

ICES WGMPCZM REPORT 2016

SCICOM STEERING GROUP ON ECOSYSTEM PRESSURES AND IMPACTS

ICES CM 2016/SSGEPI:05

REF. SCICOM

Report of the Working Group for Marine Planning and Coastal Zone Management (WGMPCZM)

14–18 March 2016

ICES Headquarters, Copenhagen, Denmark



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Recommended format for purposes of citation:

ICES. 2016. Report of the Working Group for Marine Planning and Coastal Zone Management (WGMP CZM), 14–18 March 2016, ICES Headquarters, Copenhagen, Denmark. ICES CM 2016/SSGEPI:05. 46 pp. <https://doi.org/10.17895/ices.pub.8537>

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Executive summary

The Working Group for Marine Planning and Coastal Zone Management (WGMPCZM) met on 7–11 April 2014 in Barcelona, Spain, on 16–20 March 2015 in Geesthacht, Germany, and on 14–18 March 2016 in Copenhagen, Denmark.

The annual reviews on current MSP activities in ICES Member States demonstrated the role of the EU MSP Directive as the major driver for action on MSP. However, there is a large diversity in the progress, ranging from recently establishing competent authorities and in the final legislative stages (e.g. Denmark) to operational procedures and existing plans (e.g. Germany and Netherlands) or already revising and updating original MSP plans (e.g. Scotland). The diverse ways of implementation in those countries which already started the MSP process gave rise to much debate on topics such as the role of science in MSP, science-policy interactions, interaction of science with the rest of society and the levels of information and knowledge that could be implanted in MSP or the MSP process. These discussions formed the foundation for formulating a similar ToR for the next 3 years.

A major outcome of WGMPCZM is ICES Cooperative Research Report No. 327, outlining a Marine Spatial Planning Quality Management System. This report is expected to contribute to development of MSP, in particular in those countries where it not yet exists, but also provides a structured framework for the design and evaluation of MSP processes (the way towards the plan) as well as MSP outputs (the plan and its content). The quality management system is framed along WGMPCZM work on risk management processes and earlier work of WGMPCZM on risk management in 2010 and 2013.

Risk management processes and tools were developed by WGMPCZM (ICES 2015 CRR 327) after the Workshop on the topic (WKRASM) held in 2014. During the workshop on WKPASM, the use of the Bow-tie analysis was further explored and an ICES Cooperative Research Report on Bow-tie analysis of EU Directives in relation to Maritime Spatial Planning is now in press. A meta-model was produced from this Workshop. Further development includes planning of new workshops within the next three years' ToRs specifically to explore linking Bayesian Belief Networks as a mathematical modelling technique with the conceptual Bow-tie analyses using the results from two case studies to refine the meta-model.

A Workshop on Conflicts and Coexistence in Marine Spatial Planning (WKCCMSP) was held in 2016 following on a workshop on cultural ecosystem services and inclusion of cultural components into Maritime Spatial Planning (WKCES 2014). A typology of conflicts in MSP and the MSP process was developed in WKCCMSP together with related information needs and conflict resolution tools and the results are intended for publication in an ICES Cooperative Research Report in 2017. Similarly WKCES developed criteria and a conceptual approach, which allows socio-cultural information to be transferred into culturally significant areas and thereby translating them into a format comparable to other spatial data such as biologically significant areas. This format may allow socio-cultural data to be included into decision making within MSP, which is up to now rarely the case.

1 Administrative details

Working Group name

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

Year of Appointment within the current cycle

2014

Reporting year within the current cycle (1, 2 or 3)

3

Chair(s)

Andreas Kannen, Germany

Meeting venues and dates

7–11 April 2014, Barcelona, Spain, 21 participants

16–20 March 2015, Geesthacht, Germany, 22 participants

14–18 March 2016, Copenhagen, Denmark, 14 participants (2 via WebEx)

2 Terms of Reference a) – z)

- a) Update on activities in MSP, ICZM and EBM in ICES MS with particular attention to regional specifics, land-sea interactions and evaluation of MSP/ICZM/EBM processes and outcomes;
- b) Report on approaches and methods to develop and incorporate thresholds of acceptable environmental (social and ecological) change due to regional and transboundary activities in the context of MSP processes including support for and review of follow-up activities from Workshop on Risk Assessment for Spatial management (WKRASM);
- c) Develop a typology of conflicts in MSP, ICZM and EBM, identify information needs to analyse selected types of conflict and instruments to address these. This includes review and support of follow-up activities from Workshop on Cultural Ecosystem Services (WKCES);
- d) Support ICES in developing a role in providing training in Marine Spatial Planning;
- e) Work with the ICES data centre to develop a strategy to source and present key datasets in support of MSP/ICZM activities.

3 Summary of Work plan

Year 1	<ul style="list-style-type: none"> - Hold WKRASM (ToR b) - Prepare report on a typology of conflicts (ToR c) - Develop a proposal for an ICES MSP Training course and hold a training course
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	(ToR d) - Prepare review of requirements of marine planners and marine managers for spatial data and information (ToR e)
Year 2	- Prepare CRR on WKRAS (ToR b), - Hold WKPAS (ToR b) - Prepare report(s) on the role of cultural ecosystem services in MSP in relation to the MSP cycle, spatial data needs and the quality assurance system (ToR c), - Hold WKCCMSP (ToR c) - discuss literature review and theoretical concepts for conflict typology and prepare review of information needs and tools along conflict typology (ToR c) - Prepare a review of the ICES MSP training course and further updates of the MSP challenge game (ToR d) - review spatial data requirements and gaps, matched to marine planning objectives / targets and identify similarities in needs across plans (ToR e)
Year 3	- Prepare a review paper based on information gathered at annual meetings (ToR a) - Prepare CRR on WKRAS and WKPAS and include results from further applications of the bow-tie approach (ToR b) - Prepare summarizing review paper for ToR b - Prepare scientific papers for ToR c - Prepare a review report of applications of the the MSP Challenge game(s) (ToR d) - Produce a publication on spatial data requirements and gaps, matched to marine planning objectives / targets and identify similarities in needs across plans (ToR e)

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

Overview of the history of WGMPCZM (2003–2016)

Starting in 2003 with the ICES study group on Information Needs for Coastal Zone Management, it was recommended that decision support systems, as applied in decision making for the establishment of aquaculture farms, be applied more generally for the coastal zone. In 2004, the study group recommended that a working on coastal zone management be formed as means of keeping abreast of scientific development in the coastal zone in addition to requirements for sustainable use and management of the coastal zone. Although progress was made in terms of information and management tools for integrated coastal zone management (ICZM), the newly formed Working Group on Integrated Coastal Zone Management (WGICZM) recognized the need a framework to integrate evaluate of human impacts in the coastal zone in light of the EU Water Framework Directive. Working within the terms of references of the working group, the need for such framework carried through from that point onward with the addition of risk characterization as work was progressing on the development of indicators. In 2009, WGICZM started to examine risk based decision making processes within the context of advancing integrated evaluation of human impacts with governance and structured decision-making within an ecosystem service context. With advent of marine planning, the renamed Working Group on Marine Planning and Coastal Zone Management (WGMP-CZM) adapted the ecosystem approach to management (Rice *et al.*, 2005) to risk and quality management processes based on standards of the International Organization for Standardization (Cormier *et al.*, 2013; Cormier *et al.*, 2015). Given the broader policy needs of marine planning, WGMPCZM broadened their focus towards social-cultural dimensions of ecosystem services and marine policy analysis. With the need to incorpo-

rate thresholds of acceptable environmental change, tool that can link legislation and policy to multidisciplinary social and ecological assessments were examined.

Specific achievements 2014–2016

1) ICES Cooperative Research Reports

Gee, K, Kannen, A. *et al.* 2017. Cultural ecosystem services. ICES Cooperative Research Report (In progress)

Cormier, R., *et al.* 2016. The use of ISO 31010 Bow-tie analysis of science-policy in marine spatial planning. ICES Cooperative Research Report (In progress).

Cormier, R., A. Kannen, M. Elliott, and P. Hall. 2015. Marine Spatial Planning Quality Management System. ICES Cooperative Research Report No. 327. 106 pp.

Cormier, R., A. Kannen, M. Austin and T. Theriault. 2015. The use of science in Marine Spatial Planning decision-making processes. ICES Cooperative Research Report (In press).

2) ICES Workshops

ICES. 2016. A Workshop on Conflicts and Coexistence in Marine Spatial Planning (WKCCMSP). 8–12 February 2016, Geesthacht, Germany.

ICES. 2015. Workshop on Probabilistic Assessments for Spatial Management (WKPASM), 9–13 March 2015, Hamburg, Germany. ICES CM 2015/SSGEPI:16. 32 pp.

ICES. 2014. Joint Rijkswaterstaat/DFO/ICES Workshop: Risk Assessment for Spatial Management (WKRASM), 24–28 February 2014, Amsterdam, the Netherlands. ICES CM 2014/SSGHIE:01. 35 pp.

3) ICES Working Group Reports

ICES. 2015. Second Interim Report of the Working Group on Marine Planning and Coastal Zone Management (WGMPCZM), 16–20 March 2015, Geesthacht, Germany.

ICES. 2014. First Interim Report of the Working Group on Marine Planning and Coastal Zone Management (WGMPCZM), 7–11 April 2014, Barcelona, Spain. ICES CM 2014/SSGHIE:06. 44 pp.

Further manuscripts are under preparation, some needing further advance by work in the next annual cycle and/or additional information from research contributions currently under work by members of the WG.

5 Final report on ToRs, workplan and Science Implementation Plan

ToR a: Update on activities in MSP, ICZM and EBM in ICES member states with particular attention to regional specifics, land–sea interactions and evaluation of MSP/ICZM/EBM processes and outcomes.

The next sections show the learning curve and scope identified for further analysis in the years 2017–2019: Following an overview of the learning curve, WGMPCZM addresses briefly the role(s) of science in MSP (which became part of ToR a discussions regularly and in particular between WG members representing scientific institutes and those representing government agencies), defines criteria and a template for country based reports to be used for comparative analysis of progress in MSP and provides an overview table on MSP progress in some member countries.

Introduction – Summary of the learning curve

Over the past three years the working group on MSP and CZM has shared updates on Maritime Spatial Planning and coastal management processes in ICES Member Countries - either directly from its participants or what they have been bringing in due to their involvement in other working parties, such as the EU expert group on MSP.

In all the annual meetings, the information shared has resulted in broad discussions and a second loop learning on the science-policy relations and science-policy interfaces (and vice versa) amongst the group members. It has enabled the WGMSPCZM to take up the most prominent of topics and to adequately target the discussions and related workshops to the needs in both the scientific as well as the policy communities. MSP including land-sea interactions (and vice versa) which has come the new frame to work under, is still a relatively young domain, certainly taken from a sea basin ecosystem approach and cross border and multi stakeholder perspective.

From the discussions (which went way further than the ToR specified) certain lessons can be learned. One of the lessons is that there is a wide range of sorts and types of Maritime and Marine Spatial Planning processes, with different scopes, objectives, time-lines. Strategic and long term; more tactical and with shorter term horizons or even just around a specific management objective like the management of a Natura2000 site or SPA.

Given the fact that there is by now a common understanding that Integrated Maritime and Marine Policy and its objectives drive MSP and that the core of MSP is the process (politically guided and stakeholder driven), whereas the result is a policy and action plan, with (spatial) measures and scientifically underpinned of environment and socio-economics, it's worthwhile to distinguish and flesh out what is or could be the science-policy interactions in the various MSP processes in the coming years and where science kicks into these MSP processes.

Social, economic and managerial scientific approaches are just as important to MSP as is the world of natural and ecological science. Scientific approaches to the care for ecosystems from the natural science community have a different discourse than managerial approaches and stakeholder management techniques which is being used by policy makers. The WGMSPCZM has worked on bringing these conceptual models closer together, e.g. with the bow-tie analyses, and with a new idea on the DPSIR model.

A vision, dream and a narrative about ecosystem based maritime and marine policy (and subsequently MSP/land-sea interaction processes) seem to be helpful for both the science and the policy community. It allows for a shared goal and objective, enabling professionals from both worlds to work closer and more effectively together, whilst also providing for a possibility to involve business, NGO's and the community at large more easily. This hypothesis needs further exploration and testing in the coming period.

Apart from the wide range of techniques and potential managerial approaches to the MSP policy processes which will be applied throughout the ICES member states, the WGMSPCZM has been able to identify topics which are relevant to all involved. Most prominent is the ecosystem understanding in relation to human activities. This is recommended as an important/vital topic to keep high on the agenda.

Talking about the progress in Member States, the commonalities and the differences is one. Being able to do so in various places and institutes has proven to be of extra benefit.

The exchanges in the group have often led to new contacts in the institutes the meetings took place. On the foodweb the connection with Ecopath in Barcelona, in Copenhagen with the ICES data and information centre and the secretariat and in Geesthacht with the Helmholtz centre management itself to bring in the importance of the work undertaken and that the topic is here to stay.

Connections and dialogue is the way to bring all relevant parties to the table and let them work on a mutual understanding, to work out the way in which to manage the science policy interface and the behaviour needed from those involved in the interaction. The Role of science in MSP and the model for interaction presented in the next paragraphs illustrate the multi disciplinary thinking of the working group. As a working group we are convinced that bringing together policy officers from more than the usual suspects and from a wider range of scientist affiliated with the marine and coastal environment is the best way forward.

The roles of Science in MSP

There are three components to recognize for the roles of science:

- 1) Scientific input to MSP
- 2) The interaction processes in MSP, in particular between science and other parts of society including decision makers
- 3) Interactive knowledge processing

1) Scientific Input to MSP

Science in the context of MSP (Figure 1) should:

- Provide input of basic data and assembled knowledge of various kinds to MSP processes, including evaluation and developing criteria based also on given objectives from different policy arenas (see also Figure 2).
- Identify and develop tools and methods for data collection, analysis and knowledge synthesis for different phases of the planning process (including evaluation).
- Identify knowledge and methodological gaps, identify relevant trends in society/environment/management, provide new perspectives at the front of research.
- Translate the relevant knowledge produced within academia into a form that is usable for policy makers (planners, politicians, experts) and society at large (participants in MSP), provide feedback on quality of knowledge base, planning process and documents, outcomes to planners and society.
- To do: The WG could use the framework for structuring its reporting and reflections on future ToRs. This FW is also part of our own learning within the group. We intend to flesh out some of these points with examples from different countries for the report.

1. Knowledge Input & Integration (KI) <ul style="list-style-type: none"> - Basic data - Assimilated knowledge - Systems understanding - Problems & Solutions - Evaluation (incl. criteria) 	2. Methods & Tools for KI & MSP <ul style="list-style-type: none"> - Knowledge collection - Knowledge assimilation - Process management - Plan design - Monitoring & evaluation
3. Identify Gaps & Trends <ul style="list-style-type: none"> - Gaps in 1 & 2 - Future developments - New perspectives 	
4. Communication <ul style="list-style-type: none"> - “Translate” 1 & 2 & 3 - Reformulation of Qs - Mirror & feedback to policy & society 	

Figure 1. The roles of Science in MSP.

2) Interaction Processes for MSP

Science needs to interact with the rest of society, business and decision makers in formulating and reformulating questions and discussing the answers (including story-telling to make sense). Noting that not all questions can be answered by science, it is highly important to ask the right questions and then define the science (or other information/knowledge sources) needed. The interaction process is illustrated in figure 2:

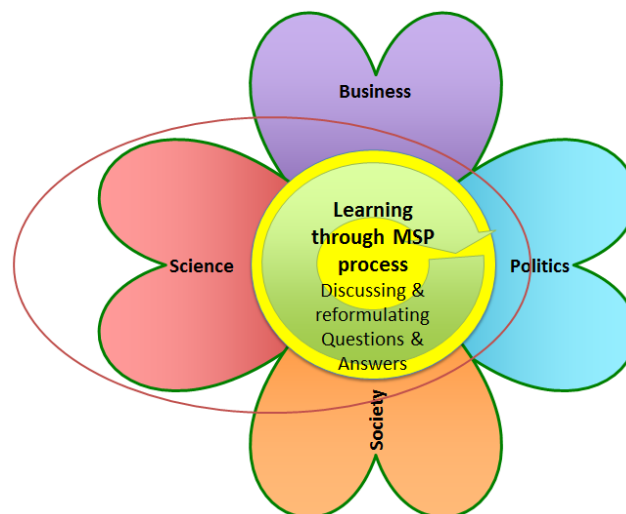


Figure 2. The Interaction between Science and the rest of Society.

The four leaves of the clover/flower are slightly overlapping – individual actors are part of different groups.

- The centre making the clover a flower is the interaction and learning through the MSP process.
- The science clover/petal: Science (scientists) as an actor(s) need(s) to become more aware of its own bias and roles in relation to the rest of society. The science community consists of many different disciplines and actors at various levels of assimilation (institutions, groups, individuals) and the knowledge production process is influenced by a number of external factors (economic and political situation, research funding, institutional system, highly competitive framing of funding, career possibilities etc.). Some scientists are close to the interactive center and easily develop communication across the clover, whereas others are rather at the periphery and need help to catch and translate relevant knowledge for MSP. The same applies to actors at the periphery of other clovers.

3) Interactive Knowledge Processing

Scientists can be one important part in the MSP-process through both data collection and assembling but also through interaction with others to facilitate and contribute to a larger scale learning process through MSP towards a “wise use of the sea”. Analytically, there are a number of steps from the raw data on environment, society and management collected, assembled asking relevant questions, translated into information relevant for MSP and finally contributing to a spatial plan (Figure 3).

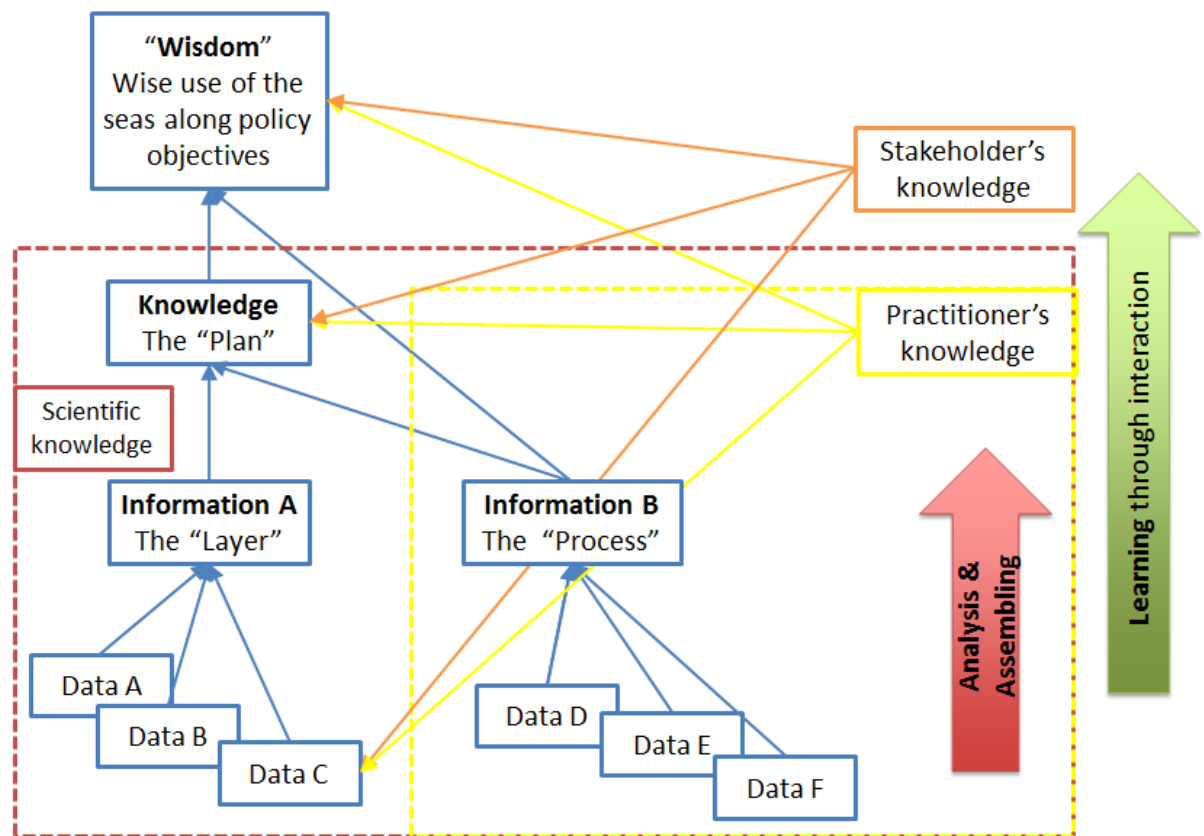


Figure 3. Levels of Knowing, Learning, Interaction for MSP.

Criteria for comparative analysis of MSP progress in different countries/regions

WGMPCZM developed a set of criteria and a template to be used for future review of MSP progress in different countries (Table 1).

Table 1. Template for reviewing MSP progress in different areas.

Criteria	Description
Stage	Is the plan underway? Has the plan been approved by the relevant authority? Has the plan been implemented, amended or revised? When did the process start?
Legal status of the plan	Is the plan statutory or non-statutory (advisory)? What has been the basis for authority e.g. national legislation?
Planning period	What is the period that the plan refers to?
Revision circle	How often is the plan going to be revised?
Responsible bodies	Which organisation is responsible for the development and implementation of the marine plan?

Level of participation	What is the purpose of stakeholder engagement? What is the frequency of Stakeholder engagement? Who was involved at which stage? Any links to stakeholder engagement strategies?
Scale	National/ regional/ local?
Main driver	What has been the major driver for MSP? E.g. legislation; New and emerging uses of the marine area; ir conflicts between marine users etc.
Explicit land-sea interactions	Are there explicit references to land-sea interactions? Has there been any coordination with local authorities?
Information sources	Is there a data portal linking all available data sources?
Reference to Climate Change	Is there any explicit reference to Climate Change? How strong is this e.g. no reference, single-line reference, policies adapted to climate change scenarios
Reference to the Ecosystem Approach	Is there any explicit reference to the Ecosystem Approach?
Major goals identified	Are the goals of the plan (Aims & Objectives) include Economic, e.g. income from sectors etc., Social, e.g. employment, thriving coastal communities etc., environmental, and governance goals e.g. stimulating partnerships?
Weblink to plan	Link to the plan's website for additional information

Criteria table for Denmark

Criteria	Description
Stage	The EU Directive is in the process of being transposed into Danish law. This process will be completed by July 2016. MSP development has not yet begun, but the Danish Maritime Authority (under the Ministry of Business and Growth) has in March 2016 advertised a project leader position to initiate the development of MSP in Denmark.
Legal status of the plan	The basis will be a Danish law transposing the requirements of the EU Directive.
Planning period	The text underpinning the proposed legislation states that MSP will begin in 2021. No reference is made so far to particular plan periods.
Revision circle	At least every 10 years. The proposed law and its supporting texts states that this leaves room for revision at earlier stages. The texts also state that the ministry can (minor) revise parts of the plan adaptively at any time, to accommodate unexpected developments.
Responsible bodies	The Danish Maritime Authority under the Ministry for Business and Growth will develop and implement the plan with the inclusion of other sectoral authorities.
Level of participation	The law proposal and supporting texts highlights the need for stakeholder participation but does not describe any methods or approaches. This will be determined by the project leader in future. The law does mention the sectors that will be the focus of the Danish spatial plan: energy sector, transport, fisheries/aquaculture, marine aggregate extraction, nature conservation incl resilience to climate change. The plan mentions that MSP will also take account of other sectors such as tourism, recreational activities etc.
Scale	The proposed law is National but it mentions a focus on transboundary cooperation.
Main driver	The main driver for MSP has been the required transposition of the EU MSP Directive. It is unlikely that MSP had been initiated in Denmark in near future if this requirement did not exist.
Explicit land-sea interactions	The proposed law mentions that interactions between land and sea must be accounted for in a Danish spatial plan.
Information sources	There is no data portal specifically in place yet. The Geodata Authority under the Ministry of Energy, Utilities and Climate will be responsible for data repositories etc. The plan will likely be developed using existing data.
Reference to Climate Change	Reference to climate change in the proposed law text is in connection with nature conservation, i.e. ensuring resilience of ecosystems in relation to consequences of climate change.

Reference to the Ecosystem Approach	Yes. The proposed law addresses the Ecosystem Approach directly, stating that the plan must be based on an ecosystem approach. The supplementary text to the law states that (own translation): “the term ecosystem approach is not defined in the MSP directive. It does however refer to the preamble of MSFD and here it is defined as managing human activities in a way in which the cumulative pressure of all activities must be kept at a level that allows achievement of good environmental status and that marine ecosystems’ resilience towards anthropogenic changes is not endangered, while sustainable use of goods and services is made possible. The term is also used in e.g. the EU Common Fisheries Policy”
Major goals identified	The overall goal of the plan (no specific objectives yet) is to promote sustainable economic growth, development of sea areas and exploitation of marine resources, take account of interactions between land and sea, strengthen transboundary cooperation in line with UNCLOS and others. Although there is clear reference to the ecosystem approach incl MSFD, the law proposal is clearly focused on Blue Growth. This is also underscored by the responsible ministry. In earlier phases, the responsibility for MSP development was rooted in the Ministry of the Environment, but this was changed after a new liberal and highly business/growth-oriented government was put in place.
Web-link to plan	No website yet because plan has not been initiated.

Table 2. MSP overview table.

	Netherlands				Sweden				Germany		UK					
Criteria	Netherlands - Offshore wind	Netherlands - Statutory MSP	Netherlands - North Sea 2050 Spatial Development and strategy policy as part of the National Water Plan	Canada	Sweden - EEZ	Sweden - Ter	Spain	Denmark	Germany - EEZ	Germany - MV	UK - England	UK - Wales	UK - N. Ireland	UK - Scotland	UK - Shetland	Comments
Stage	Partial revision related to Offshore Wind of Policy Note as part of the National Water Plan	Policy Note to North Sea as statutory MSP as part of the National Water Plan	North Sea 2050 Spatial Development and strategy policy as part of the National Water Plan	No formal MSP process - please see text	Version 1 under way, public review of 1st draft autumn 2016, adoption expected in 2017	Varies > 80 municipalities, some not up to date	Formal MSP process just started with the transposition of the EU MSP Directive.	No formal MSP process - please see text	approved in autumn 2009	Adopted in 2005, currently under revision				Adopted March 2015	Adopted January 2015	
Legal status of the plan	statutory	statutory	policy adopted by parliament		Statutory, directional, can be binding (Env. Code & MSP)	Statutory, directional and binding plans (Planning & Building Act PBA)			statutory	Statutory				Statutory	Statutory	
Revision circle	As required	Every 6 years as part of National Water	Not fixed		As needed or according to EU-MSP	As needed, latest after 10 years, 4 year political			revision planned for 2018	10 years				3 years	5 years	
Responsible bodies	Ministry for Infrastructure and Environment in cooperation with Economic Affairs and management organisation Rijkswaterstaat	Ministry for Infrastructure and Environment in cooperation with Economic Affairs and management organisation Rijkswaterstaat	Ministry for Infrastructure and Environment in cooperation with Economic Affairs		Dir. (R.vres.) not stated. Government adopts, Swedish Authority for Marine and Water Management plans in collaboration national sector authorities and with 3 County Administrative Boards responsible to coordinate MSP for 3 marine basins, CABs responsible for their areas and coord towards municipalities	Municipalities develop plan and adopt it in municipal parliament, County Administrative Boards have authority to check whether national interests and health and safety issues are included properly and if not can declare whole or parts of plans as invalid. responsible			Federal Maritime and Hydrographic Agency / Federal Ministry of Transport and Digital Infrastructure	Ministry for Energy, Infrastructure and Regional Development				Marine Scotland	NAFC Marine Centre +SIC	
Level of participation	formal consultation on draft plans, SEA and EIA nationally and neighboring countries (ESPOO) - dozens of	formal consultation national and international on draft MSP and SEA. Listening tour around North Sea Countries	2 years of participatory meetings: a joint effort of government and stakeholders		Presently: Sector authorities (sector strategies, plan input, consultation), public (consultative: guiding document, status description, plan coming)	Public & other authorities: consultative			2 public hearings, informal involvement of key users in scoping	Information and two rounds of public consultation, the second of which also includes consultation on the SEA				Consultation in all MSP development stages with organised stakeholders and the general public containing a range of stakeholders, consultation in to identify issues, collect evidence, formulate the plan, and build consensus	Guided by an advisory group containing a range of stakeholders, consultation in all stages of development. Participatory mapping used	
Scale	EEZ and territorial waters	EEZ including territorial waters, coastal and transitional waters + land-	wider North Sea area + focus on wider NL EEZ		National, 3 plans for larger marine basins, 16 in-depth planning areas	Municipal, local and topical plans			EEZ German North Sea, EEZ German Baltic Sea	Regional				National	Regional	

Main driver	off shore wind short term and cutting costs - incl within 10-12 nautical mile	National Legislation required update, MSP directive, MSFD, incorporating permitting framework and offshore wind (ambition 2023)	Blue Growth perspective: what the sea has to offer in a sustainable manner - energy transition	National needs and perceived conflicts & al policy (EU etc.), Environmental Code	Municipal needs, Planning & Building Act international		offshore wind farms emerging as a new issue	The plan is a spatial development programme for the entire federal state. Territorial waters were included because of a perceived need to manage spatial conflicts in the sea at an early stage.	New and emerging uses of the marine area i.e. Renewable energy & Marine conservation	Manage use of marine environment, in particular aquaculture	
Explicit land-sea interactions	yes - connecting off shore wind and topic of visibility	yes, with 16 movies to illustrate	yes, exploring cultural and socio-economic significance	Stated intention to include L-S interaction	Covering land and sea - whole territory		not applicable, gateways for cables and pipelines to territorial waters	Some (e.g. using the landing points of gas pipelines to strengthen the local industry base, coastal conservation areas, tourism; reference to ICZM as an integrative tool spanning land	Planning circular on the relationship between the statutory land use planning system and marine planning and development	Plan is between supplementary guidance to local development plan	
Information sources	cooperation government and offshore wind developers (existing and new)	North Sea 2050 Spatial agenda, marine environment impact studies - specific for SEA	stakeholders and their knowledge and information + charting socio-economic and ecological opportunities (12 movies on various topics)	Existing and new data	Existing and new data, partially provided by County Administrative Boards		Shipping (generated from AIS), existing environmental data for SEA, developers claims for offshore wind farms, existing designations	Official national/regional statistics, economic data, sectoral (development) strategies, reports on development trends, transnational socio-economic assessments/vision	Scotland's National Marine Plan Interactive (NMPi) website - http://www.gov.scot/Topics/marine/seamanagement/nmp/home	Brings together national and local data sets, data will soon be available on Scotland's National Marine Plan Interactive (NMPi) website - http://www.gov.scot/Topics/marine/seamanagement/nmp/home	
Climate change reference	clean energy as driver	clean energy as driver	clean energy as limited (qualitatively)	Yes	Yes, usually		no	indirect (CO2 reduction as a	Yes - Sections 3.5-3.7 & 4.39-4.58	Yes, specific policies	
Ecosystem approach reference	https://www.noo rdzeeloket.nl/en	https://www.noo rdzeeloket.nl/en	against it use/Maritime_w ind_energy/ecology/index.aspx	Yes, included in statements by SwAM. Legislation: sustainable development	Yes, usually or at least sustainable development reference.		mentioned in relation to CFP	No	Yes - General planning policy on Climate Change and Sections 6.47-6.50	Yes, structured to adopt EA	

Major goals identified	<p>wind farms areas priority development, 2 - 700MW each, connection to the coast, legislation for this, new</p> <p>energy transition, sand for coastal defense, allowing sailing through wind parks (vessels < 24 meter from sea</p> <p>1 - build with North Sea nature, 2 - energy transition, 3 - multiple use of space, 4 - land- sea interactions, 5 - shipping and cumulative impacts, 6 - international cooperation, 7 - export opportunities</p> <p>framework for financing, cumulative impacts</p> <p>management off shore wind, need to upscale North Sea wide</p>	<p>All goals, long-term sustainable management of space based on P&B Act</p> <p>All goals, long-term sustainable management of space based on Env. Code</p>	<p>securing and strengthening maritime traffic, strengthening economic capacity, promotion of offshore wind energy use, support Federal Government's sustainability strategy, long-term sustainable use of the properties and potential of the EEZ, securing natural resources by avoiding disruptions to and pollution of the marine</p> <p>General guiding vision for spatial development, guidelines and objectives/principles for spatial development.</p>	<p>Environmental, Economic, and Social</p> <p>Environmental, Economic, and Social</p>
Weblink to plan	<p>https://www.noo-rdzeeloket.nl/en</p> <p>https://www.noo-rdzeeloket.nl/en</p> <p>https://www.noo-rdzeeloket.nl/en</p> <p>https://www.noo-rdzeeloket.nl/en</p>	<p>https://www.havochvatten.nl</p> <p>Too many, forget it...</p>	<p>http://www.bsh.de_http://service.mvn.de/en/Marine%20uses%20et%20de%20pho%20down%20spatial%20Planning%20in%20ad%20pho%20dstei%20id%20the%20German%20EEZ%20689%20in%20German</p>	<p>http://www.gov.scot/Publications/2015/02/www.naft.ac.uk/3/6532</p>

MSP Status for selected countries

Canada

The impetus for marine planning in Canada, at a national scale, is based on the authorities of the Oceans Act. The ecosystem basis for planning is based on ecologically significant areas and species as well as an inventory of human activities and assessment of their impacts. Integrated Oceans Management plans and conservation objectives are identified in consultation with key Aboriginal organizations, provincial governments, industry representatives, and other stakeholders with vested interests in the projects to take into account their social, cultural, ecological and economic values into the management of human activities in the management area. Ongoing initiatives are focused on marine protected area networks, state of the oceans reporting, seismic sound in the marine environment and, corals and sponges. Across the Canadian EEZ there are five priority geographic areas where the Government of Canada is currently focusing its efforts (<http://www.dfo-mpo.gc.ca/oceans/management-gestion/index-eng.html>). These are (from west to east coast):

- Pacific North Coast;
- Beaufort Sea;
- Gulf of St. Lawrence;
- Placentia Bay/Grand Banks; and
- Scotian Shelf, Atlantic Coast and the Bay of Fundy.

Denmark

By 2016, MSP mandate was moved from the Nature Agency, Ministry of Environment and Food of Denmark to the jurisdiction of the Ministry of Business and Growth under the auspices of the Danish Maritime Authority. The Law on Maritime Spatial Planning was put forward 24 February 2016 (L.131) and is expected to enter into force on July 1. 2016. One of the aims of the law is to enhance economic growth, develop maritime areas and improve resource utilisation in a sustainable manner. This is more explicitly described as being the development of marine energy, maritime transport, fishery and aquaculture, maritime mineral extraction and the conservation, protection and improvement of the environment including resilience to consequences of climate change.

Germany

The German Maritime Spatial Plan for the EEZ (2009)

There are two maritime spatial plans for the EEZ in Germany, one for the Baltic and one for the North Sea. The legal ordinances of the responsible Ministry (BMVBS) came into force in 2009, specifically on 26 September for the North Sea (BGBl. I p. 3107), and 19 December for the Baltic Sea (BGBl. I p. 3861). The plans are likely to be revised in 2018.

The plans set out binding objectives and regulations for authorities, mainly with regard to licensing procedures and project approval. The legal base for MSP in the EEZ is the German Spatial Planning Act ("Raumordnungsgesetz" / ROG), which was amended in 2004 to include the EEZ. For SEA the Environmental Impact Assessment Act (UVPG) of

25 June 2005 applies. The Spatial Planning Act applies to the German EEZ only, whilst the Environmental Impact Assessment Act also applies to the sea areas administered by the coastal federal states. The guiding principles of the plans are as follows:

- Safeguarding and strengthening maritime traffic;
- Strengthening economic capacity through orderly spatial development and optimization of spatial use;
- Promotion of offshore wind energy use in accordance with the Federal Government's sustainability strategy;
- Long-term and sustainable use of the special features and potentials of the EEZ through reversible uses, efficient use of space, and priority of marine-specific uses;
- Safeguarding the natural environment by avoiding disruptions to and pollution of the marine environment.

Economical use of marine space is a guiding principle here, in the sense of using area designations to limit stationary structures and to minimise dissecting effects. The Spatial Plan for the EEZ is also considered a contribution to the Marine Strategy Framework Directive of 17 June 2008 (Directive 2008/56/EC).

Coordinated regulations in the form of objectives and principles apply to the single uses and functions of shipping, extraction of raw materials, pipelines and submarine cables, marine scientific research, energy production (especially wind energy), fishery and mariculture, and nature conservation. Coordinated regulation takes the form of area designations in some but not all of these cases; other forms of regulation may apply. Priority areas have been designated for shipping, offshore wind farming and pipelines, and reservation areas for shipping, marine research, and cables and pipelines. In priority areas a single activity is granted priority over other spatially significant uses, and measures and projects not compatible with the priority are excluded. In reservation areas special consideration is given to a single interest, and a comparative evaluation with other spatially significant planning tasks, measures and projects has to be carried out.

The rationale behind the designation of priority and reservation areas is as follows:

- Special importance of shipping as expressed in the United Nations Convention on the Law of the Sea (UNCLOS). Existing shipping routes have been designated as priority areas, flanked by additional reservation areas on either side, to secure a sufficiently wide transport corridor for ships to pass or overtake each other, and to keep shipping routes free of obstacles. Shipping can be limited by safety zones which may be designated around certain areas or built infrastructure in the sea.
- Support of renewable energy development. Priority areas have been designated where offshore wind energy takes precedence over other uses, and where all other uses potentially incompatible with OWF are excluded. Non-area based objectives for offshore wind farming include spatial efficiency in their siting and due consideration of environmental concerns and cables and pipelines during construction and operation.
- Essential infrastructure. Cables and pipelines are regarded as essential transnational infrastructure which is to be given sufficient space and where safety

of operation and development are important issues. Non-spatial objectives concern cable depth, temporal coordination and environmentally sensitive laying procedures.

- Securing long-term research programmes. Reservation areas have been designated for marine research, covering those areas where long-term research is carried out, e.g. regular monitoring of fish stocks. Existing measuring stations are surrounded by a buffer zone. Research must not impede shipping, and negative effects on the marine environment and cultural heritage are to be avoided.

The extraction of raw materials and fisheries and mariculture are not covered by area designations. For the fisheries sector, the plans only mention the need to ensure sustainable fishing practices (e.g. taking account of subsea cables and pipelines) and an ecosystem approach to managing fish stocks. For mariculture, the aim is to achieve a maximum of co-use with existing infrastructure, e.g. offshore wind farms. Other uses that cannot be considered in terms of stand-alone regulations for practical or legal reasons are given consideration within the regulations set out for the above use and functions. These include military use (e.g. taken into account in the designation of priority areas for offshore wind farming), recreation and tourism, ammunition and sediment dumps and underwater cultural heritage.

Environmental protection

The plans do not stipulate any area designations, but merely shows Natura 2000 sites as an information layer, assuming that sufficient protection of these areas is already ensured through sectoral law and international and European regulations. Guidelines 4 and 5 of the maritime spatial plan take account of environmental protection in more general terms, for example by emphasising the importance of the precautionary principle (considered important due to the dynamic nature of the marine environment) and that all activities must be carried out as environmentally sensitive as possible. Destructive impacts on sensitive habitats are to be avoided also outside designated Natura 2000 areas. Special consideration is given to the marine environment in the context of licensing of activities/uses, and guidelines and regulations for every use include requirements to ensure environmental concerns are taken account of. No wind turbines are allowed in Natura 2000 areas. Management arrangements are considered mostly at project level dealing with licensing applications for specific activities (e.g. wind farms). Management plans for Natura 2000 areas are developed by the Federal Nature Protection Agency.

The LEP (Spatial Development Programme) Mecklenburg–Vorpommern¹

Legislation governing regional spatial development in Mecklenburg–Vorpommern was amended in 2005 to include coastal waters, driven by the perceived need to manage spatial conflicts between newly arising technologies (offshore wind energy sites), tourism and nature conservation, and traditional sectors such as shipping, fishing and coastal defence at an early stage. Since 2005, MV has therefore had a maritime spatial plan which is part of a wider spatial development programme for the entire state. The LEP has

¹ Adapted from internal BaltSpace country report, 2015

strong links to the Regional Spatial Development Programme Vorpommern (RREP), which outlines priorities for socio-economic development in the region (e.g. transport corridors, tourism).

The LEP is strategic in character and outlines priorities for MV as a whole, including Baltic Sea use in the coastal waters of Mecklenburg-Vorpommern. Sustainable development is a guiding principle, with the aim of bringing together territorial social and economic requirements with ecological functions of the area, leading to long-term, large-scale and balanced spatial development. Conflict mitigation is a key premise driving the development of the LEP, as is the perceived need for coordination in the territorial sea. Coordination needs are perceived with respect to offshore wind farming, linear infrastructure, nature conservation, tourism, securing supply of raw materials for coastal protection and commercial uses, safety and efficiency of sea traffic, underwater cultural heritage, fishery, aquaculture, military/defence, dredging of waterways, and dumping of dredged materials.

The LEP sets out binding objectives, principles and other requirements for spatial planning. This framework guides those involved in public planning, but also those representing private interests when planning measures with spatial impacts.

The LEP MV features the following area designations:

- priority areas for mineral resources with regard to use for coastal protection, and reservation areas for commercial purposes;
- reservation area / corridor pipelines with regard to the NordStream pipeline and electricity cables in the inland waters part of Greifswald Bay;
- a suitable area for offshore wind energy (projects are subject to a spatial planning procedure);
- reservation areas for tourism, covering some coastal areas but also inland waters;
- The main shipping routes have been visualised in the map, but in general the whole territorial sea is seen as a federal waterway.

Nature conservation areas are either priority areas (for nature and countryside conservation reasons) or reservation areas. Priority areas comprise National Park areas and nature reserves. Reservation areas comprise areas to be designated under the Habitats Directive, coastal waters and near-natural coastal areas classed as showing “undisturbed development of nature” (see LEP p. 44 Figures 12 and 13).

The LEP MV is currently undergoing revision. It differs from the existing plan in that the current draft designates significantly more priority and reservation areas for offshore wind farms. The new spatial plan will also designate reservation areas for fisheries, specifically to protect selected spawning grounds for Western Spring Spawning Herring.

Netherlands

2015 marked a couple of important MSP developments, because of the 6 years' cycle of the National Water Plan (NWP) coming to an end and needing revision for the upcoming 6 years. A draft MSP was made as part of the new National Water Plan 2016-2021 based on the vision of the North Sea 2050 Spatial Agenda, with the inclusion of the Integrated

Management Framework on which to base permits and licenses. This used to be a separate policy document before. The draft MSP for the North Sea incorporates the measures needed for delivering Good Environmental Status by 2020 under the MSFD. No new plans were developed for offshore wind under the generic MSP process, but in parallel work was undertaken in terms of new legislation to be able to implement and start constructing offshore wind to reach the earlier set target of 4500 MW by 2023. Research on ecological effects showed results, a.o. it was found that fish larvae are not significantly impacted by the noise of pile driving. At the same time it was found necessary to do extra research into the effect of offshore wind on certain bats. In socio-economic terms the political decision to also use the 10–12 nm zone for offshore wind has dominated the offshore wind debate. It resulted in various studies and second opinions on the impact of that development for beach tourism and turnover of the hospitality industry. Decision has been made to start opening up new off shore wind farms for vessels smaller than 24 meter long sailing through by 2018. A search&rescue test with boats and helicopters was carried out to underpin this Cabinet decision. In terms of the 2050 development strategy 2015 has led to further cooperation amongst stakeholders, with governments and scientists (applied and fundamental). Options for combined use of space or better fitting co-use of certain wider areas and progress have been further explored. The new food source possibilities from the sea and salty coastal areas have been furthered by the North Sea Farm, which obtained a grant of 30 000 Euro's from the city of The Hague - which the local government sees as a main driver to strengthen the social and economical connection to the sea in the village of Scheveningen. Consultation on the NWP-MSP ran for 6 months, during which most of the North Sea countries were payed a visit to give an explanation and discuss relevant matters. At the same time regional and local authorities, plus stakeholders were engaged with to make a series of movies on land-sea interactions. The draft National Water Plan including the ecosystem based MSP have undergone a Strategic Environmental Assessment. The Independent Commission on the SEA and EIA has given the green light for the new NWP/MSP but warned that an improved framework for cumulative effects of human uses on the marine ecosystem is needed (in a North Sea wide setting).

The Dutch government is thus tasked to make more efforts on this, before starting the next revision cycle which is foreseen to start in 2017. The ICES WGMSPCZM is requested to provide information on the potential support it can give to this challenge.

Spain

In October 2015, work began in Spain to transpose Directive 2014/89/EU of the European Parliament and of the Council (23 July 2014) that establishes a framework for MSP in the country. The main obligation of the Directive was to establish maritime spatial plans in which the spatial and temporal distribution of the relevant activities and uses existing and future is determined. An Interministerial Commission was formed to develop such a work. An initial decision was made to develop a Royal Decree transposing the Directive through the implementation of the Article 4.2.f of the Spanish Law 41/2010 of Marine Protection (transposition of the Marine Strategy Framework Directive).

The Royal Decree will be done for September this year. An original plan of MSP will be carried out for each one of the 5 different Spanish maritime regional boundaries. The management plan for each region will be limited to maritime areas where one or more

human activities develop. MSP documents will be developed in a coordinated manner by the relevant ministerial departments, and approved by Resolution of the Council of Ministers. Specific management objectives will be established in each maritime region, respecting the environmental objectives of the Marine Strategy Framework Directive, and taking into account the general objectives of the sectoral planning. This planning will in turn subject to the Directive "Strategic Environmental Assessment". The developmental work for the planning activities will probably be starting in 2017. All responsibilities associated with the implementation will lie in the Ministerio de Agricultura, Alimentación y Medio Ambiente (MAGRAMA).

During the work of the Commission, relevant conversations were discussed on several issues; a) the main target of the Directive, the promotion of the maritime economy, b) the understanding of the concept of land-sea interactions, c) transboundary effects and relationships, and d) its legal basis for the EU which has supported the development of this policy mainly on issues of environment, transport, fisheries and energy.

United Kingdom

UK Marine Policy Statement (MPS)

The UK Administrations share a common vision of having clean, healthy, safe, productive and biologically diverse oceans and seas. Joint adoption of a UK-wide Marine Policy Statement provides a consistent high-level policy context for the development of marine plans across the UK to achieve this vision.

Scotland

The introduction of the Marine (Scotland) Act in 2010 along with the UK Marine and Coastal Access Act 2009 provided the legal basis for the creation of a Scotland's National Marine Plan. The plan supports better management of the competing demands on marine resources and ensure increasing demands for the use of our marine environment are managed, economic development of marine industries is encouraged and environmental protection is incorporated into marine decision making. It also plays a role to manage adaptation to climate change. Marine planning in Scotland is undertaken in various levels:

- **A national level**, by creating Scotland's first National Marine Plan. The plan was adopted by Scottish Ministers in March 2015. This Plan covers both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). It also applies to the exercise of both reserved and devolved functions. The plan comprise introductory chapter, a 'Vision, Objectives and Approach to Policies' chapter, a 'General Policies' chapter as well as sectoral chapters including Aggregates, Aquaculture, Carbon Capture & Storage, Defence, Offshore Renewable Energy, Oil & Gas, Recreation & Tourism, Sea Fisheries, Shipping, Ports, Harbour & Ferries, Submarine cables, and wild salmon & diadromous fish.
- **A regional level**, by creating Scottish Marine Regions. Marine planning will be implemented at a local level within 11 Scottish Marine Regions, extending out to 12 nautical miles. The boundaries of these regions have been set by secondary legislation (Scottish Marine Regions Order 2013). Within these regions, re-

gional marine plans are currently being developed by Marine Planning Partnerships to take account of local circumstances and smaller ecosystem units. Marine Planning Partnerships will take different forms in different regions. Regional Marine Plans are required to be in accordance with the National Marine Plan and the UK Marine Policy Statement to ensure they are consistent with national objectives and priorities and are subject to adoption by Scottish Ministers. The delegates of the first Marine Planning Partnerships have been made during the early months of 2016 and include Shetland and Clyde. Development plans of Regional marine plans include (1) assessing the condition of the region (2) summarising the significant pressures and impact of human activity (3) keeping under review the physical, environmental, social, cultural and economic characteristics of the region; the purposes for which it is used; its communication, energy and transport systems; and the living resources which it supports (4) setting economic, social, marine ecosystem and climate change objectives (5) stating the contribution of MPAs and other designated areas to the protection and enhancement of the region (6) Stating policies for sustainable development of the region and (7) Developing a Statement of Public Participation and carrying out consultation. An example

- The Shetland Islands' Marine Spatial Plan (SIMSP) has been developed by the NAFC Marine Centre with guidance of a local advisory group which incorporates a range of stakeholders (community, decision makers, industry). The 4th edition of the SIMSP was adopted by the Shetland Islands Council on a statutory basis in January 2015. The use of spatial data has been fundamental in developing the plan and has been linked to a policy framework. Under the Marine Act a regional marine plan for Shetland Islands will be jointly developed by the NAFC Marine Centre and the Shetland Islands Council, guided by a marine planning partnership, this process commenced in February 2016. The SIMSP strives to adopt the ecosystem approach by structuring policies to ensure activities are managed to prevent impacts on ecosystem. The SIMSP is currently undertaking a 'state of the environment assessment' to inform the development of the 5th edition of the Plan.
- **Sectoral Planning**, for offshore renewable energy. The Scottish Government has developed plans for offshore wind, wave and tidal energy in Scottish waters. The plans identified spatial plan options for offshore wind, wave and tidal energy which will contribute to meeting Scotland's target of generating the equivalent of 100% of electricity demand from renewable sources and also seek to maximise the contribution of these technologies to achieving a low carbon economy. The offshore renewable energy plan options have been laid before parliament for consideration by Scottish Ministers.
- **Terrestrial Planning**, to explore the relationship between the Statutory Land Use Planning System and Marine Planning and Licensing in Scotland. All developments and activities which take place in Scotland's seas have implications onshore too – ranging from changing infrastructure requirements to the impacts on communities of economic growth or decline. The Scottish Govern-

ment has produced a circular which explores the linkages between the marine and terrestrial planning systems and provides guidance about joint working.

The creation of the National Marine Plan has involved a wide range of supporting documents and information which can all be found at <http://www.gov.scot/Topics/marine/seamanagement>

ToR b: Report on approaches and methods to develop and incorporate thresholds of acceptable environmental (social and ecological) change due to regional and transboundary activities in the context of MSP processes including support for and review of follow-up activities from Workshop on Risk Assessment for Spatial management (WKRASM)

In line with the risk management processes and tools developed by WGMPCZM (ICES 2015 CRR 327), two subsequent workshops (WKRASM, WKPASM) were held to examine the use of the Bow-tie analysis (IEC/ISO 31010) as a tool to frame and support cumulative impact assessments. WKRASM structured cumulative impacts within a Bow-tie analysis within a legislative and policy context. Based on recommendation stemming from WKRASM, an ICES cooperative research report is being prepared to demonstrate the use of the Bow-tie to analyse of EU Directive as a policy analysis of legislation used to manage pressures from human activities. In addition, WKPASM was held to examine a Bayesian Belief Network to quantify the effectiveness of the management measures expressed in Bow-tie diagrams. That workshop produced a meta-model of the management system incorporating effectiveness and compliance to quantify the performance of a given measure at reducing a pressure and estimating to the total residual pressure released into the ecosystem. In addition to a primary paper on the meta-model, two case studies are taking place to parameterize and refine the meta-model in the Canadian Great Lakes for phosphorus and the German in the North Sea for benthic habitats. Planned for September 2016, a workshop on Bayesian Belief Network Case Studies (WKBNCs) will be held to review the results of the case studies and refine the meta-model.

ToR c: Develop a typology of conflicts in MSP, ICZM and EBM, identify information needs to analyse selected types of conflict and instruments to address these. This includes review and support of follow-up activities from Workshop on Cultural Ecosystem Services (WKCES)

In the reporting period, the work accomplished by WKCES (ICES CM 2013/SSGHIE:12) was developed further and presented in a scientific paper (Gee *et al.* submitted) setting out the importance of cultural values in MSP and the concept of culturally significant areas as a means of capturing these values for marine planning. A pilot study designed to identify culturally significant areas was carried out on the Dart estuary in the UK; a second pilot study will shortly begin in Sweden designed to provide proof of concept.

Following on from the workshop on cultural ecosystem services (WKCES), and building on the quality assurance system developed in WKQAMSP (ICES 2015 CRR 327), a workshop was held to develop a typology of conflicts in MSP, drawing on case study examples from various countries and MSP contexts. The workshop differentiated between the more material conflicts manifesting themselves in marine space and the more immaterial conflicts that occur during the MSP process. Coexistence was used as an overarching

term to describe interactions in marine space, with conflicts describing incompatible situations and synergies situations of mutual enhancement. It was noted that it may not be possible to resolve conflicts, but that they can be managed more or less well following the three steps of identify, assess and address. To assist with conflict identification, the workshop highlighted the general characteristics of conflicts, such as their multi-layered nature, the fact that they often extend beyond the issues presented, and that they consist of attitudinal, behavioural and content-related components. Conflicts between individuals, groups and organisations can escalate and de-escalate according to certain patterns; this is reflected in interactions and can therefore become visible to planners. Ideally, conflicts should be pre-empted before they escalate; for this a planner needs to be aware of how conflicts arise and the reasons for potential conflicts. Alternatively, once a conflict is expressed, understanding the nature of the conflict, its (varying) significance to the parties involved, magnitude and potential consequences may help the planner to mitigate or prevent escalation. Loss of trust or breakdown of negotiations or dialogue must be avoided as this may halt the process or damage interests. One of the conclusions is that the MSP process should be considered from an escalation/de-escalation perspective, for which a model was drawn up. Skilful management of the planning process in line with this model depends on knowing the context of the conflict (e.g. situational constraints), understanding the actors involved and the right mandate and support system for the process manager. The workshop also concluded that good process management requires certain professional competencies (link to ToR e) and makes an important contribution to reducing risks in MSP and enhancing the quality of the MSP process and its outcomes. The results of the workshop are currently being documented and will be taken forward in 2017 in another workshop specifically addressing synergies in MSP.

ToR d: Support ICES in developing a role in providing training in Marine Spatial Planning

WG Members developed the training course ICES Marine Spatial Planning (TCMSP), Processes and Tools, given at 27–31 October 2014, Copenhagen, Denmark. This training course was given by Roland Cormier and Andreas Kannen as a response to a request of the ICES Training Group. Seventeen participants attended the course. The course curriculum started with an overview of the background and context focused on the European MSP policy background and context including a review of European Blue Growth goals and objectives, EU MSP Directive scope and elements for the planning process and strategic perspective as well as European Regional Seas and trans-national cooperation. The course then switched to managing the maritime spatial planning process with an overview of international and national maritime legislation, management and governance, understanding ecological, cultural, social and economic risks, stakeholder consultation and scientific advisory processes. All these elements were first introduced conceptually and then illustrated with examples, showing when and why they are relevant and what experiences exist in dealing with them in existing MSP processes. The participants came from administration as well as scientific backgrounds. Based on the (generally very positive) course evaluation comments, future courses should either have a planning process curriculum designed for participants from administrations or have a science view of the planning process designed for scientific participants. However, both groups indicated a significant learning curve, for scientist mainly by increasing awareness on the process components of MSP and its nature as an administrative and social process, for partici-

pants from an administrative background mainly by offering a structure and guidance on how to set up a spatial planning process in marine areas and what information and data to consider in different phases of this process.

Furthermore, WGMPCZM followed regularly the development of the MSP Challenge game series and members of WGMPCZM participated in different roles in follow-up applications of new versions, developed from the MSP challenge 2011 version. In particular this referred to sessions using the MSP Challenge 2050 version. In February 2016 also a new boardgame version was released by the developers which is particularly interesting for smaller (12–14 participants) training courses and does not rely on computer support. More information on current developments and applications of the game(s) can be found at <http://www.mspchallenge.info/>.

ToR e: Work with the ICES data centre to develop a strategy to source and present key datasets in support of MSP/ICZM activities

The discussions in the WG during the 2016 meeting on ToR e) have led to the following discussion, proposed recommendations, and programme of activities for future work under the ICES collaborative network from 2017 onwards.

The ICES Datacentre

During the ICES Working group meeting 2016, WGMPCZM met with the ICES Datacentre to have an overview and discuss development progress with GIS and the Data Centre and develop a programme of activities to develop ICES spatial data holdings in relation to the needs for data to support MSP/ ICZM process in ICES countries and meet international data requirements for MSP/ ICZM. The ICES Datacentre presented the facilities below.

ICES Data Portal

The ICES Data Portal provides access to a number of large ICES dataset collections related to the marine environment. The main collection include datasets ('raw' georeferenced recorded data measurements) on biological community, contaminants and biological effects, eggs and larvae, fish predation (stomach contents), fish trawl survey, ICES historical Plankton, and Oceanographic data.

The various datasets are organised in databases, including:

- ICES Ocean – The ICES oceanographic database holds a history of oceanographic data,
- DATRAS – the Database of Trawl Surveys (DATRAS) is an online database of fish trawl survey data,
- DOME – The environmental monitoring database for management of chemical and biological data for regional marine assessments,
- ICES Historical (Plankton) Dataset - contains plankton data from current and recent surveys and research programmes,
- ICES Stomach Data – Database holding fish stomach content sampling project data

- ICES eggs and larvae – Unified portal to access data from ichthyoplankton surveys (Fish egg and fish larvae) carried out in ICES areas
- data relating to the contents of fish stomachs, and 'eggs and larvae' – eggs and larvae data (Stomach data).

Datasets are also organised around specific thematic data portals in the ICES Data portal. Thematic data portals have a pre-defined collection of content for the end user, including

- Fish Trawl Survey datasets collected in connection with the Data Collection Framework (EU-DCF) are managed under the *DATRAS* portal.
- Contaminants, biological effects and biological community data are made available through the *DOMÉ* web portal (Database on Oceanography and Marine Ecosystems).
- *Eggs and Larvae* database makes available data collected by ichthyoplankton surveys for use by ICES and the wider marine community.
- Fish predation is the focus of the *fish stomach* data portal.
- *Historical plankton* is an 'historical' dataset collection, where the dataset is considered complete and there are no immediate plans to update it.
- *Oceanographic data* which includes temperature, salinity, oxygen, chlorophyll a and nutrients measurements are made available through the OCEAN web applications.
- Impulsive underwater noise collates data on licenced events such as pile driving, controlled explosions from naval operations across the OSPAR and HELCOM areas.
- *Vulnerable Marine Ecosystems* hosts data on deep-water VME's in the North Atlantic

The ICES Data portal can be accessed at <http://ecosystemdata.ices.dk/>

ICES Spatial facility

Maps and spatial layers are used extensively in ICES.

ICES manages a number of maps related to the North-East Atlantic, these are used extensively in ICES expert groups for the planning of data collection and the visualisation of data. Existing working relationships include working closely with the regional sea conventions to offer a selection of their map products through our spatial facility. Maps can be downloaded as digital shape files, but simple pdf's are also available.

The ICES Spatial facility provides access to 'reference' datasets and consists from the following applications:

- Map Viewer – A webGIS platform that provides access to reference layers including HELCOM sub-basins, ICES Statistical Rectangles, Areas and Ecoregions as well as OSPAR Regions. It also links to External Datasets with a sole layer on 'Benthic faunal communities in the Baltic Sea'. Moreover, links to metadata, tools & widgets, and services are provided. The View application can be accessed at <http://gis.ices.dk/sf/>. Finally, similar to the ICES thematic data portals described in the previous section above, the spatial facility offer custom made products, called story maps. The sole example is the ['Popular](#)

[Advice Map](#)’ which provides a brief overview of the official ICES advice on fish stocks in different areas.

- Metadata Catalogue – A catalogue of available datasets to improve access to and integrated use of spatial data and information, which can be accessed at Old version - <http://geo.ices.dk/geonetwork/srv/en/main.home>
New version – <http://geotest.ices.local:8080/geonetwork/srv/eng/catalog.search#/home>
- API Services – a list of all layers configured in GeoServer and provides pre-views in various formats for each <http://map.ices.dk/geoserver/web/?wicket:bookmarkablePage=:org.geoserver.web.demo.MapPreviewPage>

Spatial data requirements for marine planning

During 2014 and 2015 meetings, WGMPCZM reviewed the spatial data requirements for marine planning with the objective to structure the discussion about gaps and data shortcomings as well as provide recommendations and propose a programme of activities to develop the ICES spatial data holdings to meet international data requirements for marine planning. The group developed a categorisation of data types relevant to the MSP/ICZM process where spatial data were assigned to the categories physical; biological; human and assessment. The group identified that a major next step would be to collate policy and plan objectives and targets for spatial plans in ICES Member States to allow mapping of data requirements to objectives. However, due to very different stages in the different countries ranging from adopted plans to countries which are at the start of the process, this has not been feasible.

These categories of data types required were populated with examples and the resulting tabular form can be found below:

Table 3. Spatial data requirements for Marine Planning and Coastal Zone Management (Amended Annex E, 2014 WGMPCZM Interim Report)

Physical data	Biological data	Human use data	Assessment data (derived products)
Bathymetry	Habitats (spatial and temporal)	Land use, agriculture and infrastructure	Status assessments: water and sediment quality
Hydrographic	Key species distribution maps (spatial and temporal)	Jurisdictional boundaries	Biodiversity indicators
Currents	Mobile species migration routes (birds, bats, fish, marine mammals)	Ports and harbours, anchorages, ‘safe harbours’	Pressure maps/indicators derived from activity
Waves	Fishery resources (stocks)	Shipping traffic, AIS, routes, small non-tracked vessel movements	Atlas assessments, EEA Atlas, state indicators
Water temperature	Fishery resources (sensitive areas –	Aquaculture installations and vessel movements	Modelled predictions of future human uses

Salinity	spawning / nursery) Coastal habitat types	Energy installations, O&G infrastructure and exploration areas, renewable energy installations and planned areas. Cables and pipelines.	MSFD GES assessments and spatial representation of programmes of measures
Ocean fronts	Species / habitat vulnerability data	Fisheries activity and value, inshore and offshore	Derived suitability maps by sector (conflict / co-use / constraint / opportunity mapping)
Chemistry – nutrients / contaminants	Spatial / temporal variability in food web dynamics	Recreational uses and tourism value	Buffer zones for protection of specific features/infrastructure
Wind (meteorology)	Productivity	Military use eg submarine exercise, firing ranges, war games, ammunition dumps	Disturbance indicators (eg mortality/recovery indices)
Seabed type (sediments)		Historical and prehistorical remains and cultural value	Sensitivity and vulnerability maps by habitat
Land cover type		Wrecks – location and cultural value	Mapped ecosystem service provision and value
River basin catchments		Mining and aggregate extraction areas	
Modelled data: climate change predictions (sea level, changes to the above)		Water extraction	
		Coastal defences Designated sites (MPAs, RAMSAR sites WHS, Natura 2000 etc) Telecommunications cables	

Review of ICES Datacentre in relation to MSP data requirements

Naming, structure, scope overlap, and functionality of the ICES datacentre facilities can be improved.

- Not clear why to webGIS facilities (e.g. data portal vs. spatial facility) and the structure of data (e.g. VMS-derived abrasion layers only available as Library Data Outputs)
- Current functionality does not allow the user to create a custom-made collection of layers to answer marine planning questions
- Most physical and biological data are relevant to very small areas compared to planning areas. Scope for combination?

- Direct download access through metadata catalogue was limited and required to get in touch with the data owner. Sometimes links were not working.
- Provision of lineage information for derived datasets
- Data groupings (e.g. topics) were not relevant to marine planning
- There was no centralised place of definitions – maybe create a Glossary?
- There was no site map to contextualise how the different systems are linked together

Action: Share feedback with the ICES Datacentre team on naming, structure, scope, and tool functionality about their facilities. Assist in the development of their facilities to meet marine planning needs.

- 1) The ICES datacentre provides some Physical and Biological data but very limited information on 'Human' data

There is limited provision of 'Human' data. Additional data may include:

- jurisdictional boundaries e.g. administrative areas, planning areas, etc.
- ocean space use by various marine sectors e.g. ports and harbours, shipping, aquaculture, offshore energy, fisheries, military, mining and aggregates, and water extraction areas
- marine conservation areas e.g. Marine Protected areas, etc., as well as
- areas of cultural importance e.g. recreational uses and tourism, values, historical and prehistorical remains and cultural value, etc.

- 2) The ICES datacentre mainly provides access to raw spatial datasets but not derived "assessment" data types

A large number of "assessment" data types were identified as required for planning purposes. These data are derived from other spatial datasets and often involve interpretation or assessment of data to inform plan decision making. Modelled data are often required in order to populate predictions of future state or human uses. These data types are largely lacking and where planning authorities are commissioning creation of these spatial datasets there is perceived to be a growing inconsistency of outputs in terms of indicators, units, resolution and scale.

Programme of activities to develop the ICES spatial data holdings

The review presented led into the discussion of a new ToR for the next multi-annual cycle, named "Work with the ICES data centre to development their facilities, source and present key datasets and documents in support of marine planning." This is expected to lead to a programme of activities to develop the ICES spatial data holdings. The new ToR is based on the 2014 Spatial data requirements and key issues Annex – Review of the requirements of marine planners and marine managers for "spatial data and information" concerning human activities and pressures, social and economic factors and ecological sensitivities and the 2016 Recommendations to the ICES data centre - Pro-

gramme of activities to develop the ICES spatial data holdings to meet international data requirements for MSP/ICZM. WGMPCZM aims in this context to provide guidance on the generation and format of “assessment” data to aid future spatial data consistency and availability between ICES Member States subject to plan objectives and targets.

6 Cooperation

- **Cooperation with other WG**

There is no formalised cooperation with other expert groups in ICES. WGMPCZM contributed to and several members participated in the earlier Strategic Initiative on MSP. Furthermore links exist with the newly formed SIHD. Also information exchange, e.g. during the WGMPCZM 2016 meeting, occurred with Integrated Assessment WGs. The specific interest of WGMPCZM in this context are the inclusion of needs from MSP practice into integrated assessments and the inclusion of human dimensions (socio-economic, socio-cultural and institutional) into the assessments.

- **Cooperation with Advisory structures**

No formal cooperation with advisory structures exist at the moment. What needs to be considered in the context is that for those WG members representing administrative bodies, WGMPCZM acts as an informal platform for information exchange, which allows to discuss relevant trends and approaches outside of official political agendas. This allows these members to participate in WGMPCZM discussions as experts and not in their formal role as government representatives.

- **Cooperation with other IGOs**

No formal cooperation with other IGOs exists, however several members of WGMPCZM are involved in or cooperate with relevant groups in OSPAR, HELCOM and VASAB.

7 Summary of Working Group self-evaluation and conclusions

Over many years WGMPCZM and its predecessor WGICZM have evolved and further developed important issues in coastal and marine management, in the last years with a particular focus on sea use and Maritime Spatial Planning (MSP). The group has continuously discussed and analysed needs arising from new research and from practice. This elaborates on new and innovative tools and approaches in a transdisciplinary manner, using in addition to the annual meeting specific ICES Workshops. Reach-out and discussion evolves from sessions at the ASC and a number of conceptual practice orientated CRRs. Taking into account the high relevance of WGMPCZM work, the group is requesting a continuation for a new multi-annual cycle according to the new ToRs for the years 2017–2019.

8 Nomination of new Chairs

Andreas Kannen, Germany, acted as chair for WGMPCZM the maximum amount of two terms since 2010. Based on proposals of the outgoing chair and following discussions in

2015 and 2016, WGMPCZM members present at the meeting, nominated Matthew Gubbins, UK, and Andrea Morf, Sweden, as new co-chairs of WGMPCZM for the period of 2017–2019.

Annex 1: List of participants

Member	Email
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Annex 2: Recommendations

Recommendation	Adressed to
1. Adopt resolution for new ToRs and continuation of WGMPCZM for a new multi-annual cycle in 2017-2019	SCICOM
2. Nominate Matthew Gubbins and Andrea Morf as new co-chairs for WGMPCZM for 2017-2019	SCICOM
3. Adopt resolution for a new CRR on conflicts and synergies in MSP coming from WKCCMSP	SCICOM

Annex 3: WGMPCZM multi-annual resolution 2017–2019

Working Group on Marine Planning and Coastal Zone Management (WGMPCZM), chaired by Matthew Gubbins, UK, and Andrea Morf, 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 2017	3–7 April 2017	Barcelona, Spain	Interim report by 20 May to SSGEPI	
Year 2018			Interim report by XXX to SSGEPI	
Year 2019			Final report by XXX to SCICOM	

ToR descriptors

	DESCRIPTION	BACKGROUND	SCIENCE PLAN TOPICS ADDRESSED	DURATION	EXPECTED DELIVERABLES
ToR					
a	Assess key issues arising in the development of marine plans across the ICES area and make recommendations on the role of science to address these	<p>a) Receive updates on the issues arising in ICES countries marine plans</p> <p>b) Special emphasis on issues related to cross-border / trans-national planning and land-sea interactions (LSI)</p> <p>c) Receive assessments from country reports on the use of science (natural, social, economic) data, information and advice in the plan development process</p> <p>d) This term of reference provides the context for the whole work of the WG</p>	14, 18	Years 1, 2, 3	<p>Y2: Manuscript on the role of science in MSP, based on the experiences of member countries.</p> <p>Y3: A review of key issues as a chapter of the Final WG report.</p>
b	Develop cumulative impact assessment techniques for pressures resulting human activities on the marine environment in the context of marine planning	<p>a) Continued need for Cumulative Effect Assessment in marine planning OSPAR</p> <p>b) Bayesian Network meta-model for cumulative pressures</p> <p>c) Further develop management measures assessment techniques</p> <p>d) Linkages with the UNECE</p>	7, 11, 14, 23	Years 1, 2, 3	<p>Y1: Follow up from WKPASM activities.</p> <p>Y2: Workshops to identify data needs and approaches to cumulative impact assessments of new sectors/pressures and marine vulnerabilities in marine planning</p>

		standards initiative related to Goals 14 of the UN Sustainable Development Goals			Y3: A handbook on Bayesian network and bow tie analysis tools for cumulative effects analysis Y3: Manuscript on the meta-models of pressure and their management measures.
c	Address marine planning skills and capacity shortages by working with the ICES secretariat to develop and deliver training materials / course as required. Act as scientific steering group for the MSP Challenge serious game.	a) Builds on the ICES training course developed in 2014 b) Steers the direction of development of role play / serious gaming, accounting for the above assessments of training needs.	None identified	Years 1, 2, 3	Y1: A revised MSP training course outline made available to the secretariat. Y3: A review of the experiences gained through the application of the MSP Challenge serious game and related products, probably as a chapter in the Final WG report.
d	Review approaches to plan evaluation and monitoring	a) Builds on inputs collated under ToR a, CRR 327 and existing international frameworks b) Assesses these for commonality and identify gaps	8, 27, 28	Years 1, 2, 3	Y3: Manuscript on approaches to plan evaluation and monitoring
e	Develop approaches to account for culturally significant areas in marine planning	a) Builds on work by WGMPCZM to develop an approach to identify culturally significant areas in the sea b) Takes a vulnerability and risk assessment approach, thus building on work under ToR b c) Takes examples from member countries provided under ToR a d) Makes recommendations on approaches to be adopted	8, 14, 17, 27	Years 1, 2	Y1: Workshop to develop a vulnerability and risk assessment approach for culturally significant areas Y2: Manual (CRR, already approved in 2015) for applying the vulnerability and risk assessment approach in marine planning
f	Coexistence and synergies in MSP: Develop approaches for	a) Builds on the workshop "Conflicts and Coexistence in MSP", expanding this approach towards a more	8, 14, 17	Years 2, 3	Y2: Workshop to develop a classification system for coexistence

	evaluating benefits.	specific consideration of synergies			and synergies in MSP and develop approaches for evaluating the benefits of synergies in MSP
		b) Develops approaches for analysis and evaluation of benefits			
		c) Using case studies from member countries provided under ToR a			Y3: Manuscript on synergies in marine planning and evaluation of their benefits.
		d)			
g	Work with the ICES data centre to develop, for the purposes of marine planning, aspects of the spatial data facility to improve functionality and content	a) Builds on work to define data needs of MSP and review of ICES data holdings	16, 20, 25, 27	Years 1, 2, 3	Y1: Specification of a “marine planning” Application (story map) in the ICES spatial facility. Y2: A compilation of existing external data sources hosting data for marine planning as potential sources of data feeds (year 1) A prioritised list of data gaps for MSP with particular reference to international / transboundary data. Y3: The development of an ICES “marine planning” Application in the ICES spatial facility.
		b) Recommends functionality to improve the accessibility and utility of existing data holdings for marine planning			
		c) Provides guidance on new data types and sources to enhance existing catalogue			

Summary of the Work Plan

Year 1	<ul style="list-style-type: none"> Follow up on activities from WKPASM (reporting, workshop and model development) ToR b A revised MSP training course outline made available to the ICES secretariat ToR C Workshop to develop a vulnerability and risk assessment approach for culturally significant areas Specification of “marine planning” thematic data portal ToR E A compilation of existing external data sources hosting data for marine planning was potential sources of data feeds ToR G
Year 2	<ul style="list-style-type: none"> Produce a paper on the role of science in MSP based on experiences of member countries ToR A Run a workshop to identify data needs and approaches to cumulative impact assessments of new sectors/pressures and marine vulnerabilities in marine planning ToR B Produce a manual for applying the vulnerability and risk assessment approach in marine planning ToR B Run a workshop to develop a classification system for coexistence and

	<p>synergies in MSP and develop approaches for evaluating the benefits of synergies in MSP ToR F</p> <ul style="list-style-type: none"> • A prioritised list of data gaps for MSP with particular reference to international / transboundary data ToR G
Year 3	<ul style="list-style-type: none"> • Produce a review of key issues in marine planning experienced by ICES member countries and lessons learned ToR A • Prepare a handbook on Bayesian network and bow tie analysis tools for cumulative effects analysis ToR B • Produce a primary paper on meta-models of pressures and their management measures ToR B • A review of the experiences gained through the application of the MSP Challenge serious game and related products ToR C • Produce a review paper on approaches to plan evaluation and monitoring ToR D • A review paper on synergies in marine planning and evaluation of their benefits. ToR F • The development of an ICES “marine planning” thematic portal ToR G

Supporting information

Priority	All ICES member countries are currently responding to drivers for the introduction of marine planning and many are facing common challenges to successful implementation. The groups terms of reference address some of these key challenges and will provide an overview of status, tools, manuals, training products, analysis of processes and data sources to assist with implementation.
Resource requirements	Group members have undertaken to complete the planned work programme from their own institute's resourcing. No additional resources are expected to be required, other than the current level of secretariat support to WG meetings and workshops.
Participants	The Group is normally attended by some 10-20 members and guests.
Secretariat facilities	Web conferencing, publications assistance (CRRs), attendance of data centre staff to some meetings as required. Requirement under ToR G for staff of the Data Centre to assist in creation of a new “marine planning” application (story map) by year 3.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	Group members are well connected across a variety of ACOM and SCICOM working groups. Links to SIHD, interaction with WGINOSE, ICES Data Centre.
Linkages to other organizations	EU MSP Expert Group, OSPAR ICG MSP, HELCOM-VASAB (common members and sharing ToRs for coordination purposes, past joint workshops/training events).

Annex 4: WGMPCZM self-evaluation

- 1) Working Group name: WGMPCZM
- 2) Year of appointment: 2014
- 3) Current Chairs: Andreas Kannen, Germany
- 4) Venues, dates and number of participants per meeting:
 - 7-11 April 2014, Barcelona, Spain, 21 participants
 - 16-20 March 2015, Geesthacht, Germany, 22 participants
 - 14-18 March 2016, Copenhagen, Denmark, 14 participants

WG Evaluation

- 5) If applicable, please indicate the research priorities (and sub priorities) of the Science Plan to which the WG make a significant contribution: see table (ToRs mentioned in the table refer to new ToRs proposed for 2017-2019)

		EG (Name)	Does your EG	
1. Assess the physical, chemical and biological state of regional seas and investigate the predominant climatic, hydrological and biological features and processes that characterise regional ecosystems	SSGEPI	WGMPCZM	No	
2. Quantify the nature and degree of connectivity and separation between regional ecosystems	SSGEPI	WGMPCZM	No	
3. Quantify the different effects of climate change on regional ecosystems and develop species and habitat vulnerability assessments for key species.	SSGEPI	WGMPCZM	No	
4. Understand the influence of climate impacts across a range of temporal and spatial scales, from local to global and from seasonal to multidecadal and identify indicators of climate driven biotic responses and forecast trajectories of change.	SSGEPI	WGMPCZM	No	
5. Quantify the role of structural and functional diversity in marine ecosystems in providing stability and resilience	SSGEPI	WGMPCZM	No	
6. Investigate linear and non-linear ecological responses to change, the impacts of these changes on ecosystem structure and function and their role in causing recruitment and stock variability, depletion and recovery.	SSGEPI	WGMPCZM	No	
7. Develop end to end modelling capability to fully integrate natural and anthropogenic forcing factors affecting	SSGEPI	WGMPCZM	Slightly	Modelling but not
8. Define and quantify north Atlantic Ecosystem Goods and Services, model their dependence on ecosystem processes and habitat condition and their social, economic and cultural value.	SSGEPI	WGMPCZM	Yes	ToR d, e, f

9. Identify indicators of ecosystem state and function for use in the assessment and management of ecosystem goods and services	SSGEPI	WGMPCZM	No	
10. Develop historic baseline of population and community structure and production to be used as a basis for population and system level reference points.	SSGEPI	WGMPCZM	No	
11. Develop methods to quantify multiple direct and indirect impacts from fisheries as well as from mineral extraction, energy generation, aquaculture and other anthropogenic activities and estimate the vulnerability of ecosystems to such impacts.	SSGEPI	WGMPCZM	Yes	ToR b
12. Develop approaches to mitigate impacts from these activities, particularly reduction of non-target mortalities and enhancement/restoration of habitat and assess the effects of these mitigations on marine populations	SSGEPI	WGMPCZM	No	
13. Develop indicators of pressure on populations and ecosystems from human activities such as eutrophication, contaminants and litter release, introduction of alien species and generation of underwater noise.	SSGEPI	WGMPCZM	No	Group works on outputs from this in application to marine planning
14. Evaluate ecological, economic and social trade-offs between ecosystem protection and sustainable use to advise on management of human activity in marine ecosystems	SSGEPI	WGMPCZM	Yes	ToR a, b, e, f
15. Develop tactical and strategic models to support short and long term fisheries management and governance advice and increasingly incorporate spatial components in such models to allow for finer scale management of marine habi-	SSGEPI	WGMPCZM	No	
16. Quantify and map biological, ecological and environmental values with an aim to optimize ecosystem use and minimize environmental impacts in relation to ecosystem carrying capacity	SSGEPI	WGMPCZM	Yes	ToR g
17. Develop science in support of advisory needs in marine aquaculture systems, minimizing environmental impacts and integrating other marine sectors.	SSGEPI	WGMPCZM	Yes	ToR e, f

18. Identify objectives for IEA's that address ecosystem stability and health, taking cognizance of ecological, social and economic sustainability goals as well as multi scale issues.	SSGEPI	WGMPCZM	Yes	ToR a (plan objectives and scales)
19. Identify issue based ecosystem questions relevant to science and management needs that can be addressed by developing IEA's	SSGEPI	WGMPCZM	No	
20. Provide priorities and specifications for data collection frameworks supporting IEA's.	SSGEPI	WGMPCZM	Yes	ToR g (with focus on marine planning)
21. Conduct pilot studies in data rich areas for alternative IEA approaches, linking quantitative and qualitative methods at appropriate spatial and temporal scales.	SSGEPI	WGMPCZM	No	
22. Determine and demonstrate what modelling and analytical approaches will allow projections of ecosystem states in IEA's	SSGEPI	WGMPCZM	No	
23. Use IEA's to in informing management about the effects of cumulative pressure and additive and non-additive impacts, and which provide risk evaluations and analyses of trade-offs between sectoral objectives.	SSGEPI	WGMPCZM	Yes	Tor b) (but not specifically IEA focus)
24. Compare IEA and single issue approaches regarding their efficacy in providing management and governance advice on sectoral and multi-sectoral use of the oceans.	SSGEPI	WGMPCZM	Slightly address	Not a comparative approach but all work of the group is on sectoral / multi-sectoral use of marine space
25. Identify monitoring requirements for science and advisory needs in collaboration with data product users, including a description of variable and data products, spatial and temporal resolution needs, and the desired quality of data and estimates	SSGEPI	WGMPCZM	Yes	ToR g
26. Develop a cost benefit framework to evaluate and optimize monitoring strategies in the context of the capabilities of, and requests from ICES Member Countries and clients.	SSGEPI	WGMPCZM	No	

27. Identify knowledge and methodological monitoring gaps and develop strategies to fill these gaps	SSGEPI	WGMPCZM	Yes	ToR d, e, g may identify monitoring data gaps for plans and their evaluation and cultural value gaps
28. Promote new technologies and opportunities for observation and monitoring and assess their capabilities in the ICES context	SSGEPI	WGMPCZM	Yes	ToR d - new approaches for monitoring of the effectiveness of management / plans
29. Promote the development and testing of new fishing gear technology and methods for selective reduction of by-catch and discards and for mitigation of other environmental impacts of fishing	SSGEPI	WGMPCZM	No	
30. Allocate and coordinate observation and monitoring requests to appropriate expert groups on fishery dependent surveys and sampling and monitor the quality and delivery of data products.	SSGEPI	WGMPCZM	No	
31. Ensure the development of best practice through establishment of guidelines and quality standards for (a) surveys	SSGEPI	WGMPCZM		
Please list any other science priority which you think should be listed here but isn't				
Training, education and capacity building				Yes

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

Evolution of WGMPCZM

Starting in 2003 with the ICES study group on Information Needs for Coastal Zone Management, it was recommended that decision support systems, as applied in decision making for the establishment of aquaculture farms, be applied more generally for the coastal zone. In 2004, the study group recommended that a working group on coastal zone management be formed as means of keeping abreast of scientific development in the coastal zone in addition to requirements for sustainable use and management of the coastal zone. Although progress was made in terms of information and management tools for integrated coastal zone management (ICZM), the newly formed Working Group on Integrated Coastal Zone Management (WGICZM) recognized the need a framework to integrate

evaluate of human impacts in the coastal zone in light of the EU Water Framework Directive (ICES, 2005). Working within the terms of references of the working group, the need for such framework carried through from that point onward with the addition of risk characterization as work was progressing on the development of indicators. In 2009, WGICZM started to examine risk based decision making processes within the context of advancing integrated evaluation of human impacts with governance and structured decision-making within an ecosystem service context. With advent of marine planning, the renamed Working Group on Marine Planning and Coastal Zone Management (WGMP-CZM) adapted the ecosystem approach to management (Rice *et al.*, 2005) to risk and quality management processes based on standards of the International Organization for Standardization (Cormier *et al.*, 2013; Cormier *et al.*, 2015). Given the broader policy needs of marine planning, WGMPCZM broadened their focus towards social-cultural dimensions of ecosystem services and marine policy analysis. With the need to incorporate thresholds of acceptable environmental change, tool that can link legislation and policy to multidisciplinary social and ecological assessments were examined.

ICES Cooperative Research Reports

- Gee, K, Kannen, A. *et al.* 2016. Cultural ecosystem services. ICES Cooperative Research Report (In progress)
- Cormier, R., *et al.* 2016. The use of ISO 31010 Bow-tie analysis of science-policy in marine spatial planning. ICES Cooperative Research Report (In progress).
- Cormier, R., A. Kannen, M. Elliott, and P. Hall. 2015. Marine Spatial Planning Quality Management System. ICES Cooperative Research Report No. 327. 106 pp.
- Cormier, R., A. Kannen, M. Austin and T. Theriault. 2015. The use of science in Marine Spatial Planning decision-making processes. ICES Cooperative Research Report (In press).
- Cormier, R., I. Davies, and A. Kannen. 2013. Integrated coastal-zone risk management. ICES Cooperative Research Report No. 320. 145 pp.
- Cormier, R., A. Kannen, M. Elliott, P. Hall and, I.M. Davies. 2013. Marine and coastal ecosystem-based risk management handbook. ICES Cooperative Research Report No. 317. 60 pp.

ICES Workshops organised by WGMPCZM

- ICES. 2016. Workshop on Conflicts and Coexistence in Marine Spatial Planning (WKCCMSP). 8–12 February 2016 Geesthacht, Germany (report in progress).
- ICES. 2015. Report of the Workshop on Probabilistic Assessments for Spatial Management (WKPSM), 9–13 March 2015, Hamburg, Germany. ICES CM 2015/SSGEPI:16. 32 pp.
- ICES. 2014. Report of the Joint Rijkswaterstaat/DFO/ICES Workshop: Risk Assessment for Spatial Management (WKRAM), 24–28 February 2014, Amsterdam, the Netherlands. ICES CM 2014/SSGHIE:01. 35 pp.
- ICES. 2013. Report of the Joint HZG/LOICZ/ICES Workshop: Mapping Cultural Dimensions of Marine Ecosystem Services (WKCES), 17–21 June 2013, Geesthacht, Germany. ICES CM 2013/SSGHIE:12. 70pp.
- ICES. 2012. Joint DFO/KnowSeas, and ICES Workshop on Quality Assurance in MSP (WKQAMSP), 28 February–1 March 2012, Dartmouth, Canada. ICES CM 2012/SSGHIE:02. 48 pp.

ICES Workshops with contributions from WGMPCZM

- HELCOM/VASAB, OSPAR and ICES. 2012. Report of the Joint HELCOM/VASAB, OSPAR and ICES Workshop on Multi-Disciplinary Case Studies of MSP (WKMCMS), 2-4 November 2011, Lisbon, Portugal. Administrator. 45 pp.
- ICES. 2013. Report of the ICES Workshop to draft Advice on Ecosystem Overviews (WKDECOVER), 4-7 November, ICES HQ, Copenhagen. ICES CM ACOM/SCICOM:03. 15 pp.
- ICES. 2011. Report of the Workshop on the Science for area-based management: Coastal and Marine Spatial Planning in practice (WKCMSP). 1-4 November 2010, Lisbon, Portugal. ICES CM 2011/SSGHIE:01. 25 pp.

ICES Annual Science Conference Sessions

- Kannen, A., Gubbins, M., Gilek, M. 2016: Integration challenges in maritime spatial planning – approaches, science gaps, and communication demands, Conveners for Session L at ICES Annual Science Conference 2016, September 19-23, 2016, Riga, Lithuania
- Kannen, A., R. Cormier, M. Austen and T. Therriault. 2012. Multidisciplinary perspectives in the use (and misuse) of science and scientific advice in Marine Spatial Planning. Conveners for Session I. ICES Annual Science Conference 2012. September 17-21, 2012. Bergen, Norway.
- Cormier, R., B. Morales-Nin and J. Støttrup. 2010. Theme Session B Report – The risk of failing in integrated coastal zone management. ICES Annual Science Conference 2010. September 20-24, 2010, Nantes, France.

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

No formal cooperation with advisory structures exist at the moment. What needs to be considered in the context is that for those WG members representing administrative bodies, WGMPCZM acts as an informal platform for information exchange, which allows to discuss relevant trends and approaches outside of official political agendas. This allows these members to participate in WGMPCZM discussions as experts and not in their formal role as government representatives.

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

Several WG members regularly participate in other national and international meetings, often referring to the work in WGMPCZM. Over several years by this also colleagues from outside ICES got interested in WGMPCZM and became (mostly chair-invited) members. This broadened the disciplinary background of WGMPCZM significantly, e.g. today involving natural and social scientists (from a diverse set of disciplines) as well as experts from government agencies. As well,

several WGMPCZM members collaborate in national research projects or EU projects, e.g. currently in BONUS BALTSPEACE.

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

The main problem is the high level of dynamics that currently exists in MSP. While this makes the work of WGMPCZM relevant, for example for planning practitioners, it is at the same time a huge effort to follow all developments in the different member states. Also, not all members can always attend the annual meetings, partly due to lack of travel funds (in particular scientists), partly due to time constraints or other duties (in particular government representatives).

Future plans

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

Yes, WGMPCZM has with its contributions to the evolving field of MSP, developed a good standing in the MSP community and involves scientists from a diverse set of disciplines and research backgrounds practitioners from authorities responsible for implementation of MSP in several ICES Member States. WGMPCZM is also recognised for example with contributions to VASAB conferences on MSP in the Baltic (in 2014 and again in November 2016) and addresses key challenges in MSP, some of which can only be addressed by research and outside administrative agendas including particularly the contributions from social sciences such as the concept of "Culturally Significant Areas" developed in WKCES and issues of conflict management, risk management and quality management (e.g. CRR 327).

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

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

WGMPCZM requests for an extension.

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

Generally, WGMPCZM already has a quite good mix of experiences, backgrounds and scientific disciplines. However, it also understands itself as a transdisciplinary

group. Additional expertise is usually invited for specific activities, in particular for ICES workshops organised by WGMPCZM members on specific issues, when relevant experts are invited to join.

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

In particular use should be made of products such as the concept of “Culturally Significant Areas” (WKCES 2014) and the MSP Quality Management System (CRR 327, Cormier *et al.* 2015). However, these may not fit directly into typical Advisory products of ICES, but could play a role within the Integrated Ecosystem Assessments (if these refer also to institutional aspects of ecosystem management).