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HUMAN ACTIVITIES, PRESSURES AND IMPACTS STEERING GROUP

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

23–27 April 2018

ICES Headquarters, Copenhagen, Denmark



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Executive summary

The Working Group for Marine Planning and Coastal Zone Management (WGMPCZM) met in Copenhagen, Denmark, 23–27 April 2018 with 14 members present.

A review of developments in marine planning across member countries and funded collaborative projects was informed by a large number of contributions, summarised in Annexes to this report. The roles of science and policy in these case studies were explored by the group and will be the subject of a peer reviewed manuscript to be developed interessionally.

Further development of cumulative effects assessment methodologies was discussed in the context of the output of recent workshops exploring quantitative application of “bow-tie” methodology (WK RASM, WK PASM, WK BNB T). As an outcome of these workshops a manuscript (CRR) is under preparation applying the approach to EU legislation (MSFD) and a peer review paper explaining the challenges encountered has been submitted. As a result the preparation of a manual and handbook for the methodology will no longer be progressed. Instead, a workshop in 2019 is proposed on aggregating common pressures from human activities. Planning was also continued for a UN-ECE symposium on risk management for achievement of targets under Sustainable Development Goal 14 (life below water) in October 2018, Reykjavik, Iceland.

Marine planning skills and capacity were addressed through continued review of development and applications of the MSP challenge serious game, which has become widely used in multiple for an over the last year to great benefit. There was further consideration of the modification and roll out of the ICES training course on MSP again in 2019.

A systematic review of approaches to monitoring and evaluation of marine spatial planning was further developed during the meeting and plan for completion and submission by co-authors agreed.

Work to account for culturally sensitive areas (CSA) in marine planning was continued through review of the outputs of a workshop (WKVSCA) held in early 2018. This workshop report will be completed for June 2018 and will lead to the development of of a CRR and peer reviewed manuscript on the methods to identify CSA and vulnerability and risk assessment of impacts on CSAs.

To develop approaches to evaluate the benefits of coexistence and synergy in MSP, the outputs of the workshop WKCSMSP were reviewed which was held in April 2018 jointly with the Horizon 2020 MUSES project. Here a classification of types of coexistence and synergy was developed, and the role of MSP in promoting these benefits was defined, identifying that MSP alone may not be sufficient in some cases. The workshop outputs will form a report and contribute to a CRR under development for year 3 on this subject.

The development of a spatial data facility of use for MSP at the ICES Data Centre was discussed by the group and with the Data Centre. At previous meetings, data requirements were identified and the availability of data from portals (including ICES) considered. The key data availability gap was identified to be derived pressure data with which to inform plan development. It was decided that an ICES spatial search facility would be useful,

but this needs access to collated marine plan boundaries and further development to be progressed in 2019.

1 Administrative details

Working Group name

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

Year of Appointment within current cycle

2017

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

2

Chair(s)

Matt Gubbins, UK

Andrea Morf, Sweden

Meeting dates

23–27 April 2018

Meeting venue

ICES HQ, Copenhagen, Denmark

2 Terms of Reference

- Assess key issues in the development of marine plans and make recommendations on the role of science to address these. (ToR A).
- Develop cumulative impact assessment techniques for pressures resulting from human activities on the marine environment in the context of marine planning. (ToR B).
- 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 (ToR C).
- Review approaches to plan evaluation and monitoring (ToR D).
- Develop approaches to account for culturally significant areas in marine planning (ToR E).
- Coexistence and synergies in MSP: Develop approaches for evaluating benefits (ToR F).
- 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 (ToR G).

3 Summary of Work plan

Year 1:

- 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 ToR E;
- Specification of “marine planning” thematic data portal ToR G;
- A compilation of existing external data sources hosting data for marine planning as potential sources of data feeds ToR G.

Year 2:

- 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 synergies in MSP and develop approaches for evaluating the benefits of synergies in MSP (reporting by CRR synthesising results from WKCCMSP 2016 and WKCSMP 2018) ToR F;
- A prioritised list of data gaps for MSP with particular reference to international / transboundary data ToR G.

Year 3:

- 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.

4 List of Outcomes and Achievements of the WG in this delivery period

- Submission of a CRR on application of the bow tie approach applied to the MSFD (ToR B): Cormier, R., Elliott, M. and Kannen, A. 2018. IEC/ISO Bow-tie analysis of marine legislation: A case study of the Marine Strategy Framework Directive. ICES Cooperative Research Report (in press).
- Submission of a manuscript on risk based management (ToR B): Cormier, R., Stelzenmüller, V., Irena F. Creed, I.F., Igras, J., Rambo, H., Callies, U., Johnson, L.B. The science-policy interface of risk-based freshwater and marine management systems: From concepts to practical tools. Currently under review at the Journal of Environmental Management.
- Development of a workshop proposal to further develop methodology under ToR B (cumulative effects assessment) on the spatial and temporal distribution of pressures (WKSTDP) in early 2019.
- A number of applications of the MSPChallenge serious game have been implemented over the last year as part of various European projects and training events (see Annex 4 for details), leading to scientific publications currently under development for year 3. ToR C.
- A workshop was run on Vulnerabilities and Risks to Culturally Significant Areas (WKVCSA, 2017/2/HAPISG05); (6–9 February 2018, Geesthacht, chaired by Kira Gee and Andreas Kannen). ToR E
- A workshop was held to develop a classification system for coexistence and synergies in MSP and develop approaches for evaluating the benefits of synergies in MSP (WKCSMSP, 2016/MA2/SSGEPI04); (4–6 April 2018, Edinburgh, Scotland, chaired by Eirik Mikkelsen, Norway and Kira Gee, UK). ToR F

5 Progress report on ToRs and workplan

5.1 ToR A) Assess key issues in the development of marine plans and make recommendations on the role of science to address these

The group received updates on the current status of marine planning in various ICES countries and any issues arising around the use of science (Annex 3). Updates were also given on projects taking place in these countries, and those exploring transboundary planning issues (Annex 3).

Discussions around the role of science in MSP centred on both the data and knowledge needed for an ecosystem-based plan, and the science required to support the *process* of MSP. It was also discussed how researchers tend to try to influence high-level governance and policy (for example the IPCC providing information on climate change to governments), whereas MSP tends to require more discrete information on something specific to a planning process or a plan area. Thus scientists are engaging in a science-policy interface (where science influences policy), whereas planning practitioners require a

policy-science interface, where policy influences what research is undertaken, to answer key questions. This discrepancy creates issues for both communities. It was suggested that this be explored in the manuscript which will be written this year, or in a separate manuscript.

Progress against Workplan

A plan has been developed for the writing of a peer reviewed publication on the role of science in MSP, using the experiences of member countries as case studies. This will be submitted by December 2018, as per the work plan.

5.2 ToR B) Develop Cumulative Impact Assessment Techniques for Pressures Resulting from Human Activities on the Marine Environment in the Context of Marine Planning

The work under this ToR has comprised several aspects:

- a) Continued need for Cumulative Effect Assessment in marine planning
- b) Bayesian Network meta-model for cumulative pressures
- c) Further develop management measures assessment techniques
- d) Linkages with the UNECE standards initiative related to Goals 14 of the UN Sustainable Development Goals

Y1: Follow up from WKPASM activities.

Based on recommendations from WKRAMS, a detailed Bow-tie analysis of existing legislation and policies of a regional European sea using the MSFD as the environmental policy framework was completed. A cooperative research report* is currently at ICES under review and should be published in the next few months.

*Cormier, R., Elliott, M. and Kannen, A. 2018. IEC/ISO Bow-tie analysis of marine legislation: A case study of the Marine Strategy Framework Directive. ICES Cooperative Research Report (in press)

WKBNBT was held in September 2016 to review the results of two case studies as recommended by WKRAMS. A case study to test the use of a Bayesian Belief Network model of a Bow-tie was conducted for sea-floor integrity of the North Sea and nutrient loading in the Great Lakes. A paper* was produced describing the data challenges and complexities to quantify the residual pressures based on a Bow-tie analysis of the management measures used to reduce the cumulative pressures of multiple activities.

*Cormier, R., Stelzenmüller, V., Irena F. Creed, I.F., Igras, J., Rambo, H., Callies, U., Johnson, L.B. XXXX. The science-policy interface of risk-based freshwater and marine management systems: From concepts to practical tools. Currently under review at the Journal of Environmental Management.

Y2: Workshops to identify data needs and approaches to cumulative impact assessments of new sectors/pressures and marine vulnerabilities in marine planning.

Given the lessons learned from WKRAMS, WKPASM and WKBNBT, a workshop is being proposed to examine methods to combine the similar pressures from human activities into an aggregated spatial- temporal distribution. The workshop will review methods used to aggregate the footprint and frequency of occurrence of human activities, review

the current state of the art of spatial-temporal representation of cumulative pressure used in marine spatial planning, examine the potential to standardize the methods and approach for MSP application. A separate workshop WKSTDP resolution is also included in this report.

A joint ICES/UNECE symposium is planned for October 2018. The four session will:

- Session A: Linking the sector-specific measures and practices with conservation measures within an ecosystem-based approach needed to achieve SDG 14 targets
- Session B: The use of Key Performance Indicators (KPI), Key Risk Indicators (KRI) and Key Control Indicators (KCI) to evaluate the performance and effectiveness of the management systems to achieve SDG 14 targets
- Session C: The role of governance, policy and stakeholder in establishing the risk management context and risk tolerances for technical measures in regulatory approaches to achieve SDG 14 targets
- Session D: The role of scientific and technical advisory processes in risk-based regulatory decision-making to ensure the independence of the advice

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.

Given the state of development regarding the series workshops that were held regarding the use of Bow-tie and Bayesian Belief Network to assess the effectiveness of the management measures to reduce pressures at their source, the proposed handbook and manuscript will not be considered.

Progress against Workplan

This ToR has broadly progressed in line with the workplan, with significant publications expected to be produced in year 2, including a CRR publication on the bowtie analysis of European environmental legislation and a peer review publication on the quantification challenges arising from workshops on application of the Bayesian methods to bowtie analysis for cumulative effects. However, because of these challenges, the proposed handbook in year 2 and manual in year 3 have now been dropped from the workplan.

5.3 ToR 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 the Scientific Steering Group for the MSP Challenge Serious Game

Under ToR c) WGMPCZM has two tasks, one being development and provision of an ICES training course on MSP, the other acting as a steering group for the MSP Challenge series of games. The training course on MSP had to be postponed until 2019 due to organizational issues, in particular the time consuming engagement of the envisioned lecturers in the ICES/UNECE Symposium on SDG 14 in October 2018. During the 2018 meeting of WGMPCZM an outline has been developed and sent to Anna Davies in the ICES secretariat for further discussion and technical finalization. The course is envisaged

for February 2019 at ICES headquarter in Copenhagen and plans to make use of the MSP Challenge Boardgame version throughout the course. The course will specifically focus on designing and managing MSP processes.

In recent years, significant progress has been made in the development of the MSP Challenge game series. Several editions of the board game versions are now in use in a range of institutions and countries. As well, several members of WGMPCZM have used different versions of the game in projects, teaching and training courses and/or played the game at several occasions. The digital version has been constantly further developed and expanded by including ecosystem models using Ecopath with EcoSim (EwE) for the North Sea. A review of developments in the last years is included in the Annex 4. From discussions at WGMPCZM 2018 the proposal to develop an additional new training course focusing on the use of ecosystem modelling in MSP and building on the digital version of MSP Challenge evolved. This will be further explored with the game developers in the next months. This course would specifically target people interested in exploring the role of ecosystem modelling in MSP.

Progress against Workplan

Good progress has been made in this ToR against the workplan with continued development and uptake of the serious game in many formats and development of a training course for 2019. The working group should be in a good position to review experiences as per the workplan in year 3.

5.4 ToR D) Review Approaches to Plan Evaluation and Monitoring

Monitoring and evaluation is a common step in the framework of MSP (IOC UNESCO, 2009 and others), however there is little in the way of commonality of approach to monitoring and evaluation of marine planning, with divergent approaches becoming apparent at different levels (EU, national, regional) and between countries. Monitoring and evaluation exercises tend to conform to one of three objectives: to evaluate the effectiveness of a plan, evaluate the process or evaluate the implementation of policies.

Time was spent during the meeting further developing the structure and content of a paper to systematically review approaches to monitoring and evaluation. The manuscript draws on monitoring evaluation experiences in member countries, defines a typology of approaches and critically reviews those that have been applied. Authors, section titles and rough content were identified during the meeting together with an indicative timeline for production.

Progress against Workplan

This ToR is on target for the production of a systematic review of the issue in year 3.

5.5 ToR E) Develop Approaches to Account for Culturally Significant Areas in Marine Planning

During year 2, WGMPCZM ran a workshop to develop a vulnerability and risk assessment approach for culturally significant areas.

The work of WKCES (ICES CM 2013/SSGHIE:12) has served as a starting point for developing a comprehensive body of work related to socio-cultural values and how they can be accounted for in MSP. WKCES analysed concepts of socio-cultural value in some detail and developed a method to identify and spatialise such values. Its main achievement was to develop the concept of “culturally significant areas”, a framework modelled on the idea of “ecologically and biologically significant areas”. The CSA approach was subsequently further refined and presented in a scientific paper (Gee *et al.*, 2017).

Once identified, CSAs can be subjected to a risk management approach, based on establishing the key qualities that are needed to sustain each CSA and the risks that various developments might pose to these qualities. This firstly requires a specification of the features and values that make up various CSAs. Examples of the key qualities that make up CSAs may be their aesthetic qualities, or the presence of particular species, or a combination of qualities that facilitate certain cultural activities in an area. Loosely following a DPSIR logic (Drivers-Pressures-State-Impact-Response), the next stage would be to identify pressures that could affect these specific qualities (e.g. noise, large visible infrastructure), and the susceptibility (sensitivity) of areas and features to these pressures. Sensitivity to pressures then leads to a consideration of vulnerability, which, in addition to sensitivity to pressures, would also include external circumstances – e.g. mitigating management measures or the likelihood of change. Risk assessment is the next step in this logic, asking what the consequences of change would be and how severe these consequences of a particular development or change would be (e.g. displacement, total loss). In the DPSIR logic, risk assessment would be linked to state and human welfare changes, expressed for example as enjoyment, monetary values, traditions etc. The aim is to specify risk indicators for different types of CSAs, based on pressures, susceptibilities to pressures and the likely impacts of these pressures, as well as control indicators that could indicate the success of a particular management measure.

Based on the above, the workshop on Vulnerabilities and Risks to Culturally Significant Areas (WKVCSA, 2017/2/HAPISG05); (6–9 February 2018, Geesthacht, chaired by Kira Gee and Andreas Kannen) addressed the following main aspects:

- a) In each Culturally Significant Area: What are the cultural assets in question?
- b) What pressures are these assets vulnerable to?
- c) What are the risks of not managing these pressures adequately?

Results will be available in the workshop report.

Progress against Workplan

Work is progressing according to the plan. A CRR on CSAs will be prepared as an output for Year 3, encompassing the results of WKCES and WKVCSA. The CRR will take the form of a manual and outline the methodology for identifying CSAs and conducting a vulnerability and risk assessment. A paper specifically on the vulnerability and risk assessment element of the CSA approach will also be available by Year 3.

5.6 ToR F) Coexistence and Synergies in MSP: Develop Approaches for Evaluating Benefits

ToR F built on the work of the previous years, including the workshop on conflicts and coexistence in MSP (WKCCMSP 2016). A workshop was held to develop a classification system for coexistence and synergies in MSP and develop approaches for evaluating the benefits of synergies in MSP (WKCSMSP, 2016/MA2/SSGEPI04). The workshop was organised jointly with the H2020 MUSES project and Marine Scotland and took place in Edinburgh, UK, 4-6 April 2018. Specific aims were to:

- a) Improve on ways to classify and understand coexistence and synergies in marine use;
- b) Provide advice on how coexistence and synergies can be furthered in a MSP process.

The workshop provided an overview of different types of coexistence and synergy and built on MUSES results to classify them according to a range of descriptive parameters. It then considered the various driving forces that would lead maritime sectors to seek out or at least consider coexistence and synergy with other sectors. Questions were addressed with respect to the level of coexistence and synergy desired, as well as practical barriers. The workshop also considered the role of MSP in facilitating coexistence and synergy, noting that the role of MSP may change depending on the stage of the planning cycle and that although MSP may well act as a platform to promote coexistence and synergies and to highlight barriers, the barriers cannot always be addressed by MSP (e.g. licensing, financing, wider policy). Lastly, the workshop also considered MSP tools and skills and requirements for promoting coexistence and synergy.

Progress against Workplan

Progress with this ToR is on track. A combined CRR, also encompassing the results of the present workshop and “Conflicts and Coexistence in MSP” (WKCCMSP), edited by the WKCCMSP Chairs (Kira Gee, Germany, and Andreas Kannen, Germany), as reviewed and approved by the Chair of the SSGEPI, will be prepared by Year 3.

5.7 ToR 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

The requirement for this work stemmed from recommendations of the ICES Strategic Initiative on MSP and has formed part of the terms of reference for several years. This work:

- a) Builds on work to define data needs of MSP and review of ICES data holdings;
- 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.

During its meeting in 2016, WGMPCZM reviewed the data holdings of the spatial data facility and noted that the content was geographically broad, covered many of the key

data types required to inform marine plans (human uses, pressures, environmental sensitivities, management area boundaries etc) but that finding, viewing and searching the content in a manner useful to marine planners would require further technical development.

The WG proposed for 2017 to look across the marine spatial data portal “landscape” and compile existing external data sources hosting MSP relevant data. In effect this task was already accomplished by the MSP Platform (<http://www.msp-platform.eu/>), EMODNET, IOC UNESCO and through “portals of portals” being developed in projects such as SIMCelt (<http://www.simcelt.eu/>). These sites may act as source of data readily available for marine planning applications, but there remain many instances where the ICES data holdings could add value at the baseline information gathering phase of MSP as well as serve as a source for further derived data products (pressures, vulnerabilities, conflict identification etc) of use for plan development.

For 2018, it was proposed to develop a prioritised list of data gaps for marine planning. Much of the discussion on ToR B (Cumulative effects) during this 2018 meeting was focussed on the need for data on pressures arising from human activities. These data are largely lacking, often resulting in proxies for pressure being used by simply compiling activity data. Real quantitative methods to assess cumulative pressures are lacking, leading to an inability to manage these pressures effectively through MSP and avoid unacceptable levels of environmental impact. It is therefore the view of the working group that pressure data are the highest priority data gap for marine planning purposes and that efforts are needed (for example through the proposed WKSTDP workshop) to develop these further.

In the WG workplan is a task by year 3 to develop an ICES “marine planning thematic portal”. In discussion with the ICES Data Centre it was identified that bearing in mind the points above this would most usefully take the form of a “spatial filtering tool” allowing a search of the ICES spatial data facility according to planning units (plan region boundaries). These are provisionally available for European Economic Zones and territorial waters from e.g. www.marineregions.org as a starting point but should be improved through the addition of planning subdivisions such as: Scottish Marine Region boundaries, Swedish Municipalities, Finnish regional boundaries and Norwegian municipal coastal zone boundaries. These areas could then be used to spatially filter data holdings and improve access to relevant data in the ICES spatial facility.

Further categorisation of the filtered data would then be useful to allow sorting by a typology relevant to marine planning, whilst ensuring INSPIRE compliance. Should the facility prove useful during testing, then a further “Story Map” function could be created to act as a suitable landing page for the marine planning facility. This could both tell the “story” of marine planning and showcase the search facility.

Actions:

- 1) WGMPCZM to provide the plan boundaries to the Data Centre (Nov 2018);
- 2) Data Centre and WG members (Marine Scotland) to work together to develop a business case for the marine planning search application and progress development. (2019);

- 3) Assess the usefulness of a draft product and if appropriate create a story map (2019).

Progress against Workplan

This ToR is largely on track having considered both availability of data and identifying the key data gap in the first 2 years. There is however potentially a large task to complete by year 3, which is the development of a facility with the data centre, which will require the provision of plan boundary data, developing business case and developing a spatial search facility.

6 Revisions to the work plan and justification

As explained above, some revisions to the workplan have been necessary and the revised workplan for Years 2 and 3 is presented below:

Year 2

- Produce a paper on the role of science in MSP based on experiences of member countries ToR A
- Run a workshop to develop a classification system for coexistence and synergies in MSP and develop approaches for evaluating the benefits of synergies in MSP (reporting by CRR) ToR F
- Develop with the Data Centre a business case for the development of marine planning application and provide marine plan boundaries to create a spatial data search facility ToR G
- Produce a report (CRR) on the potential application of the culturally significant area concept in coastal and marine spatial planning ToR E

Year 3

- Produce a review of key issues in marine planning experienced by ICES member countries and lessons learned ToR A
- Run a workshop on Spatial and Temporal Distribution of Pressures early 2019 ToR B
- Produce a primary paper on meta-models of pressures and their management measures ToR B (Completed year 2)
- A review of the experiences gained through development and 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

7 Next meetings

ICES WGMPCZM will next meet in Galway, Ireland, 8–12 April 2019.

Annex 1: List of participants

Name	Institute	Country	Email
Andrea Morf (chair)	Swedish Institute for the Marine Environment	Sweden	andrea.morf@havsmiljoinstitutet.se
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Wojciech Wawrzynski	ICES secretariat		Wojciech@ices.dk

Annex 2: Recommendations

None.

Annex 3: ToR a) Assess key issues in the development of marine plans and make recommendations on the role of science to address these

ToR a) currently consists of interrelated interests, which provides the context for the whole work of the WG: a) receive updates on the issues arising in ICES countries marine plans; b) special emphasis on issues related to cross-border / transnational planning and lands-sea interactions; c) receive assessments from country reports on the use of science (natural, social, economic) data, information and advice in the plan development process.

COUNTRY UPDATES

Belgium (Lisa Devriese)

In 2017, the review process for the Marine Spatial Plan (MSP) for the Belgian part of the North Sea was started, and an initiative was launched for the development of the long-term vision for the North Sea (2050). Both processes followed their own trajectory and timing. One of the working groups within the North Sea 2050 initiative was involved with the multi-use of the marine space. In this working group, the major principles and mechanisms that could lead to a more efficient use of space in the Belgian part of the North Sea were examined. In December 2017 the Secretary of State for the North Sea presented the final North Sea 2050 vision and this initiative has since been renamed into the 'Think Tank North Sea', which will facilitate the bottom-up consultation regarding the future of the Belgian part of the North Sea under the chairmanship of the Operational Directorate Natural Environment (OD Nature) and the Flanders Marine Institute (VLIZ) (<http://www.thinktanknorthsea.be/>). The North Sea 2050 vision is included as a guideline for the new Marine Spatial Plan (2020-2026). An advisory commission was appointed (Flemish and Federal level), responsible for coordination between the administrations involved in the management of the exploration and exploitation of the continental shelf and the territorial sea. During April 2018, the Council of Ministers approved a draft Royal Decree that establishes the Marine Spatial Plan 2020-2026 for the Belgian part of the North Sea. The Secretary of State for the North Sea will submit this draft MSP to the regions of Belgium and the neighbouring countries, and it will become available for public consultation in the upcoming weeks.

By the end of 2018, there will be a new version of the Belgian Compendium for Coast and Sea (VLIZ); website: <http://www.compendiumkustenzee.be/en>

The public consultation of the MRP will be available (in Dutch or French) on: <https://www.health.belgium.be/nl/milieu/milieurechten/federale-openbare-raadplegingen>

Contact MSP Belgium: Jesse Verhalle (jesse.verhalle@milieu.belgie.be) from the Federal Public Service Health, Food Chain Safety and Environment.

Denmark (Suzanne Dael)

In Denmark, transposition of the MSP Directive into national law was completed in 2016, and preparation of the country's first maritime spatial plan commenced shortly thereafter. The Danish Maritime Authority is the competent authority for maritime planning in

Denmark and functions as the Secretariat for the process. Also involved in a governmental working group on ocean planning are sixteen separate authorities from eight ministries that all work with maritime affairs (offshore energy, marine environmental management, fisheries management, etc).

Together, the participating authorities have agglomerated a knowledge base for the coming maritime spatial plan that consists of data, legal memoranda and independent analyses of the current marine and maritime conditions and uses of Denmark's sea area, which covers 105 000 km² in the North and Baltic Seas. The mapping element of the knowledge base consists of approximately 100 data layers, most of which implement the INSPIRE principles and reflect up-to-date information on the state and uses of the ocean. The knowledge base has been augmented with input from approximately 60 stakeholder groups and input from many of Denmark's 75 coastal municipalities. The coastal municipalities are responsible for the planning on land that will abut the contents of the maritime spatial plan along the coastline.

Currently, the national authorities responsible for the sectors to be covered by the MSP (the energy sector at sea; maritime transport; fishing and aquaculture; extraction of raw materials from the sea; and preservation, protection and improvement of the environment) are generating data on anticipated future uses of sea areas to be used in identifying appropriate reservations for these activities during the plan's period of enforcement. The intention is that the first maritime spatial plan will be adopted in 2021 and will be in force for a period of up to ten years.

England (Christopher Sweeting, Stacey Clarke and Jacqueline Tweddle)

English waters have been split into 11 regions for the purposes of marine planning. A lot has been published on plan timelines, drafts, reviews, etc., and is available on the MMO's planning webpages, which are up to date.

The [East marine plan](#) was published 2014, reviewed 2017 and will be reviewed every three years from adoption in line with Marine and Coastal Access Act (2009) requirements. The link includes all the materials, e.g. the plan itself, the progress report (review) and so on. This is the only adopted plan and the only one to go through a full review cycle. The review process in part looked at progress of the plans against plan objectives, but it was hard to access progress after only 3 years, and to draw out exactly what was due to the plan and what to other non-plan factors.

The [South Plans](#) are in the post consultation phase with government. The latest version in the draft plan. This will be superseded on adoption with the final plan but the draft plan is a material consideration in decision making currently. The exact timeline for the South is unsure, but adoption is expected in the coming months, and therefore a review in 2021.

Remaining plans (contained in [link](#)) are in the options phase. These are being developed slightly differently and iteratively. 2nd iteration documents are available. They provide a direction of travel, some progress building and early sight but do not count as draft plans and are therefore not a material consideration in decision making. The timeline is on track and detailed in the pages, but briefly 3rd iteration is spring 2019, consultation on draft plan mid-late 2019 (becomes a material consideration in decisions) and submission to government 2020 with all plans adopted by 2021.

Use of evidence in MSP

In England and Wales MSP processes the competent authorities undertook a strategic evidence review towards the start of the MSP process. This enabled a baseline understanding of current status of knowledge with a scientific/quantitative/statutory basis to be utilised to help formulate initial draft objectives and policy. It also helped highlight evidence gaps and determine where stronger or more specific policies were likely to be accepted. Throughout the MSP process further evidence was collected towards filling evidence gaps where possible, and stakeholder engagement often highlighted 'new' evidence that could help add local flavour to the marine plans. This latter evidence was not always of the right scale or scope to be of direct use in the MSP process, but was often useful in discussion with stakeholders or for use by other departments.

Estonia (Robert Aps)

As of July 1st, 2015, Estonia has a new Planning Act which also regulates maritime spatial planning. The national maritime spatial plan will cover both the territorial waters and the EEZ. Possible subjects to be covered in the MSP are infrastructure (energy, transport), providing sustainable use of fisheries, taking into account the MPAs and describing measures for maintaining the good and healthy status of the environment. The maritime spatial plan will be a long-term national level plan, which will give guidelines to different institutions in charge of allowing the use of marine areas for different purposes, such as offshore energy, shipping etc. A Strategic Environmental Assessment (SEA) is compulsory for the maritime spatial plan, according to the Planning Act in force since July 2015.

In parallel, Estonia has developed and adopted two legally binding county plans derived from two pilot projects. They remain in effect even after the adoption of the new Planning Act. These two pilot regional maritime spatial plans do not cover coastal terrestrial areas but view the area as functionally interlinked with the sea. Local governments must take requirements of the plan into account while planning on terrestrial areas.

Compared to other Baltic Sea Region countries, the intensity of sea space use in Estonia is moderate. Current main uses: shipping, fishing, tourism, nature protection. Shipping is very active between Helsinki and Tallinn. Fisheries sector is strong and will remain so. Concerns: nature protection and recreation. Future uses: shipping, fishing, nature protection, tourism, offshore renewable energy and aquaculture.

France (Lodewijk Abspoel)

Preparing a draft plan for consultation by the end of this year.

Ireland (Caitriona Nic Aonghusa)

Ireland's marine territory covers approx. 880 000km², making Ireland one of the largest EU states when the seabed area is taken into account. We have sovereign or exclusive rights over one of the largest sea to land ratios (over 10:1) of any EU State.

The Integrated Marine Plan for Ireland, Harnessing Our Ocean Wealth^[1], provides a policy framework for the sustainable development and protection of our marine re-

source. It sets out two ambitious economic targets. The first is to exceed €6.4 billion a year turnover in Ireland's ocean economy by 2020. The second is to double the contribution to GDP to 2.4% a year by 2030.

In 2016, Ireland initiated the Marine Spatial Planning process to support sustainable development of the marine resource. Directive 2014/89/EU establishing a framework for maritime spatial planning was transposed into Irish legislation by SI 352 of 2016: European Union (Framework for Maritime Spatial Planning) regulations 2016. The Department of Housing, Planning and Local Government is the competent authority responsible for implementation of MSP in Ireland. The Marine Institute is supporting the process by providing the necessary technical and scientific advice. The objectives and purpose of the Irish MSP are outlined in the legislation. It will have regard to economic, social and environmental aspects to support sustainable development and growth; apply an ecosystem based approach and will promote the co-existence of relevant activities and uses. The purposes of the Irish MSP concern the sustainable development of energy sectors at sea, maritime transport, fisheries and aquaculture sectors and preserving, protecting and improving the environment

In December 2017, the Minister for Housing Planning and Local Government published a roadmap for the development of Ireland's first marine spatial plan, *Towards a Marine Spatial Plan for Ireland*^[2]. There are four stages in the development of the plan:

- Activation phase: DHPLG announced proposed approach to developing MSP and made initial contact with stakeholders. An interdepartmental implementation group and high level advisory group were set up. This was completed by end 2017.
- Main development stage: Commencing in 2018 and on-going until end Q3 2019. This involves the analysis and identification of data and information required to provide a robust evidence base to underpin the MSP. An evidence and issues paper will be published and available for formal public consultation by late 2018. This process will inform the development of a full draft plan for publication in 2019 with a further consultation process running until end 2019.
- Finalisation stage: The final plan will be prepared for submission to Government in 2020 with supporting Strategic Environmental Assessment and Appropriate Assessment for approval before final submission to the European Commission ahead of the March 2021 deadline set out under the directive.
- Implementation and review: Commencing on publication of the final Marine Spatial Plan.

The preparation of Ireland's Marine Spatial Plan is underpinned by a number of scientific and technical MSP projects. The projects are led by the Marine Institute and relate to spatial data and evidence and MSP data management. They are funded under the European Maritime Fisheries Fund and are aimed at improving our knowledge about the sustainable use of marine & coastal resources and protection of the marine environment. The MSP Spatial Data and Evidence Projects are:

- Data Discovery, Collation and Gap Analysis;
- Data Prioritisation and Collection;

- Assess and Map Marine Ecosystems Services;
- Mapping the Potential Impacts of Climate Change;
- Best Practice on Modelling and Support Tools for Integrating Marine Spatial Data.

As part of existing scientific and monitoring programmes, the Marine Institute manages an array of data associated with human activities, marine environment, conservation, oceanography, climate change, seabed, marine policy. Existing datasets are being re-used, analysed and visualised to produce spatial products for MSP. Data are currently available through Ireland's Marine Atlas[3]. This is a web-based GIS tool that hosts MSP relevant spatial data from a wide range of organisations. Data governance procedures are a key element of this. There is a requirement to maintain and update existing datasets and include other sources of data. There is an emphasis on integrated data management and data governance. An MSP data strategy is being prepared and licence agreements for use of external data are being put in place. The Marine Institute is developing a data catalogue and a process to report QC of data.

[1]

<https://www.ouroceanwealth.ie/sites/default/files/sites/default/files/Harnessing%20Our%20Ocean%20Wealth%20Report.pdf>

[2]

http://www.housing.gov.ie/sites/default/files/publications/files/towards_a_marine_spatial_plan_for_ireland.pdf

[3] <http://atlas.marine.ie>

Germany (Kira Gee, Bettina Kaeppler and Andreas Kannen)

Germany has two maritime spatial plans for the EEZ in place and three at the level of the Laender for its territorial waters.

Spatial Plans for the EEZ in the North Sea and the Baltic Sea have been in place since 2009 and will be revised from 2018 onwards with new plans expected to enter into force in 2021 as set out in a draft timetable. A Scientific Advisory Board has been established in March 2018 to support the development of the new plans. Currently this includes seven members from scientific research institutions with various professional backgrounds and expertise, ranging from international and environmental law to Strategic Environmental Assessment, social sciences and fisheries research. Andreas Kannen, Kira Gee and Vanessa Stelzenmüller, all members of WGMPCZM, are among the members of this advisory board. The draft time-table for the revision proposes to start with a status report in 2018. This will include

- an evaluation of process, content and impact of the first set of plans (in force since 2009);
- an analysis of the changes in the legal, economic, political and environmental framework since then;
- an updated data and evidence base including insights from past and on-going international MSP projects;

- conclusions for the set-up, process and content for the revised plans including monitoring and evaluation criteria and indicators.

From this document, first ideas and scenarios for both sea areas will be drafted, exploring some alternative foci or priorities etc. These are then going to be discussed nationally and internationally to prepare a sound basis for the development of the first full draft plans in 2019.

In the new Federal government, established in 2018, responsibility for Maritime Spatial Planning and related staff will be shifted from the Ministry of Transport to the Ministry of the Interior, Building and Community, with MSP allocated to the new “Community”-Department. Whether this ministerial shift will have an impact on MSP for the EEZ or the planning process is not yet known.

At the Laender level, the state of Mecklenburg-Vorpommern included its marine areas in its regional development programme first time in 2005 and extended the marine component in its revised development programme, which entered into force in June 2016. The state of Schleswig-Holstein also included its territorial seas in its state-wide spatial planning report in 2005 and in its state development plan in 2010, but with only very few specific spatial planning designations. However, existing designations from sector-specific planning, such as the Wadden Sea National Park have been included. Revision of the state-wide development plan has started in 2018. In Lower Saxony in the state-wide spatial planning programme dates back to 2008, where coastal issues, principles of Integrated Coastal Zone Management (ICZM) and issues referring to territorial seas were taken up for the first time. This programme has been subsequently revised in 2012 and 2017.

Netherlands (Lodewijk Abspoel)

The current Maritime Spatial policy Plan for the Netherlands and the accompanying spatial map is an integral part of the [North Sea Policy Plan](#) 2016-2021. The plan is an appendix to the National Water Plan. The Marine Strategy (MSFD) and measures to achieve Good Ecological Status are an integral part of the MSP policy plan. The plan also encompasses the assessment framework for consenting licences.

Politically guided international cooperation with North Seas countries and the European Commission for offshore wind has started in 2016. MSP and ecology are the topics in support group 1, which is co-chaired by the Netherlands.

In summer 2016, work has started on a national strategy for the North Sea towards 2030. Prime focus is on the roll out of offshore wind farms, ecology and a future for fisheries and aquaculture. Part of the implementation of the plan is further work on cumulative effects.

In autumn 2017, a new government was installed, which lead to a change in the governance structure for maritime spatial planning and the topics it covers. The ministries for the Interior and Economic Affairs & Climate are the first responsible for offshore wind energy. In collaboration with ministries of Infrastructure and Water (responsible for overall coordination of the North Sea and MSFD) and of Agriculture, Nature and Food security (fisheries, aquaculture, mariculture and N2000) and the management organisation Rijkswaterstaat a [roadmap for offshore wind development up to 2030](#) was presented

to parliament in March 2018. The roadmap has been put together in close working cooperation with TSO TenneT and in consultation with all stakeholders involved. It foresees an installed capacity of 11.5 GigaWatts by 2030, bringing renewable power to 40% of today's electricity consumption. However, the conservation goals for seabirds and the available capacity to feed and transport electricity from the offshore wind farms to the high-voltage grid on land do impose significant limitations. Four initial and essential activities include:

- 1) allotment of the wind farm zones into sites, including the kicking off of the preparatory studies into the geophysical conditions and cultural-historical values offshore;
- 2) further development of the design of the offshore grid by TenneT and any possible alternatives, including the potential application of an island;
- 3) exploration of the connection points and corresponding routes for the offshore grids to and over land;
- 4) update of the Ecology and Cumulation Framework for the offshore wind farms, which includes the Roadmap 2030.

The North Sea 2030 Strategy is due for adoption by ministers in autumn 2019 and will feed into the next MSP cycle starting thereafter. A new MSP will need to be ready for national and international consultation by summer 2021, including a Strategic Environmental Assessment. This SEA will need to confirm that future combined uses of the sea is not contradicting conservation and restoration objectives of MSFD and N2000.

Norway (Eirik Mikkelsen)

Marine spatial planning for Norway mainly happens on two levels. 1) Municipal coastal zone planning cover out to 1 nm beyond the baseline, with the municipalities as the planning authority, but various sector authorities can make formal objections blocking proposed plans; 2) Integrated Management Plans are made for the ocean areas beyond the coastal zone: Barents Sea and Lofoten; Norwegian Sea; North Sea and Skagerrak. They are decided in Parliament.

Much of the coastal zone planning has been motivated by and related to aquaculture. Following the development of the aquaculture industry, the distribution of benefits and burdens between municipalities have changed accordingly. This relates both to the production and the ownership structure. As a consequence, a number of municipalities have become reluctant to set coastal areas aside for aquaculture, and have also asked for some form of taxation that would guarantee income from the aquaculture activities. Several recent changes and initiatives in aquaculture management can affect this, and thus the municipalities' incentives to prioritise aquaculture in coastal zone planning.

The last 7-8 years the municipalities have had the possibility to levy property tax on aquaculture farms, but this has not given sufficient income in the municipalities' view. In response, the government established an Aquaculture Fund in 2016, that direct 80 % of the fees for new licenses for grow out of salmon or trout in sea to the municipalities. The fees are distributed among all the municipalities that host aquaculture localities, not just the ones with newly established localities. The first payment was made in 2017. It is still too early to say how this will affect the municipalities' willingness to prioritise aquacul-

ture in coastal zone planning, but the expectation is that it will increase. The municipal transfers from the Aquaculture Fund will depend on new licenses. Without growth in the aquaculture production capacity, there will not be income to the municipalities through the Fund.

The latter years the growth have been rather limited due to problems dealing with salmon lice in the fish farms. This parasite is a threat to stocks of wild salmon and sea trout, and also impacts the farmed fish. The treatments to deal with salmon lice in the farms also impacts the mortality and growth of the farmed fish, and give considerable costs for the farmers.

To try to deal with the environmental challenges, in particular salmon lice, the management of salmon aquaculture have undergone significant changes from 2017. So-called Production Areas and a “traffic light system” have been introduced. The coast of Norway is divided into 13 Production Areas, and in each area the induced mortality on wild fish stocks due to salmon lice in the fish farms is assessed. Every two years the different areas are colour-coded either red, yellow or green depending on the assessed mortality. In green areas, the salmon aquaculture production volume can be increased by 6 % over two years, in red areas it should be reduced by 6 %, and in the yellow areas it can remain. Farmers that can document little problems with lice, according to a defined set of criteria, can be allowed to increase production independent of the colour coding of the Production Area they are in. Increased production capacity is being distributed in 2018. The fee for this is currently set at 94-113 million NOK for a standard license (ca 10 M€), but some of the capacity will be auctioned off. Although the total fee for increased capacity is not yet determined, it is clear that this will give substantial income to the municipalities.

Despite the introduction of the Aquaculture Fund, the Norwegian Parliament made a decision in 2017 that the government should work towards an export tax on unprocessed farmed salmon to give income to the municipalities, to be introduced by summer of 2018. So far, the government has dismissed this, stating that it conflicts with international trade regulations.

Through coastal zone planning, one municipality has challenged the division of labour between CZP (the municipalities, based on the the Planning and Building Act (PBA)) and aquaculture management (through the sector authorities, based on the Aquaculture Act). Osterøy Municipality wanted to set environmental targets for aquaculture, based on a PBA paragraph. They wanted aquaculture operations in one area to have «minimal to no emissions». First, there were formal objection from the county administration, but they were later withdrawn. If the formal objection had not been withdrawn, the issue would have gone up to the Ministry in charge of the PBA for final decision. For now, the boundary between municipal and sectors authorities' competence in managing some environmental aspects of aquaculture have been blurred somewhat.

The Integrated Management Plans are MSP on a large geographical scale. They shall be revised every 12 years, and updated every 4 years.

A joint «Expert forum» (“Faglig forum”) has been established to produce and update the knowledge base for all the plans. The Barents Sea and Lofoten plan was the first to be made. It was first ready in 2005, and was updated in 2010-11. The plan shall be updated again in 2020. The Norwegian Sea plan came in 2009, and was updated with a White

paper in 2016. The North Sea and Skagerak plan was finished in 2013. For all these plans, the science base is being updated in 2018-19.

Wales (Stacey Clarke)

The Welsh National Marine Plan public consultation has closed with close to 100 responses received. The team are now analysing the responses and aim to have a publicly available summary of responses produced before the summer parliamentary recess. Depending on the nature of responses this will determine if a final draft plan can be produced by Spring 2019, or whether further public consultation or Independent investigation will be required which could add on another 6 months to the timetable. Regarding evidence around the plan Cefas are taking the lead on behalf of the Welsh Government in identifying evidence needs and drawing up a priority list. This will aim to update the evidence that sits behind the marine plan (Welsh Marine Plan Evidence Report) and look at possible evidence required to help with plan monitoring. It will also look to identify where bordering nations have similar marine planning and related (e.g. cumulative impact) evidence needs. Evidence and further refinement of spatial elements of the plan will be considered in more depth by a separate project being undertaken by consultants looking specifically at the Strategic Resource Areas. The evidence portal and evidence hub are also being reviewed to make more public friendly, and with regards to the portal to determine if/how it can be best linked to bordering nations plan portals. Cross border engagement and involvement in evidence and plan implementation will be a key wider aspect of the Welsh planning teams work and engagement with ICES is welcomed. Finally, in regards to cross boarder planning, I have just received word from Irish marine planning colleagues (Philip Nugent) that: *we've finally sent out the formal invitations to colleagues in England, Northern Ireland, Scotland and Wales proposing the establishment of a new Five Planning Administrations Group. Hoping to have the first meeting in Cork this June.*

Project Updates

ATLAS (Matthew Gubbins)

The Horizon 2020 ATLAS project (A transatlantic assessment and deep water ecosystem based spatial management plan for Europe) <https://www.eu-atlas.org/> aims to improve our understanding of deep sea ecosystems and their associated species, predict future changes to species, habitats and vulnerabilities in the face of climate change. The knowledge base the project develops aims to inform the development of international policies to ensure Atlantic deep-sea resources are managed effectively, contributing to the European Commission's long term blue growth strategy, supporting sustainable growth of the maritime economy as a whole. The project comprises 24 partners from countries bordering the North Atlantic basin, including the USA and Canada. Twelve case studies related to blue growth potential across the main Atlantic currents are being progressed in relation to a series of workpackages. Of interest to WGMPCZM is Workpackage 6 "marine spatial planning". Here the activities of previous workpackages in relation to case studies will be analysed according to the steps identified in the EU MESMA project (<http://www.mesma.org/>) to develop proposals for spatial management

plans. Case studies have reached the stage of defining objectives (blue growth agendas) and have collated relevant data concerning Current uses, environmental sensitivities and future uses (a blue growth scenario); (MESMA steps 1 & 2). Next steps will be to analyse and assess risks and develop proposals for changes in spatial management. It will be important to present these in the context of the existing management regime, whether that be fisheries management, MPA networks or MSPs in place or under development.

BaltSpace (Andrea Morf & Kira Gee)

The BONUS financed project BaltSpace is just about to be concluded and its results are becoming available on the website and scientific publications (2015-18). BALTSPEACE is the first transnational, interdisciplinary MSP research project in the Baltic Sea Region, complementing a long chain of past and current MSP projects in the Baltic. For the last three years eight partners from five countries have been working for a better understanding of four different key challenges and enablers to integrate in MSP, namely trans-boundary, policy and sector, stakeholder and knowledge integration.

- In Work package 1, analytical and evaluation frameworks were developed (see reports D 1.X). The research shows that the four challenges identified are indeed relevant and are a useful starting point for analysing MSP initiatives – also from an evaluation perspective. Not just ecological, economic and social sustainability should be evaluated, but also the sustainability of governance.
- In Work Package 2, five different case studies analysed integration challenges and enablers in MSP practice (the overall Baltic, the Sound between Denmark and Sweden, German territorial and EEZ planning, integration of the fisheries sector into Polish MSP and MSP of Latvia and Lithuania). A comprehensive list of challenges and several reports and papers has resulted from this (see movie, policy briefs, and D 2.X reports).
- Work package 3 has focused on analysing seven tools and approaches in relation to their potential for supporting integration in MSP. All tools were found to be potentially useful, although most need to be adapted to the specific context of application (see D 3.X deliverables).
- In WP 4 interactive ways of working with stakeholders and presenting project results were tested with end users (marine stakeholders and planners).

Link to the main page with an interactive movie where one can explore the four different dimensions of integration and challenges and enablers: <https://www.baltspace.eu/>

Reports and all other products can be downloaded here:

<https://www.baltspace.eu/published-reports>

North Seas Political Initiative Offshore (wind) Energy (Lodewijk Abspoel)

The [North Seas political initiative](#) on offshore wind was initiated in autumn 2016 and will continue to summer 2019. All North Sea countries, Luxembourg and Ireland undersigned as well as the European Commission. In support group 1 on Maritime spatial planning participating countries will a.o. work on:

- Coordinating the planning and development of offshore wind and grid projects beyond national borders including area mapping;
- Developing a common environmental assessment framework;
- Increasing the availability and interoperability of marine data for planning, impact assessment, licensing and operations;

The working group is co-chaired between DG Mare and Netherlands (Leo de Vrees/Rijkswaterstaat). In conjunction with the other 3 working groups in January 2018 a cluster approach has been suggested with 4 geographical areas: Irish Sea/North Channel – UK/BE/NL – Doggerbank and German Bight. The aim is to underpin the added benefits of cooperation.

For the environmental assessment framework a subgroup is set to work, this group is tasked with elaborating earlier work on CEAF. Aim is to create a (prototype of a) tool for estimating cumulative ecological effects of Offshore renewable energy generation/wind parks. In addition the SEANSE project is developed, which has gained funding from the European Commission. This project has started early 2018. The objective of SEANSE is to develop a coherent approach to Strategic Environmental Assessments (SEAs) with a focus on renewable energy in support of the development and effective implementation of MSPs. The CEAF prototype tool will be tested in the SEANSE project in 2019. For the test different marine species of common concern have been selected to start testing the approach:

- harbour porpoise (*Phocoena phocoena*), marine mammal
- black-legged kittiwake (*Rissa tridactyla*), sea bird
- lesser black-backed gull (*Larus fuscus*), sea bird
- red-throated diver (*Gavia stellata*), sea bird
- nathusius' pipistrelle (*Pipistrellus nathusii*), bat

NorthSEE (Lodewijk Abspoel)

The [NorthSEE](#) project is at a stage where the work on the state of play and trends in Shipping, Energy and Ecology is almost finalized. The MSPChallenge platform, which also serves as a wiki Infoquarium is running with an Ecopath with Ecosim (EwE) simplified ICES foodweb model for the North Sea. A first [stakeholder workshop](#) with the MSP-Challenge serious game has been held in April 2018. Further work is needed building up to a workshop on Energy in Aberdeen in October, one on Shipping in Malmo in November and a final conference together with the BalticLines project in January 2019 in Hamburg.

Main struggle and mid-term conclusion is that for coherence of MSPs in the North Sea basin integration of data and information on the level of the North Sea is much needed. The MSPChallenge platform will act as prototype of the integration needed and the data and information necessary for cross border coherent planning. In particular, on Ecology much work (via OSPAR) needs to be done. Within the NorthSEE project a study on connectivity using sea current modelling will be undertaken. Both on updating information on N2000 management and working on coherence of Marine Protected Areas. The stakeholders in the fore-mentioned workshop are positive on the preliminary results and willing to further cooperate. Integration of the perspective of the regions is under way and will be completed in 2018. Together with Ecopath partners more options of modelling the ecosystem, the human pressures and the (spatial distribution) of effects of management options will reviewed. Either to build into the [MSPChallenge](#) platform NorthSEE edition or to list as possible improvements after the projects' life span.

INTERREG CB project “Maritime Spatial Planning for Sustainable Blue Economies (Plan4Blue)” (Robert Aps)

The Plan4Blue project promotes sustainable planning and management of marine and coastal areas of Gulf of Finland and Archipelago Sea by developing Maritime Spatial Planning (MSP) capacity with an emphasis on cross-border aspects. Presently cross-border collaboration in MSP is not active in the project area. The project tackles the expected growth of maritime sectors to find a balance between economic, social and environmental goals. Because many of the economic activities and their impacts cross borders, planning and management requires cross-border collaboration between stakeholders and authorities. The project responds directly to goals of the programme by developing capacity in cross-border MSP in order to ensure sustainable use of common resources. Project facilitates collaboration of stakeholders and authorities to find cross-border solutions for sustainable planning and management of marine and coastal areas. The project focuses on cross-border aspects, but addresses also national and county levels as appropriate. The outputs benefit the spatial planning authorities, managers and also economic actors. Cross-border MSP is novel for the area. Facilitation of a participatory process to identify sustainable solutions for blue growth creates new collaborations in the project area.

Annex 4: Experiences with the MSPChallenge

Year 2017 and early 2018 marked a further breakthrough for the *Maritime Spatial Planning Challenge*.

Board game editions

The board game edition made for the 2016 Netherlands' EU Presidency event on Short Sea Shipping, Blue Growth and Maritime Spatial Planning (MSP). The board game allows groups up till 30 participants to get more familiar and experienced with ecosystem based MSP and Blue Development in sessions from 1 to 4 hours and can be adapted and moderated in almost any training and workshop format. See www.mspchallenge.info for more information.

The simplicity of the board game made it a very powerful tool for engaging with a wider range and greater diversity of people who are, or should, become connected to MSP: novice and experienced sectoral and terrestrial planners, students and academics of all kinds of disciplines and levels, NGOs, stakeholders from all sectors, as well as the general public. Since 2016, several editions have been made, tailored to reflect local circumstances in different sea areas. They have been used very successfully in MSP conferences, workshops and educational and training programmes.

A Scottish Regional Marine edition was created under the auspices of the EU SIMCelt project to consider transboundary marine planning issues at a sub-national level. Marine Scotland, the Scottish Coastal Forum and the Clyde Marine Planning Partnership use it for stakeholder engagement as part of the Scottish marine planning process, which requires Regional Marine Plans to fit in the Scottish National Marine Plan.

A Blue Development edition of the board game widened the focus from shipping to other economic sectors. At the Atlantic Strategy Stakeholder Platform Conference (Dublin, 2016) the board game was demonstrated to the European Commissioner for Maritime Affairs and Environment (DG MARE). He invited the game for a warm-up session with speakers on the opening day of the 2nd MSP Worldwide Conference organized by IOC-UNESCO in collaboration with the European Commission in Paris, March 2017. The MSP board game was further adopted by the University of Liverpool (Sustainable Coasts and Oceans ed.), the German Federal Ministry for Transport and Digital Infrastructure (Nachhaltige Küsten und Meeren ed.) and the University of Oldenburg (Coast ed.).

A Spanish translation of the game has been made through the Museum Elder, in the context of the PLASMAR project in Las Palmas, Gran Canarias. The game was invited to kick start the review process of the Belgium MSP, in a meeting with stakeholders in Bruges (February, 2017). After a trip to Canada for use in a workshop organised by Roland Comrier, the Short Sea Shipping edition of the MSP board game is now at the World Maritime University in Sweden for training and teaching purposes within M.Sc. courses by a.o. Andreas Kannen.

In spring 2018, work has started in collaboration with the IOC-UNESCO to develop board games to be used for training purposes in Latin America, Africa and Asia. A version of the Blue Development edition of the board game is in Ireland where work is in progress to make an adapted version for use in stakeholder processes there.

Use and development of the computer simulation platform editions of the Challenge

Four two-day training courses with the MSPChallenge 2050 edition were given in Venice with the students of the Erasmus Mundus Master Course on MSP during 2015, 2016 and 2017. The development team from Breda University for applied science under coordination of Igor Mayer together with Xander Keijser and Lodewijk Abspoel from the Dutch Government organised the workshops. Roland Comrier, Jeroen van Overloop from the Belgium Government and Rhona Fairgrieve from the Scottish Coastal Forum acted in the moderation as further MSP experts. An application for funding of a continued Master Training Course for 2018-2020 also featuring the MSPChallenge is done by Università Iuav di Venezia (Coordinator), the University of the Azores, and the University of Sevilla.

Further development of the MSPChallenge has been made possible under three EU funded projects: SIMCelt, BalticLines and NorthSEE. Breda University (Igor Mayer *et al.*) oversee and carry out the game development with partners. Since the end of 2017 each edition has become available for the projects and has been tested with project partners and their stakeholders. The SIMCelt project finished in March 2018. Baltic Lines and NorthSEE will end in the first quarter in 2019, with several workshops around the MSP-Challenge to come. The final conference is scheduled for January 2019 in Hamburg (t.b.c.).

For the SIMCelt project the Firth of the Clyde has been chosen as geographic area to simulate MSP. NorthSEE is featuring the North Sea.

The Ecopath with Ecosim approach has been used for both projects. Ecopath with Ecosim or *EwE* is the worlds' most widely used ecosystem modelling approach. Initially conceived to assess the impacts of fisheries on marine food webs (Polovina 1984, Christensen and Pauly 1992), the *EwE* approach is increasingly used to assess the impact of environmental change on marine ecosystems (Christensen *et al.* 2014). *EwE* is used by approximately 8000 users worldwide, and is under active development through the Ecopath Research and Development Consortium. *EwE* is an open source software, and is freely available from <http://www.ecopath.org> (Steenbeek *et al.* 2016).

The *SIMCelt edition* features a simplified foodweb and shipping model, combined with a spatial drawing tool. Concerning the foodweb model for the NorthSEE edition:

Two original *EwE* models were used as foundations for the *EwE* MSP model for the Firth of Clyde. The original Firth of Clyde *EwE* model was built and validated by researchers at the Scottish Association for Marine Science in 2009. The West Coast of Scotland (WCofS) model was originally developed by Haggan and Pitcher (2005), and was recently updated by Serpetti *et al.* (2017) with superior parameter estimates and validation methodology. The original Firth of Clyde model was composed of 37 functional groups. For the purpose of MSP gameplay, the number of functional groups was reduced to 24. Species of interest for MSP gameplay, such as commercial species, were retained as single species groups whilst others were merged into larger groups (i.e. 'other demersals'). The number of fishing fleets were also condensed according to the pressures of interest to MSP gameplay.

The *NorthSEE platform* edition is more advanced in terms of also incorporating a simulation of energy. Concerning the foodweb model for the NorthSEE edition:

The North Sea model was built by Mackinson and Daskalov (2007) and further updated with more recent data (ICES 2015). This model, hereafter called 'original model', was used as basis from which a simplified North Sea model version (hereafter called 'simplified model') was developed for the purpose of application to the MSP Challenge platform NorthSEE edition. The original model (ICES 2015) included 69 trophic groups and 12 fleets. These were simplified to provide intuitive MSP game feedback and to reduce computational time(s). Species and trophic groups were thus reduced from 69 to 23, and fleets were reduced from 12 to 7. Some groups from the original model were retained in the simplified model as individual species (e.g. cod, herring) or as trophic groups (e.g. seabirds, seals); others were aggregated into larger groups, based on ecological, taxonomic, or other practical reasons such as similarities in spatial distribution or targeting fishing fleets.

Scientific work and papers on experiences and activities supporting the MSPChallenge

Two scientific papers are under preparation to account for the work done on EwE for the MSPChallenge platform editions (Steenbeek and Romagnoni). Two PhD students have started using the MSPChallenge games (board and digital) for their scientific research. Since 2012 several scientific publications have been published already (Mayer *et al.* 2012, 2013 and 2014 see references below). On the board game experience a scientific review paper into the efficacy of the serious gaming approach for involving stakeholders in MSP is under preparation, and another on the board game itself and the very first results of the players feedback is awaiting publication (Keijser *et al.*). Lodewijk Abspoel is lead author for a paper giving a full account of all the games developed so far under the MSPChallenge umbrella, based on his contribution on MSP, communication and community building through serious gaming at the MSP conference in Paris held in March 2017 (organised by IOC-UNESCO and the European Commission).

References published papers:

- Mayer, I., Zhou, Q., Lo, J., Abspoel, L., Keijser, X., Olsen, E., Nixon, E., Kannen, A., (2012): Integrated, Ecosystem-based Marine Spatial Planning: First Results from International Simulation-Game Experiment, Third International Engineering Systems Symposium CESUN 2012, Delft University of Technology, 18-20 June 2012.
- Mayer, I., Zhou, Q., Lo, Abspoel, L., Keijser, X., Olsen, E., Nixon, E., Kannen, A., (2013), Integrated, Ecosystem-based Marine Spatial Planning: Design and Results of a Game-based Quasi-Experiment, *Ocean & Coastal Management*. 82, 7–26, doi:dx.doi.org/10.1016/j.ocecoaman.2013.04.006.
- Mayer, I., Zhou, Q., Keijser, X., Abspoel, L., (2014): Gaming the Future of the Ocean: The Marine Spatial Planning Challenge 2050, in: M. Ma *et al.* (Eds.): *SGDA 2014, LNCS 8778*, pp. 150–162, 2014. © Springer International Publishing Switzerland 2014

Annex 5: Workshop proposal

NB This workshop was ultimately replaced with WKCEAM, Copenhagen, DK, Feb 2019

A **Workshop on Spatial and Temporal Distribution of Pressures (WKSTDP)**, chaired by Vanessa Stelzenmüller and Roland Cormier, will meet in Edinburgh, UK, February 2019 to:

- a) Review methods in how to aggregate the footprint and frequency of occurrence of human activities to estimate spatio-temporal distributions of key pressures;
- b) Review the current state of the art of spatial-temporal representation of cumulative pressure used in marine spatial planning; and,
- c) Examine the potential to standardize the methods and approach for MSP application.

WKSTDP will report by DATE for the attention of the SCICOM Committee.

Supporting information

Priority	The current activities of WGMPCZM are focused on the understanding of cumulative pressures to inform trade-offs between the benefits and risks of human activities in MSP and reduce the pressures through spatial-temporal measures.
Scientific justification	<p>While the need for CEAs is widely accepted, their actual implementation in marine spatial planning (MSP) processes is yet to be seen. Still there are few or any local or regional assessments on how marine planning could actually help reduce human pressures or even increase the pressure loads in some areas. In concept, WKRAM and WKPASM highlighted the need to understand the effectiveness of the regulatory measures used to reduce the pressures generated by human activities. WKBCNS developed the techniques to quantify the reduction.</p> <p>The proposed workshop will focus on the North Sea region and will review methods to aggregate pressures from different human activities spatially by category of pressures. The workshop will also discuss aggregation techniques to combine the spatial scale and frequency of occurrence of the various pressures to generate a generic spatial-temporal pressure profile based on selected pressures from the MSFD. The participants are expected to work in sub groups on the main pressures and review the current state of the art of their spatial-temporal representation. A standardisation of such approaches is a prerequisite to aggregate and combine pressures into a cumulative pressure distributions..</p>
Resource requirements	The research programmes of the participants would provide the main input for this workshop. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The workshop would expect 10–15 participants.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	There are no obvious direct linkages with the advisory committees.

Linkages to other committees or groups	This workshop has linkages other ICES workshops on sea bed abrasion (WKBENTH WKTRADE etc.) as well as HAPISG.
Linkages to other organizations	The workshop topic is linked to OSPAR Intersessional correspondence group or cumulative impacts (ICG-EcoC) and the UK Marine Monitoring and Assessment Strategy Pressures Group.
