) on coastal communities, with a focus on social costs and benefits including effects on well-being and equality.</p>	<p>The relationship between MSP/ICZM and the social dimensions of sustainable development are still comparatively underrepresented in research. At the same time, MSP/ICZM is increasingly recognised as a tool for achieving the SDGs (Agenda 2030), in particular for enhancing the well-being of (coastal) communities. Both the spatial dimensions of C/MSP (e.g. identifying and managing culturally significant areas) and process-related dimensions (e.g. inclusiveness, enhancing social cohesion, gender equality etc.), as well as vulnerabilities and risk-based perspectives (e.g.</p>	6.3, 7.1, 7.5, 7.6	Years 1,2,3	<p>A stocktake report on current marine plans and their links to community well-being and equality (Y 1).</p> <p>A workshop to explore the various dimensions of community well-being, equality, associated vulnerabilities, and the opportunities and constraints for MSP/ICZM in enhancing community well-being (Y 2).</p> <p>A guidance paper on how to improve current MSP/CZM practice (Y 3)</p>

risks to culturally significant areas) must be considered if MSP/ICZM practice is to maximise its potential as tool for achieving SD.

Summary of the Work Plan

Year 1	<p>ToR A: Develop “ICES WGMPCZM Ambassador” lecturing module for WG members and and inform activities in other ToRs and working groups on relevant developments.</p> <p>ToR C: Stocktake of frameworks and approaches to deal with CC in C/MSP.</p> <p>ToR E: Joint work session on board game organised by NL gov/IOC-UNESCO (training for trainers)</p> <p>ToR E: Provide training based on needs as identified by ICES secr.</p> <p>ToR F: Stocktake report on current marine plans and their links to community well-being and equality.</p>
Year 2	<p>ToR B: Review of current problems for implementation of restoration, approaches & solutions and the current/potential role of MSP/CZM through a workshop.</p> <p>ToR C: Workshop to define best practice in relation to how MSP/ICZM deals with CC.</p> <p>ToR E: “WGMPCZM MSP Challenge ambassadors” Guest lecturing module for WG members;</p> <p>ToR E: Chapter for MSP Challenge handbook on ICES knowledge and experience;</p> <p>ToR E: Joint WK MSP Challenge simulation platform with NL gov/Buas.</p> <p>ToR E: Provide training based on needs as identified by ICES secr.</p> <p>ToR F: Workshop to explore the various dimensions of community well-being, equality, associated vulnerabilities, and the opportunities and constraints for MSP/ICZM in enhancing community well-being (year 2).</p>
Year 3	<p>ToR A: Report or manuscript on the changes in evidence needed and other R&D requirements arising as planning practice evolves.</p> <p>ToR b: Review paper and proposals for concepts and strategies for ecosystem restoration through MSP/ICZM.</p> <p>ToR C: A guidance paper on how to improve current MSP/ICZM practice in relation to CC.</p> <p>ToR D: Synthesis report with a stocktake of reviews and problem analyses relating to MSP/ICZM addressing land-sea interactions and transboundary issues in marine basins, also taking into account insights from work from other ToRs (e.g. a, c).</p> <p>ToR E: Provide training based on needs as identified by ICES secrtriat</p> <p>ToR F: Guidance paper on how to improve current MSP/CZM practice.</p>

Supporting information

Priority	<p>WGMPCZM activities cover many priority areas within the ICES science plan and should therefore be of high to very high priority. The current activities of WGMPCZM are urgent in terms of a rapidly developing practice of MSP/ICZM and marine and coastal problems to address (Climate change, habitat loss, pressure on deep sea areas, current rapid deveopment of marine and coastal management institutions and related need for capacity development and institutional learning). The first three topics are included in the ICES science</p>
----------	--

plan, but often lacking links to relevant R&D and capacity development in planning and management. We see important links to ICES initiatives and working groups working with CC, integrated ecosystem assessments, social dimensions, marine uses and pressures and would like to develop these. Here, it is also important, that this group is still rather unique within ICES as one one with a highly interactive science policy interface – ascertained through the composition of the group, including both researchers, planners and policy experts from various disciplines and fields of practice.

Resource requirement	The research programmes which provide the main input to this group are already underway, and resources are committed, so the additional resource required to undertake additional activities in the framework of this group is negligible. Here, we just list a number of relevant projects and initiatives for different ToRs. For ToR A, relevant projects include the BONUS projects BASMATI, the EU-EASME financed project Pan Baltic Scope and the NorthSEE project, the INTERREG CB project Plan4Blue INTERREG BSR project Baltic Rim, the Estonia-Russia programme 2014-2020 project ADRIENNE; as well as involvement of group members in the EU MSP Platform. There is also ongoing work on country MSP plans, plus increasing attention on evaluating existing plans in the course of their first revision. ToR B can profit from countries' activities related to implementation of SDG 14 and ecosystem based MSP and work with protected area networks in both the HELCOM and the OSPAR areas (including Ireland, Canada) and the Estonia-Russia programme 2014-2020 project ADRIENNE, ToR C can build on activities carried out by the LandtoSea project at HZG, as well as the ongoing relevance of climate-proofing MSP plans and studies carried out in various contexts. ToR D can profit from other ToR work and group members' involvement in the global IOC UNESCO MSP initiative. ToR E is linked to the continued activities around the development and testing of present and new versions of the MSP Challenge Serious Game (by its developers), and a ERASMUS university collaboration on teaching and training in MSP and ICES training. ToR F will mainly draw on the Land-to-Sea, SeaUseTip and CoastWise projects at HZG which collectively are dealing with ecosystem services, culturally significant areas, community benefits and social-cultural tipping points.
Participants	Group activities are normally attended by some 15–25 members and guests (out of ca 60 appointed and chair-invited members).
Secretariat facilities	Depending on ToR and whether meetings occur in Copenhagen we need to rely on the secretariate.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages at present (related to on-going tasks), but there is a potential to develop advice on MSP and ICZM – if requested by someone and fitting the group's ToRs, competence profile and if relevant experts are available.
Linkages to other committees or groups	There is a need for working relationships with other groups, both as needs arise, but also more continuously. This includes not the least SIHD and WG SOCIAL and groups within HAPISG dealing with societal aspects and human activities in the sea, but also groups working on habitats (Tor b), integrated ecosystem assessments and on climate change (ToRc). There is also a proposal for a new spin-off group on cumulative impact assessment, which WGMPCZM wants to keep close contact with.
Linkages to other organisations	The WGMPCZM members have many linkages to relevant institutes, networks and organisations both from research and practice different group members are part of / have close contacts with through collaborations, research and consultancy (here just a few examples):

-
- Research and analysis institutes: Helmholtz Zentrum Geesthacht, Marine Scotland, Marine Institute Galway, Nordregio, Swedish Institute for the Marine Environment, SYKE (Finland)
 - Research networks: the MSP Research Network, and the Marine Social Sciences Network.
 - Expert groups: the HELCOM VASAB MSP expert group, the EU MSP expert group, the IOC-UNESCO MSP initiative and expert group
 - National planning authorities from different ICES member countries (see nominated group members) and relevant working groups in the Nordic Council of Ministers.
-

Working Group on Offshore Wind Development and Fisheries (WGOWDF)

2019/FT/HAPISG06 A Working Group on Offshore Wind Development and Fisheries (WGOWDF), co-chaired by Andy Lipsky, USA; Andrew Gill, UK; and Antje Gimpel, Germany, will be established and will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2020	27–29 April	by corresp/ webex		physical meeting cancelled - remote work
Year 2021	9–11 June; 15–16 June	Online meeting		
Year 2022			Final report by DATE to SCICOM	

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Review and report on fishing industry interactions with offshore wind development and document lessons learned including effects on the distribution of fishing operations	Europe has been operating offshore wind energy facilities for 20 years. North America is on the verge of large-scale development. The European experience can be used to document the effects of offshore development on fishery operations, fishing communities, and fishery economics. While there are distinct differences in the scale and scope of fisheries between the North American and European wind development	2.2, 2.3, 2.7	2 years	Review paper

		areas; there is also the opportunity to identify common issues and promote research to address these issues.			
b	Develop and report on methodologies to assess impacts on fishery resource data collections.	Offshore wind energy development necessitates changes in fishery-independent survey operations and potentially fishery-dependent data collection. Wind energy development also transforms habitats, thus affecting the distribution and abundance of fish and shellfish populations. Both statistical survey design and survey techniques need to be adapted and/or developed. In addition, modeling approaches need to be developed to understand the impacts of wind development and forecast possible future conditions.	2.2, 2.3, 2.7	3 years	Method development papers
c	Consider and report on effects of habitat alteration by offshore wind development on fisheries. This consideration should include anticipated changes to the benthic habitats, potential for invasive species, vertical and horizontal movement of water, sediment suspension, and water column changes.	Construction, operation, and decommissioning of offshore wind energy developments will affect marine habitats. These activities include seafloor and water column disturbance, ocean noise, electromagnetic signals, and habitat transformation. The various activities will be documented and methodologies for study identified. Potential effects will also be documented on the range of marine organisms with particular emphasis to species that are the target of commercial and / or recreational fisheries.	2.2, 2.3, 2.7	3 years	Review paper Recommendations of additional studies linked to other WGs

d	Review ICES expertise and identify gaps and opportunities relative to renewable energy and marine ecosystems and sustainability	The goal of WGOWDEF is to complement the activities of WGMBRED and WGMRE with a focus on fisheries interactions. The development and activities of the WG will be coordinated with these other two WG. The WG will also evaluate other ICES activities and coordinate with relevant groups.	6.6	Year 3	Report to ICES
---	---	---	-----	--------	----------------

Summary of the Work Plan

Year 1	The WG will meet and exchange ideas on ToR a, b, c. The WG will then develop a plan as to how to address ToR a, b, c in the 3 year time frame. The initial review paper will be planned and worked on during Year 1, both at the inaugural workshop and intersessionally. The WG Chairs will interact with the Chairs of WGMBRED and WGMRE to ensure activities are complementary.
Year 2	The WG will make progress on the all review papers and will plan workshops related to each of ToR a, b, and c. The first workshop will present the draft review for ToR a and work up the final paper. The ToR b and c workshops will be structured to gather the information needed for both the other papers, namely the methodologies and the effects. The WG Chairs will interact with the Chairs of WGMBRED and WGMRE to ensure activities are complementary.
Year 3	The WG will complete the ToR b and c review papers and submit for publication. The WG will also discuss next steps for the WG. The WG will complete review of ICES expertise related to renewable energy and marine ecosystems and sustainability working with WGMBRED and WGMRE. A report will be produced for ICES.

Supporting information

Priority	Offshore wind energy development continues in Europe and is beginning in earnest in North America. Sustainable fisheries are critical to global food security and renewable energy is critical to energy security and climate change mitigation. Coexistence requires an understanding of the interactions between offshore wind energy development and fishing. This understanding can be used to foster the exchange of information, collaboration in addressing science questions, and support decision-making. Consequently, these activities are considered to have a very high priority across the ICES area especially as wind energy development continues.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group will be attended by some 30–40 members and guests..
Secretariat facilities	WebEx support for remote participating
Financial	No financial implications.

Linkages to ACOM and groups under ACOM	There are no obvious direct linkages but developing the expertise could link to ACOM in the future.
Linkages to other committees or groups	There is potential for a very close working relationship WGMBRED and WGMRE as well as communication with WKUSER. Also the WGSFD (Spatial Fisheries Data)
Linkages to other organizations	There are linkages to fishing organizations and wind developers in the USA and similar linkages in Europe, including wider links to licencing/permitting authorities and other relevant stakeholders.

Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT)

2019/FT/HAPISG09 Working Group on the Effects of Extraction of Marine Sediments on the Ecosystem (WGEXT), chaired by Keith Cooper, UK, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2020	27–30 April	by corresp/ webex		physical meeting cancelled - remote work
Year 2021	27 April; 10 May	Online meeting		
Year 2022		Finland/ Netherlands (tbc)	Final report by DATE to SCICOM	

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
A1	Review data on marine extraction activities and provide a summary on marine extraction for the OSPAR region to OSPAR	a) OSPAR requirements b) Advisory requirements	2.1, 6.4	Year 1, 2, 3	Annual extracted amounts and areas as a chapter in all Interim and Final Reports
A2	Review of developments in marine sediment resource mapping, legal regime and policy, environmental impact assessment, research and monitoring	a) Advisory requirements b) Inform other counties (ICES, EU) to optimize their policy and management	2.1, 6.4	Year 3	Chapter in Final Report

B	Finalize an ICES aggregate database comprising data on marine extraction activities	a) Advisory requirements b) Cooperation with ICES Data Centre	2.1, 6.4	Year 1,2,3	Year 1: finalize template Year 2: incorporate historical data in ICES database Year 3: streamline the dataflow from ICES countries to database
C	Update ICES Guideline for Management of Marine Sediment Extraction	a) Advisory requirements b) Inform other countries (ICES, EU) to optimize their policy and management	2.1, 6.4	Year 1,2,3	Year 1: review the Guidelines Year 2: formulate revised guidelines Year 3: revised guidelines accepted by OSPAR
D	Ensure outputs of the WGEXT are accessible by publishing as a group	a) Inform other countries (ICES, EU) to optimize their policy and management b) Contribute to the visibility and impact of ICES	2.1, 6.4	ongoing	Publish results of the WG on intensity of extraction, on MSFD and on cumulative impacts as journal papers. Distribute Annual Reports to networks outside ICES
E	Include marine sediment extraction in cumulative impact assessment	Contribute and working together with other ICES and OSPAR WGs that are involved in this subject.	2.1, 2.2	Year 1,3	Year 1: intensify the contacts with other WGs in OSPAR and ICES. Year 3: define in cooperation with other WGs a Best Practise to include marine extraction in cumulative impact assessments.
F	Review developments with implications for the management and the effects of marine sediment extraction.	a) Advisory requirements b) Contribute to the update of the ICES guidelines	2.7, 6.4	Year 3	Chapter in Final Report

Summary of the Work Plan

Year 1	The data on marine extraction are published each year and send to OSPAR (ToR A1). To put the data in the ICES data base a template will be finalized (ToR B). The inventory for revised ICES Guidelines is ready (ToR C). A theme session on extraction will be held at ASC 2020 and the essay on dredging intensity will be submitted to a journal (ToR D). Contacts with other ICES and OSPAR WGs on cumulative effects will be established (ToR E).
--------	--

Year 2	The data on marine extraction are published each year and send to OSPAR (ToR A1). The historical data (1986-2018) will be put in the ICES data base (ToR B). The text for the actualization of the ICES Guidelines will be ready (ToR C). The review on Extraction and MSFD and the review on Cumulation of Effects will be submitted to a journal (ToR D)
Year 3	The data on marine extraction are published each year and send to OSPAR (ToR A1). A review of developments in marine sediment extraction in the ICES countries will be published in the Final Report (ToR A2).The gathering of extraction data will find its way to the ICES data base (ToR B). The revised ICES Guidelines will be accepted by ICES and OSPAR (ToR C and F). An overview of ToR A1 and A2 will be submitted to a journal (ToR D and F). Together with other ICES an OSPAR WGs a Best Practise to include marine extraction in cumulative impacts assessments will be formulated (ToR E).

Supporting information

Priority	The activities of WGEXT will lead into issues related to the effects on the ecosystem of marine sediment extraction. Sediment extraction is increasing in some countries and rather stable in others. This human activity is connected to several descriptors in the EU MSFD. The report of WGEXT and the ICES Guidelines are used in the management of extraction in the member countries. Consequently, the activities of WGEXT are considered to have a high priority.
Resource requirements	The activities of WGEXT are focussed on the use of existing research programmes (e.g. EIA monitoring) and data on marine extraction and management. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Annual Meeting of WGEXT is normally attended by some 12-20 members and guests. Besides that several members contribute by correspondence.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	ACOM
Linkages to other committees or groups	There is a direct linkage to the ICES Data Centre and a potential working relationship with WGs in SCICOM and OSPAR who are involved in cumulative effects and spatial planning.
Linkages to other organizations	Data on marine extraction are delivered to OSPAR.

Stock Identification Methods Working Group (SIMWG)

2019/FT/HAPISG10 The **Stock Identification Methods Working Group (SIMWG)**, chaired by Christoph Stransky, Germany, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2020	By correspondence			
Year 2021	17 June & by correspondence	Online meeting		

Year 2022	tbc	tbc	Final report by 1 August to SCICOM
-----------	-----	-----	------------------------------------

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Review recent advances in stock identification methods	a) Tracks best practices in stock ID b) Promotes new technologies Relevant to all ICES species	1.4, 5.1, 5.2	3 years (and continued)	EG report
b	Provide technical reviews and expert opinions on matters of stock identification, as requested by specific Working Groups and SCICOM	a) Contributes to understanding of structure and connectivity of fish populations/stocks b) Highly relevant to assessment and management	1.4, 5.1, 5.2	3 years (and continued)	EG report and updated table of species reviews
c	Review and report on advances in mixed stock analysis, and assess their potential role in improving precision of stock assessment	Relevant to resolving mixed stock composition issues in assessment and management.	1.4, 5.2, 5.4	3 years	EG report and contribution to ICES ASC; methodological paper in international journal

Summary of the Work Plan

Year 1	Address terms of reference through work by correspondence in 2020
Year 2	Organise a physical meeting for SIMWG for summer 2021.
Year 3	Address terms of reference through work by correspondence in 2022

Supporting information

Priority	Understanding stock structure is a fundamental requirement before any assessment or modelling on a stock level can be contemplated. SIMWG liaises with ICES expert groups and working groups on stock identification issues and continues to review new methods as they develop
Resource requirements	SharePoint website and clear feedback from expert groups.
Participants	The Group is normally attended by some 10–15 members and guests.
Secretariat facilities	Standard support
Financial	None

Linkages to ACOM and groups under ACOM	ACOM
Linkages to other committees or groups	SIMWG has recently worked closely with a range of ICES working groups including WGWIDE, WGBIE, WGHANSA, and NWWG; benchmark workshops including WKPLE and WKHAD, and advice drafting groups such as ADGDEEP, and in previous years SIWMG connected with many more ICES groups to fulfill requests.
Linkages to other organizations	There are no obvious direct linkages, beyond the SIMWG members' affiliation and commitment to their own employers.

Resolutions approved in 2018

Working Group on Marine Benthos and Renewable Energy Developments (WGMBRED)

2018/MA2/HAPISG01

The Working Group on Marine Benthos and Renewable

Energy Developments (WGMBRED), chaired by Jan Vanaverbeke, Belgium, and Joop Coolen, the Netherlands, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	12–15 February	Brussels, Belgium		
Year 2020	20–23 April	by corresp/ webex		physical meeting cancelled - remote work
Year 2021	8–11 March	Online meeting	Final report by 1 May to SCICOM	

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Develop guidelines on standardised data collection methodologies and criteria for metadata to enable integration of benthos data of marine renewable energy devices into wider international frameworks.	WGMBRED recognises the fact that data on the benthos of marine renewable energy devices are collected and stored according to different standards, hampering in integrated analyses of the effect of such devices on the benthos on wider spatio-temporal scales. Standardisation of data collection and storage methodology will overcome this problem, facilitating joint analyses and international collaboration.	3.1	Year 1–3	Synthesis report to ICES on review of existing standards and methodologies including guidelines for setting criteria of metadata facilitating integration and analysis of marine renewable energy devices benthic data.
b	Provide an integrated example dataset based on benthos data of marine renewable energy devices from various sources	To date, data on the effect of marine renewable energy devices are scattered in national or institutional databases. This lack of integration hampers the understanding of the general effects in space and time of renewable energy devices on the marine benthos. WGMBRED will therefore provide a prototype of an integrated database (based on publicly available data) that can be used for scientific purposes by the international scientific community	2.1; 3.1	Year 1–3	Prototype database on the benthos of renewable energy devices, submitted to a database repository.
c	Review the knowledge on changes in the benthos	Earlier WGMBRED work, showed a locally increased habitat diversity in	2.1; 2.2; 6.1	Year 1–3	Report to ICES on the assessment of

	associated with environments where marine renewable energy devices are located and relate them to the presence of these structures and the changes to other human activities (e.g. fisheries)	areas where renewable energy arrays are in function. This results in increased diversity of the benthos (including non-indigenous species). At the same time, many fisheries activities are excluded from these areas. As such, marine renewable energy device arrays could act as de facto conservation areas for benthos, adding to the existing network of designated Marine Protected Areas. This is of high importance and should be taken into account during marine spatial planning processes where multiple activities within concession zones for marine renewable energy devices are being planned for.			the evidence of whether marine renewable energy device arrays can be considered as de facto marine protected areas.
d	Develop the scientific basis for assessing the conservation of benthic habitats beyond the exploitation phase of marine renewable energy installations	Based in the current knowledge, WGMBRED realises that the local and regional biodiversity of the benthos may be positively affected in areas where marine renewable energy devices are exploited. This results from a combination of the provisioning of habitat, food and shelter for a number of marine organisms. These effects need to be taken into consideration in the decision making process for locating and the possible decommissioning of marine renewable energy devices sites.	6.1	Year 1-3	Manuscript to be submitted to peer-reviewed journal
e	Review and provide an empirical overview on the role of benthos associated with marine renewable energy devices in the maintenance of important ecosystem processes.	WGMBRED aims to provide the knowledge base to support the implementation of the Ecosystem Approach to Management with respect to marine renewable energy devices. This requires moving towards a process-driven understanding of how the changes to the structural and functional composition of the benthos (including non-indigenous species) associated with marine renewable energy devices) contributes to ecosystem functioning and the provisioning of ecosystem services (such as nutrient cycling and food provision via fisheries species).	2.2	Year 1-3	Manuscript submitted to a peer-reviewed scientific journal
f	In collaboration with WGMRE, provide a preliminary draft of advice on the current state and knowledge of studies into the deployment and environmental impacts of the following wet renewable energies and marine energy	Advisory Requirements: ICES has received a special request from OSPAR to advice on the current state and knowledge of studies into the deployment and environmental impacts of wet renewable technologies and marine energy storage systems. Given its expertise, WGMBRED will contribute to the advice with data and	6.1	Year 1	Section of the report ready for WGMRE on 25 February 2019.

storage systems: wave energy (floating, coastal infrastructure), tidal stream (screws, kites), tidal flow (barrage, lagoon) and others. Advice should cover the status of wet renewable development in the OSPAR region, future prospects, potential environmental problems (sea bed habitat loss/disturbance, fish, marine mammals, birds, seascape/public perception, and cumulative impacts), potential benefits, next steps and conclusions.	expertise on the benthic component of the marine realm. A subgroup will meet in ICES headquarters 15-16 January with experts from WGMRE and WGMBRED to draft a first version of the advice. The preliminary draft advice will be developed further during WGMBRED meeting and finalised during WGMRE meeting.
--	--

Summary of the Work Plan

Year 1	Begin reviews to start to address ToRs a, c, d and e; make inventory of data availability for compilation and integration for ToR b; develop and set out opinion matrix for ToR c. Contribute to advisory request from OSPAR (ToR f).
Year 2	Continue review activity to address ToRs a, c, d and e; Develop structure and populate integrated database for ToR b, further develop opinion matrix ToR c
Year 3	Finalise reviews ready for submission for ToRs a, c, d and e; make integrated database publicly available (ToR b), finalise expert opinion table ToR c;

Supporting information

Priority	The activities of the EG will lead ICES into a structural and functional understanding of how the marine benthic community of marine renewable energy devices contributes to the functioning of the marine ecosystem, and how they can act as areas where benthic biodiversity can be promoted. The objectives addressed for this group are therefore considered of high relevance in the context of ecosystem-based management of coastal areas where an increasing number of marine renewable energy devices are planned, and will be of directly use in marine spatial planning initiatives. Hence, the activities can be considered to be of very high priority.
Resource requirements	No specific resource requirements beyond the need for invited members to prepare for and resource their participation in the meeting. Additional resources are required to respond the request for advice from OSPAR. A subgroup of experts from WGMRE and WGMBRED will meet in January in Copenhagen to draft a first response to the advice.
Participants	The Group is normally attended by 15–20 members and guests working with the effects of marine renewable energy developments on the marine benthic communities (i.e. algae, invertebrates, and demersal fish). Participation from current ICES member countries and also from countries where marine renewable energy developments have started recently (Spain, Portugal) to develop knowledge on these activities.
Secretariat facilities	None.
Financial	Additional resources covered by OSPAR special request.
Linkages to ACOM	There are no obvious direct linkages. However, some contributions could be made to

and groups under ACOM	under 'pressures' as part of ICES ecosystems overviews.
Linkages to other committees or groups	There is a very close working relationship with Benthos Ecology Working Group (BEWG), the Working Group on Marine Renewable Energy (WGMRE), the Working Group for Marine Planning and Coastal Zone Management (WGMPCZM) and the Working Group on Biodiversity Science (WGBIODIV).
Linkages to other organizations	OSPAR ICG-CUM

ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors (WGBOSV)

2018/MA2/HAPISG02 The ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors (WGBOSV), chaired by Lisa Drake, USA, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2019	6-8 March	Weymouth, UK		
Year 2020	2-4 March	Gdynia, Poland		
Year 2021	3-5 March	Online meeting	Final report by 1 May to SCICOM	

ToR descriptors

TOR	DESCRIPTION	BACKGROUND	SCIENCE PLAN	DURATION	EXPECTED DELIVERABLES
			CODES		
a	Conduct strategic planning (identify and develop collaborative activities, advance and standardize methods, etc.) to advance research and address knowledge gaps by reviewing national activities and responding to new requests for advice.	ICES strategic plan Goal 2: understand the relationship between the impact of human activities (e.g., shipping) and marine ecosystems to estimate pressures and impacts and develop science-based sustainable pathways.	2.1; 2.5; 4.4	3 years	Report to ICES. Respond to advice requests, as applicable.
b	Evaluate test conditions, methods for collection of ballast water, or analysis of samples to inform national and/or international procedures for type approval and compliance testing of ballast water management systems.	The Convention for the Control and Management of Ships' Ballast Water and Sediments, (2004) (BWMC) aims to minimize the transfer of harmful aquatic organisms with the ballast water from ships. It is imperative that the BWMC is implemented in a scientifically valid and standardized way globally. There are science and advisory requirements related to validated	2.7; 4.1	3 years	Input on the general applicability or otherwise of such conditions or methods to IMO or national regulators through meeting participation, correspondence group and/or technical paper or peer-reviewed manuscript.

		methods and procedures.			
c	Investigate and evaluate climate change impacts on the establishment and spread of ship-mediated nonindigenous species, particularly with respect to the Arctic.	This work will be carried out jointly with WGITMO. Contributes to SICCME and ICES high-priority action area 'Arctic research'.	2.1; 2.5; 4.4	3 years	Contribution to a peer-reviewed manuscript (with WGITMO as the lead).
d	Investigate and evaluate methods/technologies to assess risks of, to minimize extent of, and to respond to vessel biofouling to inform national and/or international policies or guidelines.	This work will be carried out jointly with WGITMO. Ships' biofouling is, with ballast water, a primary bioinvasion vector. As management of invasion vectors is the only effective way to reduce risks of new invasions, addressing biofouling issues is of high priority in bioinvasions management.	2.7; 6.1; 6.4	3 years	Strengthen ties to the IMO GloFouling partnerships through meeting participation and increased discussion of research aims; report to ICES.
e	Evaluate the development of DNA- and RNA-based molecular tools for surveillance and monitoring of ship-borne invasive species.	Considering the complexity of the taxonomic groups to which invasive species belong, the decline in taxonomic expertise, the need for robust monitoring efforts, and the need for reliable and accurate methods to assess compliance to regulations (e.g. BWMC), RNA- and DNA-based molecular tools have been proposed as complementary approaches to traditional methods. Although some challenges remain, these methods warrant close scrutiny.	1.6; 4.4	3 years	Input on the general applicability or otherwise of such methods to IMO or national regulators through meeting participation, correspondence group and/or technical paper or peer-reviewed manuscript.

Summary of the Work Plan

Year 1	Working on all ToRs, but with special focus on ToRs a, e, and d.
Year 2	Working on all ToRs, but with special focus on ToRs a, b, and c.
Year 3	Report on all ToRs.

Supporting information

Priority	The work of the Group forms the scientific basis for essential advice related to the movement of invasive aquatic organisms and pathogens via ballast water and other shipping vectors. As a joint working group, it also follows and supports related work within the IMO and IOC.
Resource requirements	The research programmes which provide the main input to this group are already underway, with resources provided by national governments and scientific funding agencies. The additional resources required to undertake activities in the framework of this group are negligible.

Participants	The Group is normally attended by some 25-35 members and guests, but has more than 65 members in total.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	The group will serve as primary respondent to incoming advice requests on various issues related to ship-mediated introductions.
Linkages to other committees or groups	There is a very close working relationship with WGITMO. Potential or occasional linkage with WGBIODIV, WGHABD, WGIMT, WGPME and WGZE.
Linkages to other organizations	International Oceanographic Commission (IOC), International Maritime Organization (IMO), North Pacific Marine Science Organization (PICES). In addition, the outcomes are relevant to other national and international organizations involved in the development of regulatory policies.

Working Group on Spatial Fisheries Data (WGSFD)

2018/MA2/HAPISG03 The **Working Group on Spatial Fisheries Data (WGSFD)**, chaired by Roi Martinez, UK, and Neil Campbell, UK, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2019	24–28 June	Lysekil, Sweden		
Year 2020	8–12 June	by corresp/ webex		physical meeting cancelled - remote work
Year 2021	7–11 June	Online meeting	Final report by 1 August to SCICOM	

ToRs descriptors

TOR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Analyse current AIS datasets available to the WG, their fitness for purpose in provision of advice, and investigate possibility of inclusion of AIS data in the annual request from ICES to its member countries to provide spatial fisheries effort data to the data centre (“the ICES VMS datacall”).	For advice processes for among others DG-ENV, it is required to analyse AIS data. To ensure a smooth transition to including AIS data in advice products, best practices and logistics need to be evaluated	3.2; 3.3; 3.5	Year 1-3	Section in WG report which can be forwarded to WKBEDPRES2 describing current best practice, data gaps and approaches to data handling
b	Evaluating need and possibility to move	Using interpolation methods, make a voluntary test datacall	3.2; 3.5	Year 1	Section of WG report detailing analysis of the change in

	towards higher spatial resolution in the ICES VMS datacalls	for a couple of countries within WGSFD on submitting data on c-squares on a 0.01 degree resolution instead of the current 0.05 degree resolution. The possibility of higher resolution fishing pressure data for merging with habitat data has been discussed during the ICES workshops WKFB1, WKBENTH, WKTRADE, and can provide input for the upcoming ICES WGFBI and WKBEDPRES2.			fishing footprint when increasing to higher spatial resolution. A consideration of risks and other issues (e.g. confidentiality, credibility) in interpolating at finer scales than present should also be provided.
c	Develop spatial effort indicators for static gears	In order to estimate the effort of the passive fishing gear, other parameters (soaking time, gear length, number of hooks etc.) are needed. During the next term, WGSFD will further evaluate whether these parameters can be estimated from VMS, fleet characteristics and observer data to produce speed filters and describe typology of various fishing events for different gear categories.	3.5; 5.4; 6.1	Year 1-3	Sections in working group reports to ICES containing: i) spatial maps of fishing activity, and ii) fishing effort maps through parameterization of soak times / gear lengths / hook number.
d	Identifying potential drivers and describing spatial conflicts of fisheries in the past and future on displacement of fishing activities over various time-scales	Fisheries territories are defined by operating conditions and fish availability. Fish resources displacement due to the climate change, management measures and other human uses (MPA, marine traffic, gravel extraction, wind farms, oil rigs, seismic survey) may result in displacements when competition occurs for a given space. Through the ICES datacalls on VMS and logbook data we now have the information available to estimate the spatial variability of fisheries over time. By this we will explore drivers of fisheries displacement and develop predictive models to infer potential fisheries reallocation in a conflicting event.	5.4; 6.1; 6.2	3 years	Peer-reviewed paper
e	Support to WKBEDPRES	To ensure compatibility with WKBEDPRES1 and WKBEDPRES2, WGSFD will	NA		WG Report section providing strategic guidance and criteria for the collection,

		provide guidance on using other data sets to assess the distribution and extent of physical disturbance to the seabed.			management, quality assurance and reporting of non-fisheries spatial data.
f	<p>WGSFD is requested to analyse and produce maps of bottom contacting fishing activity in and in the vicinity of VMEs (defined by WGDEC) and separate this into mobile bottom contacting gear and static gear in NEAFC areas, including the Josephine Seamount, using the VMS and logbook information collected by NEAFC. These maps should be made available to WGDEC to ensure they can be combined by WGDEC with new information on distribution of vulnerable habitats. WGSFD is requested to also provide a short narrative on how NEAFC could improve data available to ICES that could facilitate the subsequent analysis of fishing gears used in the NEAFC areas, to provide a more detailed analysis of bottom gears accounting for a diversity of types of gear designs, sizes, rigging and operational methods (passive and active). With the understanding that their impact on the seabed differ.</p>	<p>In analysing and producing maps of fishing activity in NEAFC areas using the VMS and logbook information collected by NEAFC, WGSFD will ensure that WGDEC have the required fishing activity layers to produce a first draft advice sheet that address the annual advice request, "NEAFC requests ICES to continue to provide all available new information on distribution of vulnerable habitats in the NEAFC Convention Area and fisheries activities in and in the vicinity of such habitats, and provide advice relevant to the Regulatory Area and the above mentioned objectives" and the special request, "Advice on vulnerable marine ecosystems in the NEAFC Regulatory Areas, not acted on". The draft NEAFC VME advice produced by WGDEC (with input from WGSFD) will be submitted for further consideration by a review group (RGVME) and advisory committee advice drafting group (ADGVME).</p>	NA	year 1 year 3	<p>Maps provided to WGDEC by 30 May 2019. Maps provided to WGDEC by 30 May 2021.</p>
g	<p>In preparation for future advice requests for electronic advice outputs at higher resolution (c-square at 0.05° x 0.05°), WGSFD</p>	<p>To ensure vessel anonymity in electronic advice outputs at a higher resolution, aggregated international effort values of any c-squares containing three vessels or less will not be</p>	3.3, 3.5	year 1	<p>Section in the WG report which can be referred to in future advice processes.</p>

	will: 1) Analyse the extent of aggregated international VMS data subject to anonymity issues (≤ 3 number of vessels) 2) Discuss different procedures to preserve anonymity (gear groupings, area grouping, international grouping, ...) 3) Approve on a method/s that optimizes the data product while preserving the anonymity.	shown (see ICES VMS data call 2019). ICES Secretariat/Data centre will filter the sensitive data in the aggregated international fishing effort (3 vessels or less) and present the group with different scenarios. The agreed upon method will contain as much information as possible (spatial or as fishing effort value) while preserving the vessel anonymity.		
h	Present best-practices on how to analyse and use VMS data from a world-wide perspective.	A decadal view on fisheries distribution and variability over time is lacking from the literature. This information has however now become available through the ICES datacalls on VMS and logbook data and therefore makes a valuable data source to investigate, describe and explain the spatio-temporal use of the European seas by the different fisheries. Analyses performed using VMS and Logbook data have been published for almost two decades. Within ICES different standardized methodology has been developed, but worldwide many scientists have undertaken similar activities. To improve the activities within ICES we review literature and describe best practices in analysing VMS and logbook data.	year 3	A peer-reviewed publication describing best practices for sharing and use of VMS data in an international context.

Summary of the Work Plan

Year 1	Continuing WGSFD work from 2016–2018 on improving methods and ensuring high quality of VMS/logbook data processing from data request formats, quality checks and processing data to be implemented by the ICES data centre. Address the ToRs-Identification of best practices for the standardization of AIS VMS data/Logbook. Quality Assessment and Harmonization of the available AIS data Evaluation of the comparative advantage of integrating AIS and VMS in the calculation of indicators.
--------	--

Year 2	Address ToRs with aim to provide methodological guidance in analysing VMS/Logbook/AIS data and showcase results of interest to a wider audience. Invite ICES states to provide AIS + VMS + Logbook aggregated data. Further evaluation of the comparative advantage of integrating AIS and VMS in the calculation of indicators.
Year 3	Address ToRs with aim to provide methodological guidance in analysing VMS/Logbook/AIS data and showcase results of interest to a wider audience. Extension of the AIS data submission to all countries. Quality Assessment of the AIS data provided.

Supporting information

Priority	<p>WGSFD work in 2013-2018 has proven that there is a demand for fine scaled spatial fisheries information. Outputs on fishing intensity from WGSFD have been requested by OSPAR and HELCOM for work on MSFD descriptor 6. Outputs can also be used for ecoregion advice as well as in descriptions of fisheries activity. WGSFD will in 2019-2021 focus on showcasing the value of the information in terms of understanding fisheries behaviour, applicability for fisheries management and advance methodology development to best analyse the spatial datasets at hand.</p> <p>ToRa: as physical disturbance from bottom-contacting fishing gear is likely to be a substantial contribution to the total extent of physical disturbance, particular attention is needed to define an appropriate method or methods for this type of disturbance. Two main sources of data are currently used to map the distribution and intensity of bottom-fishing activity: Vessel Monitoring System (VMS) data, which is coupled with fishing logbook data, and Automatic Identification System (AIS) data. VMS data have been used by ICES, FP7 Benthis project and others; AIS data have been used by JRC (JRC Blue Hub) and EMODnet. Building upon the evaluation of these data types (ICES WGSFD 2016), and considering the differences in data availability, resolution and outcomes of their processing, a comparative analysis in selected study areas is needed to assess their relative merits for MSFD purposes.</p> <p>TORa should thus compare the use of VMS and AIS data, and associated data required to determine fishing effort and type, such as fishers' logbooks, in the context of use for MSFD D6 assessments. This should include a side-by-side comparison against a number of parameters, including source of the data (who holds the raw data), availability (e.g. legal requirements, including vessels to be covered), accessibility (including any costs, restrictions such as due to data sensitivity, ease of access), use (e.g. restrictions on its release), spatial coverage in European waters, temporal coverage (historic, and within year), resolution (spatial granularity), accuracy, technical requirements for processing (to define when vessels are physically disturbing the seabed), resources needed (e.g. technical expertise, time per unit area). The comparison should include maps showing the distribution of bottom-fishing activity from the two data sources for the same time period, indicating where the distribution overlaps and where not, with an associated quantification of this (e.g. number/proportion of grid cells per subdivision for AIS only, VMS only and both) and explanations for any differences. It should be noted that other electronic monitoring systems (e.g. GPS and cell-phone based systems) are being developed in some regions, for use by smaller vessels. The work should be carried out in close collaboration with EMODnet and JRC.</p>
Resource requirements	VMS/Logbook/AIS data requested in ICES data calls
Participants	The Group is normally attended by some 20–25 members and guests.
Secretariat facilities	Assistance from ICES Data Centre in hosting VMS/logbook/AIS data as well as

	quality checking and implementation of methods developed by WGSFD. Possibly meeting facilities.
Financial	Resources for ICES Data Centre to host and process VMS/logbook/AIS data.
Linkages to ACOM and groups under ACOM	ACOM
Linkages to other committees or groups	WGDEC, DIG, WGBYC, WGECCO, WGMHM, BEWG, WGHIST , WKBEDPRES
Linkages to other organizations	OSPAR, HELCOM

Working Group on Biological Effect of Contaminants (WGBEC)

2018/MA2/HAPISG04 **The Working Group on Biological Effects of Contaminants** (WGBEC), chaired by Juan Bellas, Spain, and Steven Brooks, Norway, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	11-15 March	Vigo, Spain		
Year 2020	2–6 March	Lisbon, Portugal		Joint meeting with MCWG and WGMS
Year 2021	8–12 March	Online meeting	Final report by 1 May to SCICOM	

ToR descriptors

TOR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Review and report new developments and innovative methods to study and monitor effects of contaminants	There is a continuous development of new techniques by which to monitor effects of contaminants. The use of “old” methods needs evaluation and development. For 20 years, WGBEC has maintained a list of recommended methods for marine monitoring, ensured that there are protocols available (mainly through TIMES publications) and developed quality assurance programmes. WGBEC competence has been used to develop programmes elsewhere, e.g. the Baltic, and contributed to the development of MSFD (descriptor 8).	4.4	year 2–3	Annual report to ICES, TIMES manuscript
b	Review and synthesise environmental effects of natural and synthetic particles and evaluate their direct effects and	Particles are critical to understand the behaviour of contaminants in marine ecosystems. Some anthropogenic activity leads to increased input of particles, some	3.1; 3.2; 6.1	year 3	Annual report to ICES, scientific paper

	interacting effects on marine biota	of which are associated with chemicals, others providing surfaces for adsorption. Particles will also affect organisms per se. Anthropogenically derived particles include micro- and nanoplastics, nanoparticles, mining discharges and discharges from offshore drilling.			
c	Investigate and synthesise the direct and indirect effects of ocean contamination to human health	Contaminants/pollution is one of the human pressures on marine ecosystem health resulting in human health impacts. In addition to direct effects, chemical pollutants can decrease the resilience of marine ecosystems, affect sea food security production/ resources, and may ultimately contribute to a loss of biodiversity. Several analytical and biological effect methods suggested by the ICES community can be used to establish links with human health.	5.8; 6.1; 6.4	year 3	Scientific paper
d	Update and summarise national activities on effect-based monitoring, evaluate different approaches taken and identify gaps and future avenues	WGBEC members have contributed significantly to the development and implementation of effect-based monitoring programmes in European countries, as well as OSPAR and MSFD. Monitoring is being harmonised throughout Europe as a result of WFD and MSFD, but there are still differences in take-up and implementation. Through its membership, WGBEC is uniquely placed to maintain an overview of national programmes and discuss pros and cons for different approaches.	3.1; 3.2; 6.1	3 years	Annual report to ICES
e	Describe and evaluate interaction of contamination effects with those of climate change and acidification	Contaminant exposure is not the only stressor in marine ecosystems and it is important for WGBEC to review effects of climate change and acidification-related stressors and how their presence interact with contaminant stress.	2.1; 2.2	year 3	Scientific paper
f	Review and assess effects of contaminants of emerging concern	WGBEC originally requested MCWG to inform about substances of emerging concern since they generally would appear in chemical analyses. The definition of “emerging” has been so wide and important effects have been observed in marine organisms following exposure to e.g. pesticides, so WGBEC have included the item on the work programme.	2.1; 2.2; 4.5	year 2–3	Annual report to ICES
g	Investigate and report effects of individual contaminants on marine communities	There is an ongoing discussion as to whether community analyses can detect effects of contaminants; they are definitely not the most sensitive in this respect. Since biodiversity, i.e. community analyses, is	2.1; 2.2; 6.1	year 2–3	Scientific paper

		an important component of WFD and MSFD effect programmes, there is a clear need to develop complementary analytical methods that are specific to effects of contaminants and not influenced by other ecological factors.			
h	Review and evaluate effects of contaminants on sediment-dwelling organisms, together with critical analysis of the sensitivity of the methodologies applied	The highest concentrations of contaminants in marine ecosystems are found in sediments. The standardised toxicity tests for sediments are unfortunately not very sensitive to contaminant exposure, at least partly because the organisms that are used are those amenable to lab culture. This item was on the work programme for WGBEC 20 years ago, but there is still limited progress. New analytical techniques alongside “traditional” methods bear promise for improved methods.	2.2	year 2–3	Scientific paper
i	Contribute to ICES Ecosystem overviews according to the request	Ecosystem overviews have been advanced significantly during the past years and several ICES EGs have been very active to provide input. However, there is a room for further development through adding new components on issues where ICES has expertise, such as the biological effects of contaminants, and which are essentially relevant in marine ecosystem management and policy context.	6.5	3 years	Contribution to Ecosystem overviews according to the provided guidelines/template

Summary of the Work Plan

Year 1	Update and review national monitoring programmes.
Year 2	Review effects of contaminants, including baseline studies and risk assessment; Review effects of contaminants of emerging concern; Review the study of individual effects in community studies (scientific paper) Review effects of contaminants on sediment-dwelling organisms (scientific paper) Update ToRs a, b, c, d.
Year 3	Review effects of natural and synthetic particles (scientific paper); Review progress with concepts regarding the oceans and human health (scientific paper) Review interactions of contamination effects with those of climate change and acidification (scientific paper) Continue work on ToRs a, f, g, h

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 10–15 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	There is a working relationship with WGMS, WGEEL and WGIBAR. It is also very relevant to the Marine Chemistry Working Group (MCWG).
Linkages to other organizations	OSPAR MIME/HASEC, HELCOM, EEA

Marine Chemistry Working Group (MCWG)

2018/MA2/HAPISG05 The **Working Group on Marine Chemistry (MCWG)**, chaired by Koen Parmentier, Belgium, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	4–8 March	Evora, Portugal		Meeting in association with WG on Marine Sediments (WGMS)
Year 2020	2–6 March	Lisbon, Portugal		Joint meeting with WGMS and WGBEC
Year 2021	1–5 March; 15–19 March	Online meeting	Final report (joint with MCWG) by 15 April to SCICOM	WGMS and MCWG combine to form one Expert Group as of 2022

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Assemble and synthesise new information on chemical substances of emerging concern in ICES area and beyond, including residuals in higher trophic level marine species.	Provide new data – link to WGBEC- Eco-toxicology and analytical methods – sampling, extraction, detection, issues, Quality Assurance (QA/QC).	2.1; 4.1; 6.1	3 years	Reporting to ICES, including: - synthesizing new evidence, - identification of gaps, - emphasis on concern for monitoring, - non-target screening,

		Check of EU Water Framework Directive (WFD) watch list and identify substances because of increasing international awareness. This includes toxins from algae blooms.			especially for endocrine disruptors.
b	Develop novel monitoring strategy for compliance and screening tools.	The use of passive samplers (PS) increases, and sensors are in use e.g. in Ferrybox systems, and The EU GRACE project has generated comparison and validation data regarding in situ fluorescence detection of dissolved oil.	3.1; 3.3; 6.1	3 years	Reporting to ICES on use and development of PS (compliance monitoring in relation to Environmental Quality Standards (EQS)). Collect QA/QC and validation for in-situ sensors, (incl. oil, pH, CO ₂ and nutrients) and screening methods.
c	Report new developments in QUASIMEME (Quality Assurance of Information on Marine Environmental Monitoring), and provide information on other proficiency testing schemes with relevance to MCWG.	Availability of high quality proficiency testing is vital to produce reliable results.	3.1; 3.3	3 years	Reporting to ICES: - provide guidance for proficiency testing, - development of test materials for new compounds.
d	Review and report of availability of new data, analytical methods and QA/QC on Ocean Acidification (OA) in coastal/shelf seas and establish link with eutrophication.	OA and understanding its importance, quantification of its impact is crucial for a variety of scientific disciplines, and for ocean health. OA is a voluntary parameter in OSPAR CEMP but developments in QC supports are required.	1.2; 2.1; 3.2; 4.1, 6.1	3 years	Reporting to ICES: - technical guidance document on sampling, sample handling and storage, - preparation of in-house reference material for testing and validation.
e	Review and analyse QUASIMEME assessment of chlorophyll data, in particular, regarding comparability of data and potential implications for existing measurement guidance.	Solve problems for data comparability that exist for decades concerning chlorophyll measurements.	1.3; 2.1	Year 1	Publication in TIMES: manuscript on chlorophyll determination methods.
f	Review emerging issues, and international and	Seafood is an important dietary source of many	2.1; 5.6; 6.1; 6.3	3 years	Reporting to ICES:

	national regulations related to contaminants and biotoxins in seafood.	contaminants. Several EQS are derived from human health risks. Although this is not ideal for marine environmental monitoring, follow-up is imperative.				- reference document on food and feed regulations, - overview on biotoxins, - monitoring emerging issues with respect to contaminants in seafood.
g	Review of the evidence of of man-made structures (such as platforms, wind farms, buoys, pipelines, cables and ship wrecks) and shipping (such as exhaust gases, spills and scrubbers) on the marine environment as a source of chemical pollution.	Amount of constructions is ever increasing. Some protective compounds used are new to the marine environment. Application is directly into the marine systems and requires follow-up and identification of knowledge gaps.	2.1; 4.5; 6.1	3 years	Review manuscript	
h	Summarise and synthesise relevant information from relevant ICES expert groups on the interface with MCWG: WGMS, WGBEC, WGEEL, JWGBird, WGOH, WGPME, WGML.	MCWG is active in trying to interconnect different WGs. The intention is to have joint meetings with WGMS, there is a direct link concerning dredging activities.	2.2; 2.5; 4.1	3 years	Publication in TIMES, contributing to WGMS dredge spoil report.	
i	Review and report developments in international legislative acts (incl. Marine Strategy Framework Directive (MSFD) and WFD), in particular regarding emerging and high-priority hazardous substances and associated EQS values, conversion factors and other closely related issues.	Follow-up on this matter is key in order to guide the development process for consistent application of environmental quality criteria in monitoring programmes. Follow-up on JRC list of chemicals that are being monitored by different countries.	3.2; 6.1	3 years, on a year by year basis.	Reporting to ICES: - setting EQS or Environmental Assessment Criteria (EAC) and conversion factors, - review manuscript on emerging contaminants and risks involved.	
j	Collect regional-level information to determine Trophic Magnification Factor (TMF) and Trophic Level (TL)	The use of generic TMF and TL, as required by MSFD to calculate concentrations to compare with EQS _{biota} gives rise to unacceptable inflation of uncertainty.	2.1; 6.1; 6.3	3 years	Reporting to ICES: overview of region-specific TMF, TL for target organisms and determination of highest TL.	
k	Update and summarise on recent advances in	Eutrophication reductive measures	1.2; 1.3; 2.1; 3.3	3 years	Reporting to ICES	

	nutrient analysis technique and observed nutrients trends in the marine environment.	need to be followed; recent improves in techniques allow better QA for low values.		
1	Respond to potentially incoming advisory requests	Science or advisory requirements.	3.1; 6.1; 6.5; 6.6	3 years, on a year by year basis. Advice products, as appropriate

Summary of the Work Plan

Year 1	Complete ToR e). Respond to requests under ToRs i), l). Progress work towards completion of the remaining ToRs.
Year 2	Respond to requests under ToRs i), l). Progress work towards completion of the remaining ToRs.
Year 3	Respond to requests under ToRs i), l). Report on the remaining ToRs.

Supporting information

Priority	This group maintains an overview of key issues in relation to marine chemistry, both with regard to chemical oceanography and contaminants. MCWG provides input across the field of marine chemistry, which underpins the advice given by ICES, and also supports the work of national and international collaborative monitoring programmes, e.g. within OSPAR.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 15-20 members and guests.
Secretariat facilities	Participation using electronic means should be examined and encouraged.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	WGMS (the aim is to have joint meetings), WGBEC, WGML. OSPAR ICG-OA, from 2019 on (first meeting Jan 2019, Aberdeen, UK) replacing the OSPAR/ICES study group on Ocean Acidification (SGOA) ICES Data Centre
Linkages to other organizations	The work of this group is closely aligned with EU working groups under the Water Framework Directive (e.g. Working Group on Chemicals) and EU expert networks with regard to contaminants under the MSFD. Specific agenda points will be directly relevant for QUASIMEME. The group provides the basis for some advice to OSPAR.

Working Group on the Value of coastal Habitat for Exploited Species (WGVHES)

2018/MA2/HAPISG06

The **Working Group on the Value of coastal Habitat for Exploited Species (WGVHES)**, chaired by Olivier Le Pape, France, and David Eggleston, USA, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	24–28 June	Rome, Italy		
Year 2020	29 June – 3 July	by corresp/ webex		physical meeting cancelled - remote work
Year 2021	21–25 June	Online meeting	Final report by 1 September to SCICOM	

ToR descriptors

TOR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Review the application of the nursery habitat concept in management of exploited species and assess the need for refinement of the definition	There is a need for a quantifiable definition in science and a pragmatic definition in management	1.4; 5.2	year 1–2	Review manuscript
b	Review and report on evidence that hard bottom and biogenic habitats support commercially important species	Lack of information on the value of structured habitats; continuation of ongoing work by expanding to additional habitat types and new aspects	1.4; 5.2	1, 2, 3	Review manuscript(s) and report to ICES
c	Collate and document lessons learned on conservation of habitat for exploited species using experiences from different countries	Many countries are defining essential fish habitat and using experiences from various countries will increase efficiency and consistency of its application in management	5.2; 6.1; 6.2	1, 2, 3	Report to ICES and perspectives manuscript
d	Analyse the contribution of juvenile abundance indices in forecasting stock recruitment to better utilize available information	There is an interest to integrate juvenile abundance indices in short-term forecasts to improve advice in stock assessment.	5.2	1, 2	Manuscript

Summary of the Work Plan

Year 1	Continue the work on ToR a and begin the writing process. Finalise the review of hard-bottom habitats and continue ToR b with the inclusion of biogenic habitats and other aspects. Initiate the work on ToR c and continue the work on ToR d, following comprehensive scoping during the previous year..
Year 2	Complete the work on ToR a and continue the work on ToR b, c and d.
Year 3	Finalise the ongoing work in ToR b, c and d and identify future research priorities or management needs

Supporting information

Priority	The current activities of this EG will lead ICES into issues related to the importance of coastal habitat for fisheries management.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by 10–15 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	There are no obvious direct linkages.
Linkages to other organizations	There are no obvious direct linkages.

Working Group on Multispecies Assessment Methods (WGSAM)

2018/MA2/HAPISG08 **The Working Group on Multispecies Assessment Methods (WGSAM)**, chaired by Sarah Gaichas, USA, and Valerio Bartolino*, Sweden, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	14–18 October	Rome, Italy		
Year 2020	12–16 October	online meeting/ by corresp.		physical meeting cancelled - remote work
Year 2021	11–15 October	Scotland, UK/ USA (tbc)	Final report by 1 December to SCICOM	Change in Chair <u>Incoming co-chair</u> : Valerio Bartolino <u>Outgoing co-chair</u> : Alexander Kempf

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Review further progress and deliver key updates on multispecies modelling and ecosystem data analysis contributing to modeling throughout the ICES region	This ToR acts to increase the speed of communication of new results across the ICES area	5.1; 5.2; 6.1,	3 years	Report on further progress and key updates.
b	Update of key-runs (standardized model runs updated with recent data) of multispecies and eco-system models for different ICES regions	The key runs provide information on natural mortality for inclusion in various single species assessments	5.1; 5.2; 6.1	3 years	Report on output of multispecies models including stock biomass and numbers and natural mortalities for use by single species assessment groups and external users.
c	Establish and apply methods to assess the skill of multispecies models intended for operational advice	This work is aimed at assessing the performance of models intended for strategic or tactical management advice.	5.1; 6.1; 6.3	Establish methods 2019, apply 2020-2021	Manuscript for methods, report on success of methods for different examples.
d	Evaluate methods for generating advice by comparing and/or combining multiple models	This work is aimed at addressing structural uncertainty in advice arising from multiple models, as applied for example management questions	5.1; 6.1; 6.3	3 years	Report on methods for comparing models and for constructing model ensembles.
e	Management Strategy Evaluation (MSE) methods and applications for multispecies and ecosystem advice, including evaluating management procedures and estimating biological reference points	Adapting existing multispecies/ecosystem models for MSE (operating models, assessment models), visualizing tradeoffs and uncertainty for managers and stakeholders	5.3; 6.1; 6.3	3 years	Review of MSE modeling approaches. Review of visualization methods. Review of applications throughout the ICES area with lessons learned.

Summary of the Work Plan

Year 1	All ToRs, Key run Baltic, multiple models
Year 2	All ToRs, Key Run North Sea SMS (maybe others)
Year 3	All ToRs, Key Run US Northeast Shelf, multiple models

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the MSY Approach. The activities will provide information (e.g., natural mortality estimates, performance of indicators) and tools (e.g., multi-model ensembles, keyrun models) valuable for the implementation of an integrated advice in several North Atlantic ecosystems. Consequently, these activities are considered to have a very high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	Approx 20. Expertise in ecosystem, modelling and fish stock assessment from across the whole ICES region.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	ACOM, most assessment Expert Groups
Linkages to other committees or groups	WGMIXFISH, WGDIM, WGBIFS, IBTSWG, WGECO, WGINOSE, WGIAB, WGNARS, WGIPEM.
Linkages to other organizations	None

Working Group on Cumulative Effects Assessment Approaches in Management (WGCEAM)

2018/MA2/HAPISG09 The **Working Group on Cumulative Effects Assessment Approaches in Management (WGCEAM)**, chaired by Vanessa Stelzenmüller, Germany, Roland Cormier, Germany, and Gerjan Piet, the Netherlands, will be established and will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	28 October – 1 November	ICES HQ, Copenhagen, Denmark		
Year 2020	21–25 September	by corresp/ webex		physical meeting cancelled - remote work
Year 2021	27 September – 1 October	ICES HQ, Copenhagen, Denmark (tbc)	Final report by 15 November to SCICOM	

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Develop a cumulative effects assessment (CEA)	While the need for CEAs is widely accepted, their actual	6.1, 6.2, 6.6,	Year 1	CEA framework suited to guide

	framework suited to guide science advice on the development and implementation of ecosystem-based management	implementation in marine planning and management processes is yet to be seen. A common framework requires a review of the differences in the factors (data, knowledge, decision-process) being considered regarding cumulative effects assessment (CEA) in relation to environmental policies, an ecosystem approach to marine spatial planning (MSP) and regulatory processes. The framework should clearly outline: a) Science Requirements b) Advisory Requirements c) Requirements from other EGs			science advice on the development and implementation of ecosystem-based management.
b	Demonstrate the application of the CEA framework in one or more regional case studies	To advance the development of a generic CEA methodology and identify real research gaps one or more case studies will be used as a proof of concept. The initial focus should be on the North Sea and a Canadian bioregion where the CEA is conducted with the available knowledge base..	6.1,6.2	Years 2	Scientific paper describing the application of the CEA framework in one or more regional case studies.
c	Produce generic guidance on data and knowledge needs for CEA's including: using qualitative and quantitative data, accommodating uncertainty, identifying information gaps based on the application of the framework in the above case studies	The application of the framework in case studies allows to i) indicate useful tool(s) for each step, ii) show the indicative datasets and types of data required in carrying out a CEA, iii) develop straight forward visualization tools for pressures, and iv) demonstrate end products and engage with potential clients. The latter point is essential to scope the potential usefulness of CEAs as part of ecosystem advice provided by ICES	6.1, 6.2,	Year 3	Generic guidance on data and knowledge needs for CEA's.
d	Liaise with other fora or expert groups both within ICES (i.e. Secretariat, Data Centre or expert groups) as well as outside ICES (e.g. OSPAR, EEA, HELCOM,	The consolidation of a common CEA framework requires a continuous collaboration and exchange of expertise with other groups and fora working on CEAs	6.2, 6.4, 6.5	Year1-Year 3 (ongoing)	Consolidated common CEA framework.

JPI Oceans, CEAF, DFO, TC, ECCC) to work towards and consolidate a common CEA framework

Summary of the Work Plan

Year 1	During the first year the linkages to other groups working on CEAs have to be identified and established. The main goal is the development of a common and consolidated CEA framework allowing to implement CEA in different settings regarding data, knowledge, and decision-processes.
Year 2	In the second year the work will focus on the application of the CEA framework in case study areas. The North Sea and a Canadian bioregion will be the first case studies since data availability and relevant scientific knowledge is most advanced.
Year 3	Emphasis will be on the provision of guidance on data and knowledge needs when applying the common framework. This guidance will lead into a final recommendation on the usefulness of CEAs as part of ecosystem advice provided by ICES.

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of all marine human activities including fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 20–25 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	There is a very close working relationship with all the groups under HAPISG. It is also very relevant to WGINOSE.
Linkages to other organizations	There are strong linkages to the OSPAR and HELCOM work on CEAs.

Working Group on Shipping Impacts in the Marine Environment (WGSHIP)

2018/MA2/HAPISG11 **A Working Group on Shipping Impacts in the Marine Environment (WGSHIP)**, chaired by Cathryn Murray, Canada, and Ida-Maja Hassellöv, Sweden, will be established and will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2019	25-27 November	ICES HQ, Copenhagen, Denmark		
Year 2020	27–29 May 3–4 Nov	by corresp/ webex		- Incoming co-chair: Ida-Maja Hassellöv, Sweden. - 2020 physical meeting cancelled - remote work
Year 2021	25–26 May 2–4 November	Online meeting	Final report by 15 December to SCICOM	

ToR descriptors

TO R	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Conduct strategic planning through review of national research on shipping interactions with the environment and report on priorities, knowledge gaps and opportunities for further collaboration.	ICES strategic plan Goal 2: understand the relationship between the impact of human activities (e.g., shipping) and marine ecosystems to estimate pressures and impacts and develop science-based sustainable pathways.	2.1; 2.5;	2 years	Report to ICES. Respond to advice requests, as applicable.
b	Review the intensity, geographical scope, and trends in current and future global shipping activity, including those in the Arctic and in/near marine protected areas.	The distribution and intensity of commercial shipping is increasing and there is a growing need to assess and mitigate the impacts of vessel activities on the marine environment, especially in areas of enhanced protection. The Arctic is one such area but there are a number of other productive sea areas where the shipping intensity has increased to an extent where impacts on the environment are becoming obvious.	2.1; 2.4; 2.7	2 years	Technical paper or peer-reviewed manuscript.
c	Review and evaluate methods to assess the effect of shipping on the marine environment,	Cumulative effects assessment is needed to address the sheer volume and frequency of vessel movements, the interaction and	2.1; 2.2; 6.1	3 years	Input on the general applicability or otherwise of such methods to IMO or national

	including cumulative effects..	summation of multiple impact pathways, and effects which overlap spatially and manifest through time.			regulators through meeting participation, correspondence group and/or technical paper or peer-reviewed manuscript.
d	Review and identify possible mitigation strategies for decreasing noise (from shipping) in general and specifically in sensitive areas.	The impact of noise has been the topic of discussion at the Environment Committee (IMO) for years. In parallel quite a lot of research has been carried out and it is time to summarize the knowledge and recommend action and further research.	2.1; 2.7; 6.1		Input on the general applicability or otherwise of such strategies to IMO or national regulators through meeting participation, correspondence group and/or technical paper or peer-reviewed manuscript.
e	Review and identify methods for holistic management of shipping impacts, considering possible trade-offs across impact types.	Vessel activities can have transboundary impacts and successful mitigation efforts require coordination and collaboration between trade partners. Methods for holistic management are urgently needed to balance the benefits of industry with environmental impacts.	6.1; 6.2	3 years	ICES Viewpoint

Summary of the Work Plan

Year 1	Working on all ToRs, but with special focus on ToRs a, b
Year 2	Working on all ToRs, but with special focus on ToRs c, d, e
Year 3	Report on all ToRs

Supporting information

Priority	The work of the Group forms the scientific basis for advancing knowledge related to the impacts of shipping on the environment. It is anticipated that advisory requests could soon be received concerning shipping impacts, thus it is high priority to establish a Group to address any new requests.
----------	---

Resource requirements	The research programmes which provide the main input to this group are already underway, with resources provided by national governments and scientific funding agencies. The additional resources required to undertake activities in the framework of this group are negligible.
Participants	The Group has had expressions of interest from more than 30 members.
Secretariat facilities	Standard secretarial support.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	Development of ICES Viewpoint in collaboration with ACOM
Linkages to other committees or groups	Potential linkages with WGBOSV, WGITMO, WGSFD, WGMHM, WGMPCZM, IEASG
Linkages to other organizations	Potential linkages with Arctic Council, the Baltic Marine Environment Protection Commission (HELCOM), European Maritime Safety, Agency (EMSA), International Maritime Organization (IMO), National Oceanic and Atmospheric Administration (NOAA), North Pacific Marine Science Organization (PICES), OSPAR Commission and UNEP Oceans and Seas Program. In addition, the outcomes are relevant to other national and international organizations involved in the development of regulatory policies.

Resolutions approved in 2017

Working Group on Marine Sediment (WGMS)

2017/MA2/HAPISG01 The Working Group on Marine Sediments with respect to pollution (WGMS), chaired by Claire Mason, UK, and Maria Belzunce, Spain, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2018	5–9 March	San Pedro del Pinatar, Murcia, Spain	Interim report by 1 June	
Year 2019	4–8 March	Évora, Portugal		Change in Chairs Outgoing: Craig Robinson, UK Incoming: Claire Mason, UK
Year 2020	2–6 March	Lisbon, Portugal	Final report by 15 April (suspended following decision to combine with MCWG)	Joint meeting with MCWG and WGBEC
Year 2021	1–5 March; 15–19 March	Online meeting	Final report (joint with MCWG) by 15 April to SCICOM	WGMS and MCWG combine to form one Expert Group as of 2022

ToR descriptors

ToR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
A	Respond to potential requests for advice as required.		2.1; 2.2	3 years	Advice
B	Dredging activities	A major source of contaminants in marine sediments, the substances considered, their thresholds and management approaches are different in each country.	2.1; 6.1	3 years	Review document & recommendation, if required
	1) Review the regulated substances and thresholds used in management of dredging activities				Review document & recommendation, if required
	2) Review and recommend monitoring approaches to disposal sites		2.1; 3.1; 6.4	3 years	Review document & recommendation, if required
C	Sediment Quality Guidelines Review recent publications that may contain data to refine existing sediment assessment criteria	More data may be available to refine existing BACs / EACs; there are no existing criteria for some priority substances (e.g. PBDEs) for use in MSFD / OSPAR status assessments.	2.1; 3.2; 6.1	3 years	Annual updates and final report.

D	Plastic litter: To assess the relevance and the potential risk impact of (micro-) plastics in sediments and follow up of outcomes of other expert groups	(Micro-)plastics are included in MSFD Descriptor 10, are of emerging concern and can be a vector for contaminant transfer to sediments, or from sediments to biota	2.1; 2.2; 2.5	3 years	Annual updates and final report.
E	Emerging issues 1. To review and inform on the occurrence of substances of emerging concern in sediments, including platinum group and rare earth elements, as well as organic contaminants 2. To consider other forms of pollution, e.g. microbiological	Sediments are a sink for many of these pollutants, but may also be a source.	2.1; 4.5 2.1; 2.2	3 years	Annual updates and final report.
F	Impact of renewable energy devices To explore the potential risk impact in terms of inputs (corrosion, anti-corrosion agents...) and release of contaminants due to sediment scouring	Changes in hydrodynamics may release sediment-bound contaminants; there may be inputs of contaminants during installation, operation and decommissioning. This is under active research by a member of the group.	2.1; 2.2; 2.7	3 years	Report (with recommendations, as appropriate)
G	Passive sampling 1) To publish guidelines on passive sampling of sediments 2) To publish a review on passive sampling techniques 3) Review and update on developments 4) continue to develop a database to provide information of use in developing assessment criteria for passive sampling techniques	Documents are in advanced drafts and will be completed A review document is at an advanced stage of drafting and will be completed Passive sampling is an advancing area of research that could improve on existing monitoring techniques	2.3; 3.3; 4.4; 6.1 2.3; 3.3; 4.4; 6.1 2.3; 3.3; 4.4; 6.1	1 year 1 year 3 years	Two ICES TIMES papers Cooperative Research Report Annual updates and final report.
H	Coordinate with MCWG members to form one group (merge WGMS and MCWG	WGMS and MCWG to combine into one expert group and produce a joint		1 year	Resolution proposing new Expert Group with

into new Expert Group)

final report in 2021.
Members to decide name,
and future ToRs for next
term 2022-2024.

associated ToRs for
next 3 years.

Summary of the Work Plan

Year 1	Completion of the different draft documents on Passive Sampling (PS) and submission as two ICES TIMES papers (Guidelines on PS in sediments) and one Cooperative Research Report on the techniques for passive sampling of marine sediments. Progress work towards completion of the remaining ToRs.
Year 2	Progress work towards completion of the remaining ToRs.
Year 3	Final Report (suspended as now combining with MCWG). Continued work towards completion of all the ToRs.
Year 4	Final Report jointly with MCWG.

Supporting information

Priority	This Group handles key issues regarding monitoring and assessment of contaminants in sediments. The current activities of this Group will lead ICES into issues related to the understanding of the relationship between human activities and marine ecosystems (estimation of pressure and impact, ...). Consequently, these activities are considered to have a high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 10-15 members and guests.
Secretariat facilities	The normal secretarial support to an ICES Expert Group is required.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	There are close working relationships with Marine Chemistry Working Group (MCWG) and Working Group on Biological Effects of Contaminants (WGBEC); some members of WGMS are also members of these. The work of WGMS is also relevant to the Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT) and to the OSPAR Intersessional Correspondence Group on Marine Litter (ICG ML).
Linkages to other organizations	OSPAR, HELCOM, MEDPOL, EU/JRC Expert Network on Contaminants.

EGs DISSOLVED in 2020

	Working Group on Methods for Estimating Discard Survival (WGMEDS)	
	Workshop on Global Ocean Social Sciences (WKGLOSS)	
	Workshop on fisheries Emergency Measures to minimize BYCatch of short-beaked common dolphins in the Bay of Biscay and harbor porpoise in the Baltic Sea (WKEMBYC)	
	Workshop on Fish of Conservation and Bycatch Relevance (WKCOFIBYC)	