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Executive summary

Compared to the last years the ToRs for 2011 for the WG were new and focussed on specific aspects of MSP and ICZM. Following the discussion at this year's meeting some ToRs have been even more specified for 2012 in order to allow conceptually focussed discussions on main aspects in particular with respect to current developments in MSP and in order to address open questions of marine and maritime spatial planners. WGMPCZM actually consists of members representing science as well as people involved in administrative decision making and is therefore truly transdisciplinary in its nature.

Members of the WG had been involved considerably in the activities of STIG-MSP in 2010. For 2011/2012 WGMPCZM made specific suggestions for further cooperation. This includes in particular the proposal for a joint theme session at ASC 2012 and an outline for a workshop with STIG-MSP in 2011 as already discussed along WKCMSP in November 2010.

This report is largely based on experiences gained from projects and activities in ICES MS or from research projects and/or direct personal experiences of WG members. This is reflected in discussion of case studies throughout the report, always interpreted in relation to the respective ToR. Depending on the ToR this is accompanied by analysis of framing documents (such as EU policy documents) and/or analysis of reviews of scientific literature and group discussions reflecting different disciplinary and practical backgrounds and experiences of WG members.

With respect to identifying good practice and gaps in decision making and objective setting in ICES MS (ToR a) success factors and major challenges faced by practitioners have been identified. Success factors include among others to continuously improve the knowledge base related to the system, early formulation of a vision and early involvement of major stakeholders (mainly on an advisory basis as opposed to decision-making). While a clear legal base and administrative process to support MSP has to be established beforehand, participation should be seen as an open, transparent process with clearly defined rules of engagement and communication (e.g. among authorities, scientific disciplines, science-policy, stakeholders, etc.). In particular there is a need for more efficient integration of science with decision-making, recognising the distinctive roles of scientists (objective information) and managers (judgement decisions). Furthermore a cross-sectoral approach is necessary even though one sector (e.g. wind farming) can provide a valid starting point for MSP. However, several gaps and challenges can also be identified, among them fragmented and/or overlapping jurisdiction constraining the development of coherent policy, the lack of legally binding umbrella instruments, incompatible systems and timelines between science and policy and conceptual limits, e.g. the significant amount of terminology associated with MSP which is subject to multiple interpretations (i.e. ecosystem approach, marine vs. maritime spatial planning).

ToR d (update and report on activities in MSP and ICZM in ICES MS) has highlighted that there are different approaches to MSP depending on the initial vision and objectives for the MSP. The input from each country and discussions around both ToR a and ToR d have highlighted the need to focus on certain issues/challenges to ensure that the approach taken by each MS is consistent. Therefore, this process has highlighted specific science needs that could steer the work of specific ICES WGs. These included 1)Ecosystem Goods and Services, e.g. methods of effectively capturing fisheries information for inclusion in MSP, 2) Social and Cultural Issues, e.g. understand-

ing the importance of aesthetic and spiritual values in the marine planning or understanding the societal significance of ecosystem services that are not related to one particular industry, and currently do not have an economic value, 3) Cumulative Effects, e.g. there is no agreed procedure for assessing cumulative effects of certain developments (e.g. windfarms) and 4) Risk Assessment, e.g. it is important to achieve a joint understanding of risk across authorities and scientists and there is a need to identify risk thresholds that would guide management priority setting.

From the conducted review for ToR b it can be concluded that quality assurance in relation to the scientific advice and the related processes in the plan development phase has not been clearly addressed in most of the analysed processes. In most cases there has not been any systematic pervasive process to assess the uncertainty of data and analysis going into the scientific reports. Further the auditing process of existing management plans is also not explicitly outlined in most cases. In summary, under this ToR we identified clear gaps proportionate to clear guidance in quality assurance related to both the development phase of an integrated management plan or MSP and the auditing process of existing plans.

While the ecosystem service concept (ToR c) is increasingly mentioned in environmental (including coastal and marine) policy frames and much debated within science it still in its infancy as an operational concept. However, the case studies presented at the meeting illustrate that the application of the concept is discussed in planning practice and can be linked to a range of purposes in policy making. Conceptually the practical measurement of and the "currency" in which to measure ecosystem services and societal benefits, in particular the role of monetary vs. non-monetary measures is much debated as is the question of how to deal with intangibles like many cultural services.

1 Opening of the meeting

The Chair, Andreas Kannen, opened the meeting at 10:30hrs on Tuesday, 22 March 2011, welcomed the participants and made some announcements regarding organisational arrangements. Vanessa Stelzenmüller as local host provided information on domestic issues. A round of introduction of the participants followed.

Eight ICES countries: Germany, Spain, Norway, UK, the Netherlands, Poland, Sweden and Canada were represented at the 2010 meeting. A list of participants is included in Annex 1.

2 Adoption of the agenda

A draft agenda was circulated in advance of the meeting which was adopted without changes. The adopted agenda is presented in Annex 2.

3 Terms of Reference

a) Report on the development and use of MSP specifically identifying good practice and gaps in priority based decision making and objective setting in IM and ICES countries;

b) Prepare a review of existing practices in Quality assurance including a review of formal management standards for its use in IM;

c) Prepare a review of the measurement and application of ecosystem goods and services in IM;

d) Update and report on IM activities, including ICZM and MSP in different ICES countries including information on initiatives towards integrated governance in the CZ;

e) Receive a report on the Strategic Initiative on Coastal and Marine Spatial Planning and plan for the suggested ICES ASC Joint Theme session in 2012;

f) Report on the ICES 2010 ASC Theme Session B: The risk of failing in integrated coastal zone management progress and the publication of any suitable papers;

g) Evaluate potential for collaboration with other EGs in relation to the ICES Science Plan and report on how such cooperation has been achieved in practical terms (e.g. joint meetings, back-to-back meetings, communication between EG chairs, having representatives from own EG attend other EG meetings).

WGMPCZM will report by 21 April 2011 (via SSGHIE) for the attention of ACOM and SCICOM.

3.1 Report on the development and use of MSP specifically identifying good practice and gaps in priority based decision making and objective setting in IM and ICES countries (ToR a)

This ToR is directly related to ToR d where ICES countries report on local experiences and case studies related to MSP in the context of the IOC-UNESCO guidelines (see below). In this ToR, the WGMPCZM provides (1) a brief overview of relevant policy and guidelines related to MSP, focusing on the EU and the MSP guidelines developed by IOC-UNESCO, (2) a report on the major international projects that are being de-

veloped in the ICES region related to MSP, and (3) a Web of Knowledge review of the scientific literature related to MSP with a synthesis of the major issues that are being addressed in these papers. As a conclusion to this ToR, the group conducted a discussion about the main success factors and challenges associated with the development and use of MSP, which was based on their experiences at the national level (case studies are presented in ToR d) and through their involvement in international projects (listed previously in this ToR a). These factors are listed in subsection (4). Case studies that refer to the specific topic of priority based decision making and objective setting may be found in ToR d.

3.1.1 Overview of MSP in the EU and the IOC-UNESCO MSP guidelines

MSP can be defined as a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process (Ehler and Douvere 2009). Maritime Spatial Planning was identified as one of the cross-sectoral tools supporting the implementation of the EU Integrated Maritime Policy (IMP), which was published in 2007. Subsequently, in 2008, the Commission adopted the Communication Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU (EC 2008a), which proposed the following set of key principles for MSP:

- Using MSP according to area and type of activity;
- Defining objectives to guide MSP;
- Developing MSP in a transparent manner;
- Stakeholder participation;
- Coordination within Member States — Simplifying decision processes;
- Ensuring the legal effect of national MSP;
- Cross-border cooperation and consultation;
- Incorporating monitoring and evaluation in the planning process;
- Achieving coherence between terrestrial and maritime spatial planning in relation with ICZM;
- A strong data and knowledge base.

In the Roadmap, the Commission agreed to produce a report on a series of workshops which were to be held during 2009 and to propose further steps and actions. These debates resulted in the publication of EU Communication 771 in 2010 (EC 2010), with the following conclusions:

- The ecosystem approach was highlighted as an overarching principle for MSP;
- Using MSP according to area and type of activity;
- Defining objectives to guide MSP;
- Developing MSP in a transparent manner;
- Stakeholder participation;
- Coordination within Member States – simplifying decision-making processes;
- Ensuring the legal effect of national MSP;
- Cross-border cooperation and consultation;
- Incorporating monitoring and evaluation in the planning process;

- Achieving coherence between terrestrial spatial planning and MSP – relationship with ICZM;
- A strong data and knowledge base.

Communication 771 also addresses the specific relationship between MSP and the Marine Strategy Framework Directive (MSFD, EC 2008b), which is the environmental pillar of the IMP. Specifically:

The MSFD aims to achieve or maintain good environmental status in the marine environment by 2020, to manage human activities in marine areas in accordance with the ecosystem approach and contribute to the integration of environmental concerns into different policies. The Directive specifies that the programme of measures which Member States are due to set up by 2015 to achieve this objective may include spatial measures, spatial and temporal distribution controls and management coordination measures. MSP can thus be an important tool for Member States to support certain aspects of MSFD implementation, including in the context of cross-border coordination of marine strategies. Both MSP and MSFD depend on sound data and knowledge. There is also a link between the spatial measures of the MSFD and the implementation of the Birds and Habitats Directives in coastal and marine areas (EC 2010).

In 2009, UNESCO published a widely referenced step-by-step guide for MSP (Ehler and Douvere, 2009) which describes a series of steps designed to operationalise the MSP process. These steps were developed on the basis of a review of MSP initiatives from around the world. Thus "good practice" is extracted from the documented success and failure of practical international MSP experience. The proposed steps for MSP include:

- Establishing context and authority for marine spatial planning;
- Obtaining financial support for marine spatial planning;
- Organizing the process for marine spatial planning;
- Organizing stakeholder participation for marine spatial planning;
- Defining and analyzing existing conditions for marine spatial planning;
- Defining and analyzing future conditions for marine spatial planning;
- Preparing and approving the spatial management plan;
- Implementing and enforcing the spatial management plan;
- Monitoring and evaluating performance of the spatial management plan;
- Adapting the marine spatial management process.

References

EC. 2010. Marine Spatial Planning in the EU – achievements and future development. COM (2010) 771 final.

Ehler, C, Douvere, F. 2009. Marine Spatial Planning: a step-by-step approach toward ecosystem-based management. Intergovernmental Oceanographic Commission and Man and the Biosphere Programme. IOC Manual and Guides No. 53, ICAM Dossier No. 6 Paris: UNESCO, 2009.

EC. 2008a. Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU. COM (2008) 791 final.

EC 2008b. Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for Community action in the field of marine environmental policy.

EC 2007. An Integrated Maritime Policy for the European Union. COM(2007) 575.

3.1.2 Projects

a) Coastal Futures (2004–2010)

Coastal Futures (www.coastal-futures.org) had been coordinated by the Helmholtz Zentrum Geesthacht (HZG, former name GKSS). The project was finished after 6 years in 2010 and final results are published in a Synthesis Report (Lange *et al.* 2010). With respect to MSP and ICZM (see Kannen *et al.* in chapter 10 of the Synthesis Report) the project focused on selected structures and processes that enable decision-making in the context of the German North Sea regions at regional and national scales, in particular in relation to offshore wind farm development. The results indicate that while development of governance structures is necessary, processes (who decides what and based on what rules) and involvement (who is involved when and how) are at least as important. Particularly power structures and power conflicts e.g. between different ministries or government authorities, might form a major constraint in the implementation of new approaches. Another constraint that is difficult to overcome without proper communication mechanisms is different perceptions and value systems of the actors involved. Traditional approaches to planning are not particularly suited to deal with contradictory value sets and the potential value conflicts surrounding offshore wind farms. Similarly, contradictory policy targets are difficult to overcome. Without question, MSP is needed to resolve the spatial dilemmas arising in the German EEZ. At the same time, a governance approach that exclusively relies on MSP or other statutory tools is found to be insufficient. On the other hand the transition from traditional to integrated approaches of planning and management implies a paradigm shift. In this context windows of opportunity are of particular importance because they permit shifts within the system. As illustrated by the recent evolvement of policies and legislations such as the MSFD and IMP the paradigm shift has moved into policy formulation, but in many cases it still lacks successful implementation at the level of planning and management where it demands changes in daily practice.

Reference

Lange, M., Burkhard, B., Garthe, S., Gee, K., Lenhart, H., Kannen, A., Windhorst, W. (2010): Analysing Coastal and Marine Changes – Offshore Wind Farming as a Case Study: Zukunft Kueste – Coastal Futures Synthesis Report. LOICZ R & S Report No. 36, 212 p., downloadable from www.loicz.org.

b) MESMA (2009–2013)

MESMA (www.mesma.org) is coordinated by IMARES and concerned with the monitoring and evaluation of spatially managed areas. It will supply innovative methods and integrated strategies for governments, local authorities, stakeholders and other managerial bodies for planning and decision making at different local, national and European scales. This will also comprise an easy accessible information system to gain support from politicians, stakeholders and the public in general for difficult (inter)national decisions that will be needed for sustainable use and protection of this vulnerable area. MESMA will supply strategic tools for sustainable development of European seas and coastal areas. The major challenge is to combine an

optimized use with a sustained ecosystem of high quality, taking into account ecological and economic differences. By studying and comparing different national situations and solutions from a selected number of sites throughout Europe and by determining common features and differences, including the socio-economic settings and requirements, an integrated toolbox that can be applied throughout Europe will be made available.

c) MASPNOSE (2010–2012)

MASPNOSE aims to facilitate concrete, cross-border cooperation among European countries on ecosystem-based Marine Spatial Planning (MSP) in the southern North Sea. The guidelines and principles on MSP recommended by the EU will be evaluated. With the help of two case studies, the developed concepts will be tested to derive general recommendations for a cross-boundary MSP process. MASPNOSE especially seeks to involve stakeholders in the development of this guidance on cross-border MSP. The project is coordinated by the Centre of Marine Policy, Leuwarden, NL.

d) PLAN BOTHNIA (2011–2012)

The PLAN BOTHNIA project, co-ordinated by the HELCOM Secretariat, will test Maritime Spatial Planning (MSP) in the Bothnian Sea area as a transboundary case between Sweden and Finland. This is a MSP and EU Integrated Maritime Policy "preparatory action" funded by EU Commission DG MARE (budget 0.5 M EUR), and running 18 months between 2 December 2011 and 1 June 2012. The project had its kick-off partner meeting in Stockholm 16 December 2010 and anticipates to have its first Bothnian Sea MSP meeting in Pori, Finland 7–8 March 2010. Four other MSP meetings (invited participants only) as well as two dissemination events open to all (late September 2011 and spring 2012) will follow.

e) BaltSeaPlan (2009–2012)

The 3.7 m EUR project BaltSeaPlan is one the major EU initiatives in the field of maritime spatial planning in the coming years. With 14 partners from seven Baltic countries, the project will provide key input into the realization of the EU Maritime Policy, HELCOM Baltic Sea Action Plan and the VASAB Gdańsk Declaration. Coordinator is the German Federal Hydrographic and Maritime Agency (BSH). With a learning-by-doing approach BaltSeaPlan will overcome the lack of relevant legislation in most Baltic SeaRegion countries. Seven important Baltic areas were chosen for pilot maritime spatial plans, among them the Pomeranian Bight, Gulf of Gdańsk or the Middle Bank area between Poland and Sweden. A broad scale stocktake of maritime uses will be carried out in each pilot area. Additional information will be collected with application of newest tools and methods, such as sea-bed modelling and climate change scenarios. All data will be harmonised according to requirements of the EC INSPIRE directive and compiled in a joint data base. Additionally, BaltSeaPlan will provide key input into National Maritime Strategies as required by the EU Blue Book on Future Maritime Policy. In 2011 a common spatial development vision for the Baltic Sea will be produced as a synergy of the national visions and plans of all Baltic SeaRegion countries. A presentation on BaltSeaPlan is included in Annex 3.

f) COEXIST (2010–2013)

COEXIST (May 2010–2013) is coordinated by IMR, Norway and is concerned with the interaction and sustainable integration of aquaculture and fisheries in coastal waters.

COEXIST aims to develop a broad, multidisciplinary approach to evaluate these interactions with the ultimate goal to provide a roadmap to better integration, sustainability and synergies among different activities in the coastal zone. The project will study the interactions between capture fisheries and aquaculture and evaluate mutual benefits and possible bottlenecks for concomitant development of these activities in the coastal zone within the context of the ecosystem approach to management. It will propose, develop and evaluate the efficiency of spatial management tools (zoning, closed areas, etc) to promote different forms of coastal aquaculture and fisheries at different scales (e.g. local, regional) and it will exploit mutual opportunities (e.g. artificial reefs, protected areas, wind farms, tourism etc) within a context of competition for space by multiple users. The project will address differences in acceptance of activities (fisheries, aquaculture, and other use of the coastal zone) by the society. A detailed strategy for communication and involvement of stakeholders and for dissemination of results to general and targeted audiences is integrated in the project. By these actions, the project will support the new European Maritime Policy and spatial planning of coastal areas.

3.1.3 Web of Knowledge review of papers related to Marine (or) Maritime Spatial Planning

A keyword search was carried out using the Web of Knowledge (WoK) in order to gain a general overview of the work that is being carried out in the academic world related to MSP. Specifically, the search targeted papers that include the terms "marine (or) maritime spatial planning" in the title. A full list of these publications, aggregated by year, with abstracts (where available) may be found in Annex 4. It is important to note that this list *only* includes papers listed on the WoK with the specific search words in the title. Table 1 below summarizes the general topics (designated by the WG) and spatial scale of the publications from the search. The papers are aggregated by year. [*] denotes papers that have been classified as predominantly applied research (i.e. responds to a specific issue and provides specific scientific tools/data for addressing that issue). Other papers are considered to be mainly theoretical in focus.[1]

Some major trends highlighted by this review include:

- The search revealed 37 papers, published from 2007–2011. This indicates that MSP is a relatively new topic in the academic literature.
- The majority of papers were published in 2010 (15) and 2008 (12). The high number in 2008 is partially due to a special issue in the journal Marine Policy that was published on the topic. The high number of papers in 2010 indicates a growing interest in the topic in the scientific community.
- Only 5 of the 37 papers were considered by the group to be predominantly applied research. This indicates that the study of MSP in academia is primarily at the theoretical level as opposed to practical.

[1] It is important to note that these categories have been generally assigned by the WG as a first step in analyzing the literature. MSP is a complex, interdisciplinary process so the categorization process was ambiguous for many of the publications. It is possible that some papers are relevant to one or more of the topics or may have some practical application even though they are classified as being generally theoretical.

- The majority of papers focused on MSP as a general topic (13). The next most common category was conflict (6). The latter were all focused on a conflict(s) between human use and a conservation issues.
- The majority of the general, theoretical papers were not relevant to a specified spatial scale (15). A significant number of studies are shown to be relevant at the national scale (12) with considerably fewer local applications (5).
- The majority (all but 2 papers where scale is specified) of the papers pertain to ICES countries.
- Applied papers were all relevant to locally specific scales.
- The table indicates that the academic literature is evolving from a more general focus of MSP towards assessing more specific aspects of the process of specific conflicts.

Table 1. Summary of major focal areas of papers listed on the Web of Knowledge with the term "marine (or) maritime spatial planning" in the title[2].

General Topic	Additional information	Spatial Scale	Reference (see Annex 4 for full reference)
MPAs (1)	As tools for MSP	Not specified	Agardy *et al.* 2011
Participation (1)		EU	De Santo 2011
Governance (1)		Taiwan	Liu *et al.* 2011
Conflict (4)	Conservation and technological development	Poland	Andrulewicz *et al.* 2010
	Raptors and wind farms*	Denmark (local scale)	Baisner *et al.* 2010
	Wind farms and fisheries	Germany	Berkenhagen *et al.* 2010
	Aquaculture and conservation*	Scotland (local scale)	Greathead *et al.* 2010
MPAs (1)	Fisheries management	Not specified	Norse 2010
MSP general (4)	Ecological dimension	Not specified	Foley *et al.* 2010
	Tool for ecosystem-based management	Wider Caribbean	Ogden 2010
	General	Not specified	Ray 2010
	Oceanography focus	Not specified	Thoroughgood 2010
Ecosystem goods and services (2)	General	Spain (regional scale)	Brenner *et al.* 2010
	Tourism and recreation	UK (local scale)	Rees *et al.* 2010
Participation (1)		Irish Sea	Ritchie and Ellis 2010
Geospatial information networks (1)*		UK (local scale)	Stojanovic 2010
Governance (1)		Portugal	Calado *et al.* 2010
Human dimensions (1)*	Mapping uses in a bay	USA (local scale)	Dalton *et al.* 2010
Human dimensions (1)	Socio-economic costs in relation to conservation planning	Not specified	Ban and Klein 2009
Governance (1)		Not specified	De Vivero *et al.* 2009

[2] * **Denotes papers that have been classified as applied research (i.e. responds to a specific issue and provides specific scientific tools/data for addressing that issue).**

MSP general (1)	Policy	EU	Douvere and Ehler 2009
Ecological modeling (1)*		Irish and Celtic Seas, English Channel	Maxwell *et al.* 2009
Conflict (1)	Wind farms and conservation	Holland	Punt *et al*. 2009
MSP and technological development (1)		Not specified	Street 2009
MSP general (6)	High seas	High seas	Ardron *et al.* 2008
	Ecosystem based management	Not specified	Douvere 2008
	Overall benefits	Not specified	Ehler 2008
	Participation	Ireland (local scale)	Flannery and Cinneide 2008
	Policy	Belgium	Plasman 2008
	Ecosystem approach	Not specified	Gillialnd and Laffoley 2008
Ecological dimensions (1)	Ecosystem approach, ecosystem services, resilience	Not specified	Crowder and Norse 2008
Fisheries management (1)		Germany	Fock 2008
Governance (1)	International legal framework	Not specified	Maes 2008
Participation (1)		Not specified	Pomeroy and Douvere 2008
Human dimensions (1)	Participatory mapping of fishing communities at sea	Not specified	St Martin and Hall-Arber 2008
Conflict (1)	Fishing and marine landscapes	UK	Stelzenmuller *et al.* 2008
MSP general (2)		Belgium	Douvere *et al.* 2007
	Link with ICZM	UK	Toussik 2007

3.1.4 Group discussion about the main success factors and challenges associated with MSP in ICES Countries

The group conducted a discussion about the main success factors and challenges associated with the development and use of MSP, which was based on their experiences at the national level (ToR d) and through their involvement in international projects (listed previously in this ToR a). The following main success factors and challenges were identified:[3]

Success factors

1) In general, it was agreed that there is a need for a common framework for MSP that is adaptable to varied social-ecological systems and spatial scales.

2) A primary step should be the characterization of the relevant social-ecological system(s) (space, natural, resources, activities, governance). Throughout the process, it is important to routinely identify the best available information and knowledge gaps and improve the knowledge base related to the system.

3) A vision and priority objectives should be clearly defined early on in the process.

4) There is a need for a clear legal base and administrative process to support MSP.

5) Stakeholder participation (mainly on an advisory basis as opposed to decision-making) should be ensured from an early stage in the process (i.e. involve key users in drafting the objectives of MSP). The participation process should be adapted to the local reality (i.e. economic, legal, cultural). It should be an open, transparent process, and it is important to recognize that consensus based decisions are not always possible.

6) There is a need for more efficient integration of science with decision-making. It is important to recognize the distinctive roles of scientists (objective information) and managers (judgement decisions).

7) A cross-sectoral approach is necessary. However, one sector (e.g. wind farming) can provide a valid starting point for MSP, so long as it evolves into an integrated vision of impacts and interactions with other sectors.

8) There is a need for clearly defined rules of engagement and communication (e.g. among authorities, scientific disciplines, science-policy, stakeholders, etc.).

9) MSP should be supported by a coordinated, accessible data and technical support system (e.g. national database standards, access to multiple types of data).

10) A clearly structured, iterative process for monitoring and evaluating the implemented plan and, if necessary, updating management measures in the plan is required.

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[3] It was noted by the group that the factors that were identified are coherent with existing success criteria and challenges identified by UNESCO (Ehler and Douvere 2009) and the EU (2008, 2010).

Major Challenges

1) Legal challenges – MSP is subject to the legal limitations of the EEZ (as defined by UNCLOS); fisheries management is often not sufficiently addressed.

2) Binding instruments are based on the sectoral approach - the lack of umbrella instruments can delay integration.

3) Fragmented and/or overlapping jurisdiction in coastal and marine space is constraining the development of coherent policy.

4) There is a lack of coordinated governance related to MSP in the EU.

5) A purely spatial view of the sea is frequently applied - zoning alone cannot solve all of the issues to be addressed by MSP.

6) Major weaknesses related to participation in the MSP process include transparency and representativeness.

7) Conceptual limits – there is a significant amount of terminology associated with MSP which is subject to multiple interpretations (i.e. ecosystem approach, marine vs. maritime spatial planning).

8) The link with ICZM is not strong enough.

9) Lack of baseline information.

10) Critical thresholds (or guidelines) are difficult to define.

11) Science-policy gap (i.e. academic and policy systems are not compatible for information sharing, scientists and decision-makers often have different timelines).

The WGMPCZM agreed that reporting (national and project level) related to the development and use of MSP in this report and in subsequent meetings would be structured in part around the success factors and challenges listed previously. The group may choose to focus on a selection of these elements as opposed to all of them, depending on those issues that are identified as being especially relevant at the time.

3.2 Prepare a review of existing practices in Quality assurance including a review of formal management standards for its use in IM (ToR b)

In general, quality assurance is crucial for both the development phase of marine spatial plans or integrated management plans and the assessment of the effectiveness of the implemented plan. In relation to the UNESCO step by step guidelines for marine spatial planning (Ehler and Douvere, 2009) the development phase represents the first seven steps, while the performance assessment relates to step nine of the guidelines (see Figure 1).

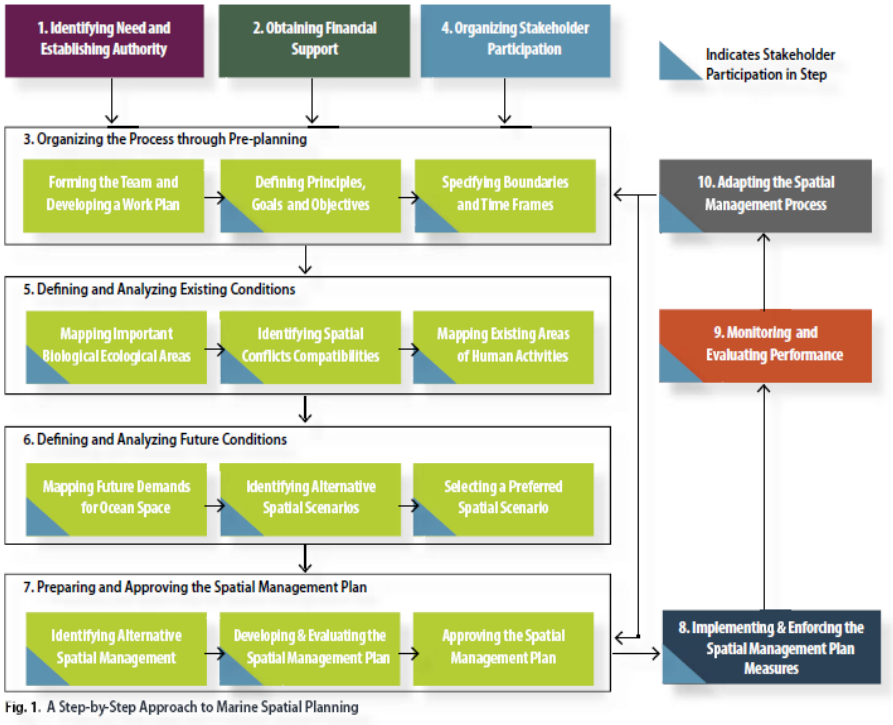

Figure 1. Example of MSP process (UNESCO guide on MSP) as one possible integrated management.

This ToR addresses the processes and practices in quality assurance for both phases with a structured review of example case studies. The development of marine spatial plans is related to the Strategic Environmental Assessment Directive (SEA) which is a legally enforced assessment procedure (2001/42/EC). The SEA Directive aims at introducing systematic assessment of the likely significant environmental effects of plans and programs developed by public bodies, the practical application has the following structure:

- Screening; determination of whether the plan or program falls under the SEA legislation;
- Scoping; defining the boundaries of investigation, assessment and assumptions required;
- Documentation of the state of the environment;
- Determination of the likely (non-marginal) significant environmental impacts;
- Informing and consulting the public;
- Influencing "Decision taking" based on the assessment;
- Monitoring of the effects of plans and programs after their implementation.

In the context of marine spatial planning, SEA results are used to define the new science required for the support of the integrated management initiatives, in particular to fill information gaps identified by the SEA and to investigate particular mechanisms of environmental impact. Science requirements can be distinguished between short term and long term needs. However, the use of a SEA is not equivalent to an

assessment the quality of underlying scientific information or of the decisions made in the Plan. It is the task of the strategic environmental report to identify, describe and evaluate the likely significant effects on the environment of implementing the plan.

The key question that can be applied to all data and data processing employed in the planning process, and the resulting Plan itself, is whether it is fit for purpose. In the case of data layers for GIS applications, the data should have a number of characteristics, including being reliable, up to date, at a spatial resolution appropriate for the Plan, and be traceable. In the case of data handling procedures or spatial modelling, the processes should be documented, have been shown to result in useful outputs and be robust to the uncertainties inherent in all data. In the case of the Plan itself, it should meet the initial requirements established at the initiation of the project, and does the Plan have support from Government, industry, NGOs, the public etc, as appropriate.

The quality of advice to managers is dependent on both the quality of information used in IM tools, which in turn is dependent on the effectiveness of the process used by managers to formulate relevant science questions. Therefore, the development phase of the selected case studies are reviewed in relation to:

a) the quality of science advice, and

b) the mechanisms or processes used.

The former comprises practices to ensure the quality of the scientific input to the planning process, such as peer-reviewed reports. It is dependent to a significant degree on the adequacy of the quantitative and qualitative data used together with the related uncertainty of analysis results which can be summarised, for instance, in quality flags. Implemented mechanisms and processes related to quality assurance in the development phase of a plan may comprise scientific advisory boards or specific legal frameworks.

Quality assurance in relation to the assessment of the effectiveness of an implemented marine spatial plan or integrated management plan relates to the structure of a post-Plan audit process. Reviewing the audit processes will allow deriving some management standards.

3.2.1 Management standards for an ecosystem-based management

The intense pressure on coastal and marine ecosystems elsewhere in the world calls for preventive and protective action at all levels - local, national, regional and global. Different states and regions have addressed strategies to reach a sustainable use of these domains while maintaining its ecosystem functions and integrity: Australia (Oceans policy, 1998; Commonwealth coastal policy, 1995), Canada (Oceans action Plan, 2004), United States (Oceans Act, 2000; An Ocean Blueprint, 2004), Europe (Water Framework Directive, 2000; Marine Strategy Directive, 2008; Maritime Policy-Blue Book,). All these policy frameworks respond to the overlying principle of sustainable development and called for the use of the Ecosystem Approach, a principle driven management concept that focuses on the relationship between human society and the ecosystems that supports it. This new approach offers new opportunities for sustainable use of the sea but requires better understanding of how marine social-ecological systems operate, how they generate goods and services, how well these benefits are captured and sustained, how human degradation of the systems affects human welfare and generates costs, and the complex social relations and value sys-

tems underpinning human governance of marine systems. The understanding and commitment to the application of these concepts is critical for the future of oceans and coasts and must play a primary role in decision making; the use of systematic environmental management tools can provide the foundation for a sustainable development implementation plan at all levels of management.

Since years, the environmental management science has been aimed at developing a consistent theoretical framework to support the reduction of environmental impacts due to human activities and to integrate environmental issues into strategic management practices. In parallel, the concept of the Ecosystem Approach has gained respect among academics as a positive contribution towards solving the problem of the management of environmental public goods, and has become increasingly cited and used in the academic literature as well as in policy regulation instruments. It is time to go one step further, by combining classical Environmental Management System (EMS) theory, the traditional approach towards minimizing the environmental impact exerted by human activities, with policy applications of the Ecosystem Approach, we could develop a much more coherent, holistic, formal systematic way to manage environmental public goods as oceans and coasts.

When referred to coastal areas, Integrated Coastal Zone Management (ICM) has increasingly being recognised as an effective method for managing and protecting marine and coastal environments and associated freshwater catchments. It merits wider application, both for resolving existing problems and for dealing effectively with new ones. However, the wide use of ICZM processes in practice is reduced by a myriad of blocking mechanisms to the needed managerial transition. Basically these problems can be grouped into two large blocks, the absence of effective governance structures built to deal with the issue, and the absence of a clear management framework to be used in practice. Conflicting jurisdictional policy objectives of various levels and arms of government in a given geographical area, amplified when land-based interactions located in the catchment area are considered, constitute a huge problem that ends in the fact that the policy objectives of management do not align with marine ecosystem integrity. On the other hand, the observed sectorialization in the management of coastal activities produces that every single agent is using different tools for its management, repeating processes, blocking others, and with big failures in communication.

A management system is a systematic framework of policies, procedures and practices used to ensure that an organization can fulfil the tasks required to achieve its objectives. When objectives are related to environmental considerations, an Environmental Management System (EMS) is produced. This involves the management of an organisation's environmental programs in a comprehensive, systematic and documented manner. The EMS can be defined as a continuous improvement process based on policies, procedures and practices aimed at reducing the negative environmental impacts of the activities carried out by an organization. On the other hand, the concept so-called Ecosystem-Based Management (EBM) has been defined as an innovative management approach to address the challenges associated with the emergence of the Ecosystem Approach concept. The concept of EBM has received significant international scientific consensus and has been defined as, “an integrated approach to management that considers entire ecosystems, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative im-

pacts of different sectors." (COMPASS). However when applications of EBM are observed in practice, a wide variety of types of tools are used. These tools can be classified into different groups such as decision support tools, modelling and analysis tools, data collection, processing, and management tools, stakeholder engagement and outreach tools, conceptual modelling tools, visualization tools, project management tools, and monitoring and assessment tools. The use of different tools for different sites to address specific problems, makes experiences differ greatly one form the others. It is clear that these tools could be more effectively used inside a kind of managerial system designed to systematically drive managing decisions into its desired vision that could be understood for every single agent working on the coastal environment.

As a consequence, proposing standard systems to manage the marine environment (coastal and oceans) is gaining acceptance. This standardisation will serve to ensure that desirable elements that need to be included in effective management of these environments; the use of the ecosystem approach, the maintenance of ecosystem integrity, the sustainability practices of human activities... should be always applied. At the same time, the use of a standardized system will facilitate efficient, reliable, environmental friendliness, and interchangeable managerial procedures and it will be basic for the introduction of other Adaptive Management theory.

Today, some standards tools can be seen in the management of some coastal units. Following increasing use in the private sector, an initiative has recently emerged in Spain to implement ISO 14001 for beaches, even the additional requirements for the Eco-Management and Audit Scheme (EMAS) implemented in Europe (EC Council Regulation 761/2001), and also addressing a specific Spanish management system, the Q of Quality of beaches (Sistema de Calidad Turística Española en Playas). The requirements for certification of the environmental quality of beaches are the same as those used in the administrative and industrial sectors; however, some specific factors also need to be considered for its management. Recently, other guiding principles to implement ICZM processes under ISO type of procedures have been described to apply such standardization to other type of coastal units or regional areas. However, in most of this cases, the management of such type of developments do not cover all specific functions that those social-ecological systems have (i.e., in beaches just the recreational functions of the beach are addressed by these ISO, EMAS, or the Q of Quality).

The management of environmental public goods and services should be based in making the best decisions for societies and for the effective functioning of these public goods. EMS are useful frameworks through which organisations can reduce their environmental impact, improve their environmental performance, and provide relevant information to the public and other interested parties. EBM, on the other hand, represents a policy framework for the application of the Ecosystem Approach concept. Used in conjunction with each other, EMS may be viewed as a useful tool for delivering the Ecosystem Approach which, in turn, may be expressed through the implementation of EBM. Recently some researchers have propose the use of the term Ecosystem-Based Management System (EBMS) to define a systematic approach that links the EMS tool with the EBM framework. The EBMS framework combines classical environmental management system (EMS) theory with the concept of ecosystem-based management (EBM). The EBMS provides a systematic approach for the principles of the Ecosystem Approach by introducing them into a clear, familiar, managerial framework.

3.2.2 Case studies

The following review of quality assurance in the case studies is distinguished between the development phase and the performance assessment.

Canada

Quality of scientific advice

In terms of scientific support to decision-making, the Canadian Scientific Advisory Secretariat of Fisheries and Oceans Canada (DFO) manages peer review processes that are conducted to address a number of scientific questions related to the management of Canadian oceans and the conservation of marine and freshwater resources. The issues examined relate to the health of marine ecosystems, the conservation of species at risk, and the status and trends of different stocks of fish, invertebrates and marine mammals in Canada.

Mechanisms or processes in relation to quality assurance

Being an important pillar of sound decision-making in management and policy formation, the advisory process aims at providing information on the consequences of policy and management options, and the likelihood of achieving policy objectives under alternative management strategies and tactics. When objectives are stated explicitly, science evaluates which options are most likely to achieve them, and which options are likely to fail. In addition to being science-based information for policy formation and development of management approaches, the advisory documents also form the basis for subsequent consultative processes with stakeholders and advisory bodies. With a committed to quality, objectivity, and inclusiveness in its overall scientific advisory process, the whole process is intended to make sure that DFO Science meets its advisory responsibilities fully, in ways that are predictable to all participants, and give all interested parties a clear understanding of their roles and responsibilities. The process is based on the SAGE (Scientific Advice for Government Effectiveness) Principles and Guidelines.

Performance assessment or audit of integrated management plan

Fisheries and Oceans Canada has both integrated oceans management and habitat management responsibilities. Operating under the fish habitat provisions of the *Fisheries* Act, the habitat management program is responsible for all environmental assessments that have the potential for impacting fish and fish habitat. Within its habitat management program, the department has instituted compliance monitoring and quality assurance activities to ensure that regulatory compliance of management measures related to development projects are being implemented properly and that they are effective at preventing environmental effects.

With the need to address a general prohibition of any harmful alteration, disruption, or destruction of fish and fish habitat, project submissions are reviewed against the potential of releasing sediments in the aquatic environment, changing the hydrological flow of stream and rivers, changing benthic habitat or fragmenting habitat to fish passage. It should be noted that other concerns such as pollutants and nutrients are managed under the authority of Environment Canada. As part of a strategy to enhance the effectiveness of mitigation measures and the efficiency of administrative process regarding environmental assessments within a compliance continuum, the program has integrated guidelines into partners environmental permitting systems, has implemented operational mitigation guidelines and certification programs for

specific industry sectors and has established formalized regulatory review processes for large scale EA's.

From a compliance perspective, joint audit activities are conducted on permitting systems, regulatory verification and inspection activities are conducted on projects sites and occurrence investigations are conducted in relation to complaints. These activities are delivered within standardized auditing and regulatory verification practices and documentation via the use of check lists, assessment of conformity to agreed management measures and the implementation of correction actions and follow-up for non-conformities. Subsequent analysis of the audits and inspections are then used to ascertain the effectiveness of guidelines and management measures.

Scotland

Development of the integrated management plan

Quality of scientific advice

The Scottish National Marine Plan: The Scottish NMP has been primarily the responsibility of a policy Division of Marine Scotland. In defining data needs, and accessing marine information, they have worked in close collaboration with Marine Scotland Science. In some cases, MS has sufficiently expert to provide the necessary data and/or quality assessment. In other cases, the assessment of the quality of input data has been dependent on the views of recognized external experts in the fields covered by the various data used in the development of the Plan. Considerable efforts have been made to use the best available information, and in turn this had led to the identification of areas for which data are missing or of relatively poor quality. Marine planning has acted as stimulus to fill these gaps.

Where GIS spatial modelling tools have been used, data layers are fully supported by metadata, and details of model runs are automatically archived so that models can be reconstructed and reassessed at future dates. MS has adopted spatial modelling approaches to sectoral plans for wave and tidal energy, and for offshore wind farms (and to a lesser degree for offshore aquaculture, macro-algal cultivation and shellfish farming potential). The modelling for sectoral plans for renewable energy have been subjected to sensitivity analysis to determine the sensitivity of the outputs to the data used in the models, the underlying structure and data handling within the models, with the aim of identifying the robustness of the outputs.

Mechanisms or processes in relation to quality assurance

Two phases can be identified in the application of science to marine planning in Scotland. The first phase comprises the collation of data layers describing features of the environment and its uses. In many cases, this information (e.g. numbers and distribution of seals) will have been collected for other purposes (e.g. to assess conservation status of seal populations) but provide the basic descriptive data on which planning is based. The second phase is initiated by specification of a planning task by national planning authority (Marine Scotland), for example, to identify priority areas for wave and tidal power developments that minimise interactions with environmental sensitivities and other uses of the sea. The subsequent scientific task is to determine the suite of data layers to be included in the planning assessment, interpret the task in terms of how the layers should be used, and then to apply an appropriate multi-factorial decisions support process to identify areas that satisfy the specification in the task. Examples in Scotland include the Saltire Prize process for wave and tidal power, and the plan for wind farm development in Scottish territorial waters. Quality

assurance is applied through discussions with the policy group who have commissioned the work, and consultation processes with key stakeholders (environmental agencies, industry, other users of the sea, local communities) to assess the acceptability of the outcome.

Performance assessment or audit of integrated management plan:

The performance of the spatial plans is currently being assessed through political channels (e.g. through sign-off of drafts by Ministers) and through subsequent consultation with interested stakeholders including industry, conservation bodies, and the general public. Expressions of support for the Plans from these groups are taken as indications of a successful outcome to the process. Sectoral plans for wave and tidal power, and for offshore wind farms are being implemented, and developers are creating projects that are coherent with the plans. Some of these projects have entered the licensing/consenting process. The proportions successfully completing this process might serve as indices of success of the Plans.

Netherlands

Development of the integrated management plan

Quality of scientific advice

The Dutch National Waterplan is based on a formal strategic environmental assessment (SEA) and a suitability appraisal (Passende Beoordeling) required by the Nature Protection Act (NB wet). Consultation for the Draft Waterplan has been held according to Dutch Law.

Mechanisms or processes in relation to quality assurance

All underlying reports have been made public. Five governmental Advisory councils have given advise on the Waterplan. The Wadden Sea Council, the Advisory Board for Water, The Netherlands environmental assessment agency, the Expertise network Water safety and the Netherlands Commission for Environmental Assessment. Cross border consultation also enhances quality assurance. Cross border consultation is required by the SEA and EIA Directives of the EU. An overview of the EIA procedure for licensing purposes is given in Annex 5.

Performance assessment or audit of integrated management plan

For further knowledge (specifically for wind farms) a study has been set up: the Master plan Ecological Monitoring 'Wind op Zee' audits take place nationally and internationally. Master plan has been peer reviewed by experts from neighbouring countries. Their reactions have been taken into account and in a separate document it is stated in what manner. All other studies and monitoring reports are internationally audited/ peer reviewed before release.

Norway

The work with Norway's integrated management plans have been organised through an inter-ministerial committee to coordinate the work, and with advisory and expert groups to provide the factual basis for the plans.

Quality of scientific advice

The advisory/expert groups have, in the case of the IMP for the Norwegian Sea, consisted of members from state directorates only (but (other) research institutions (some

of the state directorates are also research institutions) have contributed to the scientific reports making up the factual basis for the IMP). For the IMP for the Barents Sea and Lofoten area the advisory/expert groups had members from both state directorates and (other) research institutions. In the work with the Barents Sea/Lofoten plan there have also been a reference group with affected interests groups represented connected to the advisory/expert groups. Regarding the quality of the scientific advice, in the case of the 2010 update of the scientific report for the Barents Sea/Lofoten IMP, it is stated that it is based on "scientifically published papers and other sources of documented knowledge". The production of the scientific report for the Norwegian Sea IMP took place within a group of people from state directorates, with some input from other research institutions. It is stated in the report that during the making of it, it went on an internal hearing in one of the participating state directorates (The Norwegian Institute of Marine Research). The members of the expert groups have discussed and agreed on what constitutes the factual basis for the plan. This constitutes a basic level of quality assurance of the scientific input, both that it is actually based on peer-reviewed sources, and of the adequacy of the data. Some supplementary investigations have been commissioned to improve the scientific basis for the IMPs. The scientific reports are public documents open to public scrutiny, but apart from this the process of establishing the factual scientific basis for the IMPs have not included any type of review or QA external to the expert/advisory groups responsible for making them. There has not been any systematic pervasive process to assess the uncertainty of data and analysis going into the scientific reports.

Mechanisms or processes in relation to quality assurance

All publications are available to the public through government web pages. There have been public meetings to present both the factual basis and the measures and assessments made in the draft plans, as well as formal hearing processes where the public can provide written inputs. Identifying knowledge gaps are integral parts of the work with the IMPs, as well as explicit sections in the actual plans themselves.

Performance assessment or audit of integrated management plan

The IMPs will be regularly reviewed and updated, like the Barents Sea/Lofoten plan now has been updated. The organization of the work with updates of the plans follows the same model as in making the first IMP for an area, or alternatively with improvements based on the experiences from making of previous IMPs. The implementation and effects of measures proposed in the original (or last) version of the IMP are assessed during the making of an update, as well as assessments of the development in the environmental state of the marine area, and associated social aspects.

Germany

Development of the integrated management plan

Quality of scientific advice

An environmental assessment according to the SEA Directive has been carried out in connection with the establishment of the maritime spatial plans by the Federal Maritime and Hydrographic Agency. The purpose of the SEA Directive as stated in Art. 1 is "to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development by ensur-

ing that in accordance with the provisions of this Directive an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment". The scope and amount of detail of the environmental report (scoping) were discussed, in co-operation with the Federal Agency for Nature Conservation (BfN), in 2005 with representatives of authorities and associations.

Based on the scoping carried out, an environmental report was prepared according to the criteria in Annex I to the SEA Directive. The report includes contributions made by the Federal Agency for Nature Conservation which describe the biological features of protection as well as the anticipated development in case the plan is not implemented. The North Sea planning region was subdivided further into part areas taking into account biotopic and geological conditions. The environmental report focuses on the description and evaluation of any substantial impacts on the marine environment that are likely to be caused by the implementation of the Spatial Plan, using the existing description and assessment of the marine environmental status as a basis. At the same time, measures are described which are aimed at preventing, reducing, or compensated such substantial impact on the marine environment as best possible. Besides giving a brief explanation of the reasons for choosing the alternatives reviewed, the report lists planned measures by which the substantial impacts of an implemented Spatial Plan are to be monitored, as well as the results of compatibility assessments regarding FFH areas and bird sanctuaries.

The Plan is the outcome of this comprehensive environmental assessment. Environmental concerns and knowledge gained in preparing the environmental report have been taken into account in the designations made in the draft Plan. The findings in the strategic environmental assessment concerning the importance of part areas for biological features of conservation interest have been taken into account in deciding on the designation of areas for particular uses, especially offshore wind energy production. At the same time, while drafting the Plan, the spatial designations made were continuously checked for their environmental impact and adapted as appropriate. The expected substantial negative effects of individual uses discussed in the environmental report led to general and source-related regulations in the Spatial Plan aimed at avoiding and reducing such effects. These regulations, which are aimed at avoiding and reducing substantial negative effects, and the special consideration of part areas that are important to biological features of conservation interest ensure that no substantial negative impacts will be caused by implementation of the Spatial Plan and, in comparison with the development of the marine environment in the absence of an implemented Spatial Plan, that detrimental effects are avoided. In the Maritime Spatial Plan, only such area designations have been made which will not have any substantial impacts on the protection and conservation goals of the FFH and bird sanctuary areas or which will meet the requirements of the United Nations Convention on the Law of the Sea in conjunction with § 57 BNatSchG (Federal Nature Conservation Act).

Mechanisms or processes in relation to quality assurance

From the promulgation of the Spatial Plan on, the environmental report is open to public inspection at Federal Maritime and Hydrographic Agency (BSH) in Hamburg and in Rostock as well as at the website of the BSH. The environmental report including compatibility assessments and the results of the public hearing, especially any comments received, have been taken into account in the establishment of the Spatial Plan. In the course of the participation procedures the spatial plan draft and the en-

vironmental report were open to the bordering states, the German authorities and the public in two participation rounds, giving the opportunity to issue statements. Oral hearings have taken place with the bordering states, with the authorities and the public in 2008. Following the analysis of the oral and the written statements, a modification of the results of the environmental report regarding the spatial planning determinations was not necessary.

Performance assessment or audit of integrated management plan

As a measure for monitoring the significant impacts of implementation of the Maritime Spatial Plan on the environment it is intended, to access existing national and international monitoring programmes in the North Sea and in the Baltic Sea. Additionally, in order to ensure an environment-friendly exertion of the uses „exploitation of non-living resources" and „wind power production", the Spatial Plan determines that the impacts on the environment have to be consolidated and analysed within the framework of a project-related monitoring. This also applies for the event of remaining pipelines and submarine cables after the termination of their use. The plan-related monitoring will merge and evaluate these results. The analysis will also refer to the unforeseen significant effects of the implementation of the Maritime Spatial Plan on the marine environment as well as the examination of the predictions and assumptions of the Environmental Report. In this connection and in accordance with the Act on Environmental Assessment the BSH will query the monitoring results – which are required for safeguarding of monitoring measures – on hand with the responsible authorities. The intended plan-related monitoring measures in the North Sea and Baltic Sea can be presented as follows:

- Consolidation and analysis of project-related impact monitoring efforts implemented at the project level and any accompanying research;
- Analysis of national and international monitoring programmes, in particular:
- National BLMP monitoring programme
- BSH marine environmental monitoring network "MARNET"
- Monitoring programme within the scope of OSPAR (e.g. Joint Monitoring and Assessment Program, Quality Status Report) and HELCOM
- Monitoring programme within the scope of ICES
- Monitoring of the preservation status of specific species and habitats according to Art. 11 FFH Directive
- Management plans for the SPAs or studies for the assigned FFH areas
- Environmental monitoring according to § 12 BNatSchG
- Measures according to the EU Marine Strategy Directive
- Measures according to the EU Water Framework Directive

Initial findings for the monitoring at the spatial planning level are expected from the effect monitoring at the project level prescribed according to the standard for analysis of the impact of offshore wind energy on the marine environment (BSH standard assessment concept [StUK]), and from the accompanying ecological research by the Foundation of German Business (SDW) on the test field project located in the priority area for wind energy "North off Borkum" (offshore wind park "alpha ventus" with 12 wind energy facilities), sponsored by BMU research funds.

In 2009, this wind farm was the first German wind farm constructed. A series of measures for monitoring the impact on the marine ecosystem has been prepared during the designation of the project-specific scope for the impact monitoring and development of a concept for accompanying research for the test field project. For monitoring the implementation of the Maritime Spatial Plan, there are also certain measures planned that shall help to verify assumptions made with regard to significant impacts of offshore wind energy, and, wherever necessary, help to adapt use strategies and planned preventative and mitigating measures, or help to verify evaluation criteria, particularly those concerning cumulative effects.

Poland

Development of the integrated management plan

In Polish approach, three phases can be identified for quality assurance for developing MSP which is considered to be a key step for developing IM:

1) Selection of consortium for MSP elaboration

2) Collection the best available data and knowledge for preparing MSP Draft

3) Public hearing including participation of stakeholders and scientists (for adoption of MSP Draft)

Quality of scientific advice

The first phase is carried out by the national authority responsible for preparing MSP (Maritime Offices). According to the national law – there is a need for open bid for spending national financial resources. Theoretically, the best possible team of experts (MSP Consortium) shall be selected, however in practice often the cheapest offer may also be accepted. The second phase is carried by MSP Consortium and comprises of collection of the best available knowledge about environment and about traditional and current uses of a given MSP area. This information is available in papers, books, internet and through experts. In this stage consultation process shall also start, particularly for confrontation of "the best available knowledge" with "field reality". No research is performed to fill some identified gaps in knowledge, however gaps and possible management risk shall be identified and clearly indicated.

Mechanisms or processes in relation to quality assurance

The third phase of the MSP development is initiated by Maritime Offices, responsible authority for MSP preparation. This stage is very important for quality assurance of MSP Draft. All critical remarks are collected and shall be reflected in the next version of MSP Draft. This process might be quite lengthy and leading to many corrections and new (improved) versions of MSP Draft. MSP Draft is submitted for adoption by the relevant ministry. Until now, the most advance is preparation of MSP for the Western Part of the Gulf of Gdansk. The first stakeholders meeting for this MSP was organized and a number of comments completed. The quality of MSP has also been assessed by appointed team of experts as well as by stakeholders present at the meeting.

3.2.3 Summary of current practices in quality assurance in ICES Members States

Development phase of MSP

Quality of scientific advice

- Peer reviewed scientific advice.
- Experts to provide the necessary data and/or quality assessment and recognized external experts in the fields covered by the various data used in the development of the Plan.
- Provision of metadata for GIS based information.
- Advisory and expert groups to provide the factual basis for the plans.
- Scientifically published papers and other sources of documented knowledge.
- Use of SEA and suitability appraisal.

Mechanisms or processes in relation to quality assurance

- Advisory process aiming to provide information on the consequences of policy and management options, and the likelihood of achieving policy objectives under alternative management strategies and tactics.
- Quality assurance is applied through discussions with the policy group who have commissioned scientific work, and consultation processes with key stakeholders (environmental agencies, industry, other users of the sea, local communities) to assess the acceptability of the outcome.
- Public hearings.

Performance assessment or audit of integrated management plan

- Joint audit activities on permitting systems, regulatory verification and inspection activities are conducted on projects sites and occurrence investigations are conducted in relation to complaints. These activities are delivered within standardized auditing and regulatory verification practices and documentation via the use of check lists, assessment of conformity to agreed management measures and the implementation of correction actions and follow-up for non-conformities.
- Consultation with interested stakeholders including industry, conservation bodies, and the general public.
- Scientific reports are public documents open to public scrutiny.
- Peer reviewed audit by neighbouring countries.

From the conducted review it can be concluded that quality assurance in relation to the scientific advice and the related processes in the plan development phase was not clearly addressed. In most cases there has not been any systematic pervasive process to assess the uncertainty of data and analysis going into the scientific reports. Further the auditing process of existing management plans is also not explicitly outlined in most cases. In summary, under this ToR we identified clear gaps proportionate to clear guidance in quality assurance related to both the development phase of an integrated management plan or MSP and the auditing process of existing plans.

References

Ehler, C, Douvere, F. 2009. Marine Spatial Planning: a step-by-step approach toward ecosystem-based management. Intergovernmental Oceanographic Commission and Man and the Biosphere Programme. IOC Manual and Guides No. 53, ICAM Dossier No. 6 Paris: UNESCO, 2009.

EC 2001/42. 2001. Directive of the EU parliament and of the council on the assessment of the effects of certain plans and programs on the environment.

3.3 Prepare a review of the measurement and application of ecosystem goods and services in IM (ToR c)

Even though the ecosystem service concept is increasingly mentioned in environmental (including coastal and marine) policy frames, e.g. in the EU Marine Strategy Framework Directive (MSFD), it still is not a fully operational concept and much debated within science. Debated issues include for example the practical measurement of and the "currency" in which to measure ecosystem services and societal benefits, in particular the role of monetary vs. non-monetary measures and how to deal with intangibles like many cultural services such as land- and seascape aesthetics. Another much debated question is how to establish clear and if possible quantifiable relations between ecosystem functions and processes with human benefits and sea uses and with human well-being. Establishing such relations is highly relevant if the concept of ecosystem services should be able to support decision making in spatial planning.

However, the case studies presented by members of WGMPCZM in chapter 3.3.2 illustrate that the application of the concept is discussed in planning practice and already used for a range of purposes in policy making. This range includes:

- sustainable use of natural resources which provide ecosystem services as an underlying goal to the application of the ecosystem based management in Canada;
- the use of ecosystem services as starting point for the formulation of policy objectives in fisheries in Sweden;
- several activities in the UK; and
- its use for interdisciplinary synthesis of impacts from offshore wind farms in the German research project Coastal Futures.

3.3.1 History and definitions

The idea behind a comprehensive view on ecosystems as a source of human well-being and a potential origin of management activities can be traced back to the year 1992, when de Groot's approach to 'Functions of Nature' was published. It named 37 environmental functions fulfilled by ecosystems and provided methods for establishing their socio-economic value. Contributions of Costanza *et al.* (1997), focusing on the monetary value of natural capital and ecosystem services, and Daily (1997), pointing out human dependency on earth's life-support system, e.g. the provision of ecosystem services, further shaped the development of an ecosystem-based research design. On global scale the most prominent and major application of the approach is the Millennium Ecosystem Assessment (MA, www.millenniumassessment.org).

The MA (2005) defines ecosystem services as the benefits that humans obtain from ecosystems, identifying four interacting categories:

- "provisioning" (such as food and timber);
- "regulating" (such as air and water purification);

- "cultural" (e.g., recreational opportunities); and
- "supporting" ecosystem services (i.e., services that underpin all of the above services, e.g., nutrient cycling).

However, as discussed in Busch *et al.* (2010) there is an ongoing controversial scientific discussion concerning the definition of central terms of ecosystem service research. New publications tend to clearly separate between services and benefits while defining ecosystem services as aspects of ecosystems (actively or passively) utilized to produce human well-being (Fisher & Turner 2008, Boyd & Banzhaf 2007). In this understanding, services must be ecological phenomena that do not have to be utilized directly. Consequently, cultural services are understood as benefits and not services. Moreover, ecosystem services include ecosystem organization and structure as well as processes and functions, if they are consumed or utilized by mankind. Along these definitions ecosystem functions and processes become services, if humans benefit from them, meaning without human beneficiaries they are not services (Busch *et al.* 2010). In this understanding sea uses are not (mainly provisioning) services, but benefits, which rely on particular ecosystem functions and processes.

However, while differences in definitions are relevant for structuring the necessary information for an evaluation of ecosystem services and therefore need to be made explicit in any scientific or practical evaluation, the most important aspect is that the ecosystem service approach establishes a principal link between natural processes – services provided by ecosystems to humans – benefits humans derive from using ecosystem services and finally human well-being as driving force for human activities.

With regard to MSP it needs to be noted that ecosystem services are strictly linked to the spatial dimension of the defined area in which those services are provided. Spatial scaling is therefore of utmost importance for assessments and policy formulation. Global findings might not be relevant at particular local scales (and vice versa). Furthermore scales for ecosystem processes, provision and use of ecosystem services, derivation of benefits by users and legal as well as planning processes typically vary and do not necessarily overlap in the sea. This makes assessments of ecosystem services and translation of findings from assessments into policy formulation particularly difficult. However, the case studies below demonstrate that the ecosystem service approach is applied for a variety of aims in ICES Member States.

3.3.2 Case Studies

Canada

Principles of Ecosystem-based Fisheries Management

International consensus is emerging that the adoption of ecosystem-based fisheries management is essential for sustainable fish stocks and sustainable fisheries over the long term.

An ecosystem approach requires that fisheries management decisions consider the impact of the fishery not only on the target species, but also on non-target species, seafloor habitats, and the ecosystems of which these species are a part. This approach also requires that management decisions take into account changes in the ecosystem which may affect the species being fished. This includes the effects of weather and climate, and the interactions of target fish stocks with predators, competitors, and prey species.

Ecosystem-based fisheries management is also part of the broader approach to managing oceans and activities that take place in and around marine environments. Known as integrated oceans management, it compels decision makers who are responsible for fisheries to consider other ocean users during management planning processes. This helps to ensure that fisheries managers make more informed decisions regarding ecosystem issues, such as the protection of ecologically significant areas and species.

Building on existing fisheries management practices, Canada's Sustainable Fisheries Framework forms a foundation for implementing an ecosystem approach in the management of its fisheries. This includes using new policies and tools to implement the precautionary approach to fisheries management decision making, and manage the impacts of these fisheries on sensitive benthic areas and forage species.

Over time, new national policies on other aspects of ecosystem management, such as the management of by-catch species, will be incorporated into this Framework. This will ensure that Canada continues to build a solid framework for applying an ecosystem approach to fisheries management.

Applying the Ecosystem-Based Management Approach

The ecosystem-based management (EBM) approach is critical to ensure sustainable use of natural resources providing ecosystem goods and services. In the context of the oceans, EBM can be defined as the approach that consists in taking primary considerations for marine ecosystem health in the management of human activities affecting marine and coastal area so that the ecosystem components which are key to maintaining the ecosystem structure, functions and environmental quality, are not significantly impacted by activities and are maintained at appropriate temporal and spatial scales over time. This definition follows a series of guiding principles, where EBM is:

- holistic and cross-disciplinary;
- based on the best knowledge available;
- a phased implementation process, nationally developed and regionally implemented;
- areas-based management;
- objective-based management;
- applied within the broader context of Integrated Management (IM);
- incorporating the precautionary approach and principle;
- built upon adaptive management.

EBM is made operational and its achievement becomes possible and measurable when areas, species and properties are identified as management conservation priorities, and then translated into ecosystem objectives in the Integrated Management (IM) plans for each Large Ocean Management Area (LOMA). Doing so allows defining the bounds within which sustainable development objectives have to be set.

The Oceans Action Plan identifies a number of key deliverables to enhance the knowledge and assessment of marine ecosystems and help the identification of conservation priorities within the five LOMAs (including the Gulf of St. Lawrence Integrated Management area): 1) the preparation of an Ecosystem Overview and Assessment Report for assessing and reporting on marine ecosystems nested within the management areas; 2) the identification of Ecologically and Biologically Significant Areas; and 3) the development of Ecosystem Objectives for informing IM plans

in LOMAs. These science-based management tools are needed to achieve key steps of IM while being the foundation on which the EBM framework has been developed in Canada.

Sweden

Discussing ecosystem services when formulating policy objectives

Within the Swedish Board of Fisheries scientists and managers have discussed how the concept of ecosystem services could best contribute to the formulation of objectives in a reformed Common Fisheries Policy. In the following text ideas from the internal deliberations within the Board of Fisheries have been captured. The text does not necessarily reflect the Swedish official position and should therefore not be quoted.

The ecosystem approach as fundament

The ecosystem approach to management is a paradigm shift and cannot be introduced gradually. Either you take the whole ecosystem into account or you don't. To implement the ecosystems approach in fisheries management means creating a process where stakeholders on several levels cooperate – research, management, the fishing sector and other stakeholders – to preserve the common values of the aquatic ecosystem.

Fish has a decisive role in all functions of the aquatic ecosystem, not only as a target for harvesting ecosystem goods but as a participant in all the other life-supporting services of the ecosystem. Fish dominate the roles as prey or predator at several trophic levels in seas and inland waters. By excessively depleting fish at any of those levels an imbalance and a chain of events is started, with often unforeseen consequences. Eutrophication, red tides and mass occurrence of jellyfish have all been traced to disturbances of the role of fish in the ecosystem.

The European Union acts through the Integrated Maritime Policy to ensure that the fisheries policy contributes to the ecosystem based approach, which is fundamental in the Marine Strategy Framework Directive. The Commission ascertains that applying maximum sustainable yield, MSY, as a management target will improve the resource base for the fishery and this shall be attained by 2015.

The Marine Strategy is the environmental pillar of the Maritime Policy and its Framework Directive shall ensure that all policy areas, including the fishery policy, cooperate and integrate environmental concern in their respective policy.

New objectives and objective hierarchy

A reformed CFP should use the ecosystem approach as a framework and ensure that the structure and function of the fish ecosystem is maintained, supporting all other policies within the Maritime Policy. Additionally the CFP should contribute to the prosperity of the coastal communities in Europe by restoring the fish resources towards a maximum sustainable yield.

To achieve the above the objectives must be clearly formulated and prioritized. Their mutual interaction and relation to other policy areas must be made clear. The objectives shall give unambiguous guidance for management decisions. The point of departure in formulation the objectives can be the four main ecosystem goods and

services – the producing, regulating, supporting and cultural services[4]. The objective with the highest priority for the Fisheries Policy is given to the producing service. The next objective relates to the supporting and regulating services and the third objective, with lowest priority, relates to the cultural services.

1. The Common Fisheries Policy shall secure the consumers access to sound food by exploiting the marine ecosystem at close to maximum sustainable yield, without jeopardising biological diversity and the resilience of the ecosystem.
2. The Common Fisheries Policy shall contribute to the Maritime Policy by taking the effects of the fishing sector on the regulating and supporting functions of the ecosystem into account.
3. The Common Fisheries Policy shall contribute to a fishing sector which creates occupation, income, recreation and preserves a cultural heritage. The fishing sector shall give a standard of living which follows that in the rest of society. To achieve that the fishing capacity must be continuously adjusted to the limits set by the recourses.

In addition to the objectives clear guidance is necessary for their application. The objectives should be broken down into measurable and dated parts. Indicators and principles for decision making are important as well as principles for evaluation of the effects of decisions. A system of adaptive management should be incorporated in a reformed CFP. The Fisheries Policy must be dynamic and able to adapt both to how its objectives are achieved and to the development in adjacent policy sectors. Evaluation and corrections of decisions should be continuously used tools to control the quality and achievement of the policy.

UK: Valuation of Ecosystem services in the UK

Defra guide on ecosystem services valuation

A consequence of the inclusion of socio-economic assessment in the SEA (SA) process is that there is increasing need to be able to value ecosystem services. SA is now a routine feature of terrestrial development plans, and is now appearing in marine contexts, as outlined above. In order to assist in the valuation process, UK Government (Defra) has recently (2007) published "An introductory guide to valuing ecosystem services".

The aim of this Guide is to provide an introduction to the valuation of ecosystem services. It builds on previous approaches to valuing the environment but takes a more systematic approach to the assessment of impacts on the natural environment. The central theme of this work is to ensure that the true value of ecosystems and the services provided are taken into account in policy decision-making. The underlying case for the valuation of ecosystem services is that it will contribute towards better decision-making, ensuring that policy appraisals fully take into account the costs and benefits to the natural environment.

The Guide defines Ecosystem services as services provided by the natural environment that benefit people. Some of these ecosystem services are well known including

[4] Millennium Assessment, 2003. Ecosystems and Human Well-being: A Framework for Assessment. Island Press

food, fibre and fuel provision and the cultural services that provide benefits to people through recreation and cultural appreciation of nature. Other services provided by ecosystems are not so well known. These include the regulation of the climate, purification of air and water, flood protection, soil formation and nutrient cycling. Four categories of ecosystem services are recognised (Table 1.1 below).

The Guide notes that the underlying case for the valuation of ecosystem services is that it will contribute towards better decision-making, ensuring that policy appraisals fully take into account the costs and benefits to the natural environment. A range of methodologies are available to value changes in ecosystem services. These values are considered in a Total Economic Value framework that takes into account both the use and non-use values individuals and society gain or lose from marginal changes in ecosystem services. As many ecosystem services are not traded in markets, and therefore remain unpriced, it is necessary to assess the relative economic worth of these goods or services using non-market valuation techniques. The Guide presents a number of ways in which this can be done.

Economic analysis in Marine Strategy Framework Directive

The implementation of the Marine Strategy Framework Directive requires economic analysis at several stages. For example the initial assessment of environmental status due in 2012 should include a pressures and impacts assessment, and also an assessment of the current cost of marine environmental degradation. Similarly, the implementation of measures to improve status should be preceded by a Cost-Benefit Analysis to ensure that the cost of measures is not disproportionate to their benefits.

The UK Government has commissioned the preparation of a Handbook for Undertaking Socio-economic Analysis for the Marine Strategy Framework Directive: Practical Guidelines for Applied Analysis. Parallel activities are in place at EU level: Economic assessment of policy measures for the implementation of the Marine Strategy Framework

Contract N° 070307/2010/577902/ETU/F1 EC DG Environment.

Table 1.1: MA categories of ecosystem services and examples

Category	Examples of ecosystem services provided
Provisioning services i.e. products obtained from ecosystems	• Food e.g. crops, fruit, fish • Fibre and fuel e.g. timber, wool • Biochemicals, natural medicines and pharmaceuticals • Genetic resources: genes and genetic information used for animal/plant breeding and biotechnology • Ornamental resources e.g. shells, flowers
Regulating services i.e. benefits obtained from the regulation of ecosystem processes	• Air-quality maintenance: ecosystems contribute chemicals to and extract chemicals from the atmosphere • Climate regulation e.g. land cover can affect local temperature and precipitation; globally ecosystems affect greenhouse gas sequestration and emissions • Water regulation: ecosystems affect e.g. the timing and magnitude of runoff, flooding etc. • Erosion control: vegetative cover plays an important role in soil retention/prevention of land/asset erosion • Water purification/detoxification: ecosystems can be a source of water impurities but can also help to filter out/decompose organic waste • Natural hazard protection e.g. storms, floods, landslides • Bioremediation of waste i.e. removal of pollutants through storage, dilution, transformation and burial
Cultural services i.e. non-material benefits that people obtain through spiritual enrichment, cognitive development, recreation etc	• Spiritual and religious value: many religions attach spiritual and religious values to ecosystems • Inspiration for art, folklore, architecture etc • Social relations: ecosystems affect the types of social relations that are established e.g. fishing societies • Aesthetic values: many people find beauty in various aspects of ecosystems • Cultural heritage values: many societies place high value on the maintenance of important landscapes or species • Recreation and ecotourism
Supporting services, necessary for the production of all other ecosystem services	• Soil formation and retention • Nutrient cycling • Primary production • Water cycling • Production of atmospheric oxygen • Provision of habitat

Scotland: Scottish Government economic review of ecosystem services research

The Scottish Government has undertaken an in-house terrestrial and marine research mapping exercise for ecosystem services in Scotland, from an economic/valuation perspective. The study concluded that, regarding valuation studies, there are several available at the Scotland level, most of which focus exclusively on terrestrial ecosystems with few covering marine. Most of the marine valuation studies focus on biodiversity, rather than ecosystems. Many valuation studies found were consistent with an ecosystem services framework, though some terrestrial and most specific marine studies were not. While some Scottish data is available, the majority of studies examined are at the UK and EU level but may offer some value to Scotland through the use of benefits transfer i.e. using the values derived in these studies as an approximation for Scotland.

Less literature was found on measurement/trade off studies than for other categories. In this case, there were some interesting Scottish findings on the terrestrial side, although few have been developed within an ecosystem services framework. For marine, most of the work identified focused on biodiversity, with some work being done

in an ecosystems context. Overall, the research for this category identified little work on Scotland and results were largely specific to the region examined which limits the extent to which results from studies of outside regions can be applied to Scotland.

Some common themes have emerged from the research. Primarily, more economic valuation data and information on ecosystems is required. Additional valuation studies would increase the amount of economic data available, increase the knowledge base and allow for the development common methodological approaches. Additional valuation studies would also go towards addressing two further issues which emerged. Firstly, the benefits transfer approach was sometimes viewed as having limited applicability as the values of certain ecosystems will differ across regions. This makes it difficult to reliably adopt values derived in previous studies, and could be overcome by providing additional valuation data. Secondly, results from valuation studies are sometimes viewed with uncertainty due to the fact that they only provide estimates of values and their results may be perceived to be subject to bias. Further developing methodological approaches may improve future valuation studies in terms of consistency and reliability. Additionally, it was found that the benefits transfer approach may have limited applicability, as the values of certain ecosystem elements will differ across regions, thus making it difficult to reliably adopt values derived in previous studies. Most studies also agree that natural and social scientists need to work more closely together. This will facilitate the interpretation of natural science data and its incorporation into an analytical framework and allow for more reliable economic modelling.

The main knowledge gap identified is the lack of economic valuation data for ecosystem services, both at the Scottish level and at all regional / international levels. As discussed, additional data would decrease the reliance on benefits transfer and help create consistency in methodological approaches. It was also found that cultural benefits are often omitted in valuations, perhaps due to difficulty in measuring them, whilst other studies focus exclusively on these - a more integrated approach would be helpful. Finally, the research acknowledges a lack of understanding in several areas, including the link between biodiversity and ecosystem services, whether ecosystems contain tipping points and how these would be measured. Knowledge of ecosystem functionality and how human behaviour influences it and of interconnectivities of ecosystems was also found to be in need of further development.

Scotland: Role of the economic assessment of ecosystem goods and services in marine planning

Marine spatial plans, prepared by public bodies in the EU, are very likely to require Strategic Environmental Assessment under EU Directive 2001/42/EC (on the assessment of the effects of certain plans and programmes on the environment; the 'SEA Directive').

Plans which qualify for SEA also require Sustainability Appraisal (SA), which is considered to be a central element of the preparation of development plan documents. The SA should perform a key role in providing a sound evidence base for the plan and form an integrated part of the plan preparation process. Typically, a Sustainability Assessment of a marine plan would include an SEA, a Habitats Regulations Appraisal (HRA), and a socio-economic assessment of the consequences of the plan.

The socio-economic assessment will normally include valuation of changes in the provision of ecosystem goods and services arising from the plan, and would cover both use and non-use elements.

An example of the application of the process of Sustainability Assessment in a marine planning context is the plan for offshore wind energy development in Scottish Territorial Waters. The Post Adoption Statement for this Plan has recently been published on the Marine Scotland website at:

(http://www.scotland.gov.uk/Topics/marine/marineenergy/wind). The Plan is supported by a Sustainability Assessment containing an HRA and Socio-Economic Assessment, and a sensitivity analysis of the spatial modelling involved in developing the plan.

The recognition of ecosystem goods and services offers additional concepts that could be explicitly included in the objectives of a plan. For example, a plan to improve fisheries and increase marine renewable energy generation clearly has the generation of commercial (use) goods from the sea as primary objectives. However, the draft Scottish National Marine Plan explicitly includes the 11 Descriptors of GES under MSFD as environmental objectives within the plan, and Canada is considering adopting a similar set of expressions of desirable environmental state. Cost benefit analysis of actions under the plan should therefore include valuation of changes in the range of ecosystem goods and services covered by the Descriptors. However, current national or regional scale marine plans in Europe are normally directed towards economic development while maintaining environmental quality and non-use elements of value have not as yet been prominent in plan design.

Germany

The Coastal Futures research project

As part of the project Coastal Futures, funded by the German research ministry from 2004 to 2010 (see also chapter 3.1.2 of this report) impacts of large scale offshore wind farming in the German Bight on the provision of ecosystem services have been analysed. Here, the ecosystem service approach was tested as a tool to analyze the impacts caused by this single agent (OWFs) on marine ecosystems, or more abstract, the system's response to a new introduced pressure. The research approach and detailed results are available in chapter 8 (Busch *et al.* 2010) of the Coastal Futures Synthesis report (Lange *et al.* 2010), downloadable from the LOICZ website. To make results from different disciplines including natural and social sciences and from different sources (including modelling efforts as well as document analysis and questionnaires) the single ES were rated to make them traceable and comparable. An exact valuation or measurement of relevant ES is difficult and there is an ongoing discussion about monetizing ES. In Coastal Futures a qualitative rating ranging from -2 to +2 was used to express the expected trends of development.

The results concerning supporting services and ecological integrity show that the majority of identified impacts is expected to enforce ecological processes on a lower spatial scale (pile, OWF), while impacts might disappear on a larger scale (EEZ, southern North Sea). 'Biotic diversity' is an exception in which negative trends are expected for example for sea birds. The results demonstrate that tradeoffs between ES seem to be difficult to avoid when it comes to an enforced installation of OWFs. It is conceivable that the degree of impacts on seabirds could be mitigated by appropriate siting of OWFs to avoid their construction on core bird migration routes and feeding grounds.

There does not seem to be a high impacting potential on large scale regulating ecosystem services. Although scour protections might have a slightly negative impact on

sea bed stability, regulating ecosystem services do not show relevant changes related to offshore wind power introduction. The nutrient filtration rate is expected to increase due to larger populations of filtrating mussels on a local scale. The main effect is the reduction of CO2 emissions for electricity generation, which is supposed to slightly slow down the current process of climate change and therefore contributes to targets of climate politics.

The introduction of OWFs as a new human offshore activity, from a provisioning service point of view, conflicts with the traditional marine use fishery. But, a ban of fisheries within wind farms could potentially also enforce the recovery of commercially used fish populations and in the long term increase the catches in their surroundings. Nevertheless, until now, the fisheries sector mainly interprets offshore wind farming as a risk of its interests (Schubert 2009). The potential of mariculture to produce blue mussels and algae is of exceptional interest. Even a co-use with hydrogen production is currently being discussed among small expert groups. It can be concluded that the assumed process-enforcements within provisioning services (including the energy production from wind as a renewable source) exceeds the locally negative developments of the ES 'food - fishery'.

Cultural services show a controversial behaviour that is difficult to estimate due to the high relevance of local residents' personal preferences. These circumstances lead to the presumed impact ranges for several ES varying between process-enforcement and -diminishment on a local and regional spatial scale (sense of place, image, knowledge systems, recreation) perceptible to coastal residents. OWFs proved to be a development some consider an opportunity and others a threat and has raised many arguments that are well suited for framing a conflict over cultural services. Visibility, or rather the fear that OWFs will be visible from the mainland, and accessibility were identified as further important factors shaping force and direction of impacts relevant on a local and regional spatial scale. On an EEZ and international scale impact estimations become more distinct, indicating trends for a slight enforcement of the ecosystem services 'knowledge systems' and 'informal education', while 'habitat and species value', like expected across all scales, shows a strong process-diminishing impact even on an international scale.

References

Boyd, J. & Banzhaf, S. (2007): What are ecosystem services? Ecological Economics 63(2-3): 616-626.

Busch, M, Burkhard, B, Lange, M, Gee, K, Stelljes, N (2010): Impacts of Offshore Wind Farms on the Provision of Ecosystem Services and Human Well-being. In: Lange, M., Burkhard, B., Garthe, S., Gee, K., Lenhart, H., Kannen, A., Windhorst, W. (2010): Analysing Coastal and Marine Changes – Offshore Wind Farming as a Case Study: Zukunft Kueste – Coastal Futures Synthesis Report. LOICZ R & S Report No. 36, Chapter 8, pp. 121-160, downloadable from www.loicz.org.

Costanza, R.; D´Arge, R.; de Groot, R.S.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S.; O´Neill, R.V.; Paruelo, J.; Raskin, R.G.; Sutton, P. & van den Belt, M. (1997): The value of world´s ecosystem services and natural capital. Nature 387: 253-260.

Daily, G.C. (1997): Nature´s Services: Societal Dependence On Natural Ecosystems. Island Press. Washington D.C..

De Groot, R.S. (1992): Functions of Nature. Evaluation of Nature in Environmental Planning, Management and Decision Making. Wolters-Noordhoff, Amsterdam.

Fisher, B. & Turner, R.K. (2008): Ecosystem services: Classification for valuation. Biological Conservation 141: 1167-1169.

MA (Millennium Ecosystem Assessment) (2005): Ecosystems and Human Well-being. Synthesis. Island Press, Washington D.C.

3.3.3 WGMPCZM approach for a review of ecosystem services for 2012

In this report different approaches to the assessment of ecosystem services in objective setting for Integrated Management are discussed. Cases include Canada, Sweden, the UK and Germany.

For 2012 the ToR has been specified in order to focus on one particular aspect that appears to be highly relevant for planning and management: Which methods are used and which experiences exist for the assessment of cultural ecosystem services and the cultural dimensions of coastal and marine use? The social and cultural dimension in planning and management decisions is up to now often only loosely recognised – even though in many cases it is a source of conflict between different coastal actors or local stakeholders and administrations acting at provincial and national levels.

3.4 Update and report on IM activities, including ICZM and MSP in different ICES countries including information on initiatives towards integrated governance in the CZ (ToR d)

In 2010 the EU coastal Member States were invited to draw up a National Report on the further progress in implementation achieved since 2006. At present, reports from 9 MSs have been submitted and are available on the European Commission ICZM pages[5]. Although this meeting of the WGMPCZM has concentrated on MSP, some attendees have also submitted a separate update of ICZM in their countries. Both of these can be found in Annex 6 along with any more detailed information on MSP.

The tables in Annex 7 summarise the progress of MSP in each MS against the 'step-by-step' guidelines produced in the UNESCO report[6], some points from the tables have been expanded on in the text below. The tables could be updated each year as progress is made and for as long as this is deemed a useful exercise. Each MS has also provided information on where their progress towards the development of an MSP was consistent with the successes and challenges listed in ToR a. The MS contributions were then analysed to identify any specific science questions that would be needed to be addressed, for ICES countries to fully address the best practice guidelines for MSP.

3.4.1 Case Studies

Case studies have been provided by participants of some MSs to illustrate best practice for certain aspects of MSP.

[5] http://ec.europa.eu/environment/iczm/nat_reports.htm

[6] http://www.unesco-ioc-marinesp.be/uploads/documentenbank/d87c0c421da4593fd93bbee1898e1d51.pdf

3.4.1.1 Legislative Structure

Roland Cormier - Canada

Formalized governance and engagement structures

Governance and engagement structures are in operation in each of the LOMAs. These structures bring together the Federal, Provincial and Territorial jurisdictions in a forum to facilitate policy fragmentation dialogue in relation to ecosystem-based management of coastal and oceans resources. Attached to these structures are stakeholder advisory bodies. DFO formalized scientific advisory processes are used for the development of science-based management policies.

Environmental assessment regulatory coordination and declaration processes

All environmental assessments are coordinated under the Federation Coordination Regulations under the authority of the Canadian Environmental Assessment Act. The goal of federal coordination is to ensure that the activities and obligations of federal authorities, industry stakeholders and the public involved in an environmental assessment are carried out in an efficient manner operating within regulated timeframes. Combined with the regulatory requirements for developing strategic and class assessments in terms of scoping, identification of valued ecosystem components and management measures, the public declaration and legal standing of such documents are valued instruments in the development and implementation of marine spatial plans.

3.4.1.2 Objective setting in the Scottish draft National Marine Plan

Ian Davies – Scotland

The Scottish National Marine Plan sets out:

- Policies for sustainable development of Scotland's seas;
- Policies on Nature Conservation Marine Protected Areas (MPAs) and other relevant conservation sites;
- Economic, social and marine ecosystem objectives and further objectives for the mitigation and adaption of climate change;
- The condition of the Scottish marine area (or region) including a summary of the significant pressures and human impacts on the relevant area. These are set out in Scotland's Marine Atlas: Information for the National Marine Plan;
- Information relating to the policies appropriate to the plan.

The pre-consultation Draft National Marine Plan sets out policies for the sustainable development of Scotland's seas and includes economic, social and marine ecosystems objectives. The plan also introduces key challenges of marine sectors and the objectives needed to deliver these based on an integrated approach.

Scottish Government Objectives

The Scottish Government's key purpose is to focus on creating a more successful country with opportunities for all of Scotland to flourish through increasing sustainable economic growth. The Scottish Government's view is that there should be a presumption of use for the marine area. This purpose is set around five strategic objectives and a set of purpose targets. Those most relevant to marine planning are:

Our strategic objectives

- WEALTHIER & FAIRER – Enable businesses and people to increase their wealth and more people to share fairly in that wealth.
- GREENER – Improve Scotland's natural and built environment and the sustainable use and enjoyment of it.

Purpose targets

- Economic Growth: To raise the GDP growth rate to the UK level by 2011 and to match the GDP growth rate of the small independent EU countries by 2017.
- Sustainability: To reduce emissions over the period to 2011 and to reduce emissions by 80 percent by 2050.

National Objectives

In addition to the Scottish Government objectives outlined above, our draft plan includes High Level Marine Objectives (HLMO) agreed by the four devolved administrations across the British Isles, as well as Good Environmental Status (GES) indicators under the EU Marine Strategy Framework Directive. These are classified under the headings:

- Clean and Safe Seas
- Healthy and Biologically Diverse Seas
- Productive Seas, contributing to the needs of people
- Better Governance of the Sea

The National Marine Plan has been developed to clarify overall objectives which provide the basis for managing Scotland's marine environment.

Scottish Government approach to development in the marine area

1) Different marine interests will be treated with fairness when decisions are being made in the marine environment.

2) There is a presumption in favour of development. Any development in the marine environment will be considered within the context of national priorities which provide a basis for conflict resolution.

3) Development should take account of sustaining and enhancing the significance of heritage assets.

4) Developments in the marine environment should take account of the impacts on the special qualities for which a National Scenic Area is designated.

5) Developments in the marine environment should take air quality issues into account, especially relevant air quality limits.

6) Developments and activities will be resilient to, and will not unacceptably impact upon, coastal change.

7) Developments should not result in a deterioration of the ecological status of any water to which the Water Framework Directive applies.

8) Development should aim to avoid harm to marine ecology, biodiversity and geological conservation interests, including through location, mitigation and consideration of reasonable alternatives.

Sixteen sectors have been identified which contain key sectoral objectives, challenges and policies, grouped as below:

Section 1: Food, Fisheries, Wild Salmon and Freshwater Fisheries, Aquaculture

Section 2: Energy, Oil and Gas, Carbon Capture and Storage, Renewables

Section 3: Tourism and Recreation

Section 4: Marine Transport

Section 5: Telecommunication and Cables

Section 6: Military Activities

Section 7: Marine Environment Nature Conservation Marine Historic Environment

Section 8: Coastal/Water Coastal Protection and Flood Defence, Water Abstraction, Waste Water

Section 9: Aggregates and Disposal

For each sector the document outlines:

1) Key challenges
2) Objectives
3) Background
4) Current situation
5) Environmental impacts
6) Economic impacts
7) Spatial constraints
8) Future - short, medium and long term goals

In some cases, the future goals are quantified, and in other they are expressed qualitatively.

Comments

The Scottish NMP is very clearly directed at facilitating development of use of the sea, for the benefit of the people of Scotland. It is a policy document that will lead to an agreed set of policies to guide the development of Scotland's marine area. The finalised document will be consistent with the UK Marine Policy Statement. Local marine plans to be developed for Scottish coastal waters by a set of Coastal Planning Partnerships (yet to be created) will have to be consistent with the Scottish National Marine Plan. Licensing/consenting for projects that are consistent with the local (and therefore national) plan should be a relatively straightforward process compared to the process likely to experienced by projects that are not consistent with the plans.

The sectoral objectives are presented as the end of a sequential hierarchy of Scottish Government policy objectives. The current draft almost entirely deals with sectoral ambitions separately. It is recognised that an early further stage will be to assess the potential interactions between the objectives of different sectors, particularly once the Coastal Planning Partnerships begin to make more detailed plans for their areas.

3.4.1.3 Lessons learned from MSP in The Netherlands

Sense of urgency

- Must be felt by stakeholders and politicians

- Wind energy development / creating and allocating space for wind energy was the driving force (N2000 areas had been already been identified and allocated)
- Potential lack of space for all functions and experiences form the past planning period for wind energy at sea lead to an integrated and forward looking plan
- Providing certainty for all users became necessary

Institutional aspects (success factors)

- Government institutes (policy, management and scientific) work closely together
- One department responsible for coordination of policy making and implementation
- With legally binding instruments

Stakeholder participation (key elements of success)

- Building up confidence amongst all participants at the beginning proved helpful.
- Being transparent on the process that was going to be followed.
- Government facilitated process, therewith leading to an end result within a relatively short period (one and a half/tow years).
- Gathering table for developing alternatives (not one plan proposed by government and opposed by stakeholders, but different spatial plans with their plusses and minuses).
- Being flexible in the process and giving stakeholders time, but not unlimited. New insights have led to adjusting of alternatives put forward by the shipping industry; these have been accepted in the process and have been taking into account in the cost/benefit analysis.
- Formal Safety assessment and bridge simulations by captains for different conditions to get a good understanding of distances needed between shipping and wind farms. Expert help form the UK was hired, which helped build confidence.
- Involving stakeholders in the studies which had to be carried out (ecological, alternatives, cost/benefits etc.): agreeing on the questions asked and being transparent about state of knowledge and research necessary to take a political decision on the Maritime Spatial Plan.
- Political decisions are at the end of the process. Stakeholders can of course make use of their democratic right to try to influence these decisions. This includes a process for further research into bird populations and other species after which more areas for wind farms might be allocated. (so make those decisions which you can and take other decisions later on).

3.4.2 Country Reports

3.4.2.1 Canada

Integrated Oceans Management

Marine Spatial Planning is pursed through existing Integrated Oceans Management processes that are at various stages of development in five key Large Ocean Man-

agement Areas. Generally, MSP is considered as the spatial management measure within an ecosystem-based integrated management plan. Oceans management was initiated with the intent of bringing ecosystem-based management approaches into planning of oceans use in addition to reducing the level of fragmentation in policy and bureaucratic processes. The federal authority for oceans planning and management is provided by the Oceans Act under the leadership of Fisheries and Oceans Canada (DFO). In addition to program funding for oceans science and management, additional government oceans initiative funding was also provided under government initiatives such as the Oceans Action Plan and the Health of the Oceans initiatives as well as programme operation funding.

Within DFO program activity architecture, integrated oceans management is one of the key programs of the department against which work and resource planning are implemented to manage timely deliverables and products. Pre-planning for oceans management initiatives also includes the identification of eco-regions and their corresponding management areas. In the initial development of the program, DFO also developed of policies and guidelines regarding the integrated management processes and the generation of ecosystem knowledge such as ecosystem overview reports, ecologically and biologically significant areas and species as well as conservation objectives.

Each oceans management area has formalized governance and public engagement structures and processes. These structures include terms of references, reporting requirements and consultative and feedback processes. In oceans management, governance structures have senior management oversight committees, secretariats and stakeholder advisory bodies. In terms of scientific support to decision-making, the Canadian Scientific Advisory Secretariat of DFO manages peer review processes that are conducted to address scientific questions related to the management of Canadian oceans and the conservation of marine and freshwater resources.

In oceans management, existing conditions focused on establishing the ecosystem basis for management via the preparation of ecosystem, social, cultural and economic overview reports as well as state of the oceans reports in some cases. Extensive ecological and biological spatial inventories have been conducted for all LOMAs. In addition, human use atlases have also been developed and used for preliminary risk assessments and objective formulation. Coupled with the difficulty to identify medium to long-term development objectives in the LOMA, future conditions considerations have been limited by the lack of knowledge on the state of cumulative environmental effects and their corresponding management action thresholds linked to the drivers and pressures in the management area. Although conservation objectives have been identified in some LOMAs, linking these objectives to management objectives have challenging. Successful impact management are achieved for conservation objectives vulnerabilities that are directly linked to specific drivers or pressures. However, conservation objectives are difficult to achieve when they are vulnerable to non-point source cumulative environmental effects. Some scientific exercises are presently underway to address these knowledge gaps.

Integrated management plans for Canada's LOMAs are at various stages of development. Integrated Management plans for two of the five Large Ocean Management Areas have been developed and made public (Integrated Management Plan for the Beaufort Sea: 2009 and beyond and the Eastern Scotian Shelf Integrated Ocean Management Plan - 2007) with one receiving formal endorsement (Beaufort Sea IM Plan). In these ecosystem-based plans, spatial planning is one of the management measures

amount other temporal and procedural management measures. Although each of these plans has spatial management aspects, the Oceans Act does not provide the legislative authority for zoning of activities in the marine environment. The management accountability of all management measures, including spatial plans, in an integrated management plan lie within the jurisdictional mandate of federal and provincial authorities that were implicated in the development of the plan. Thus, the enforcement of the plan lies within the terms of reference of the governance structure of the LOMA and memorandum of understandings.

DFO and its Federal and Provincial partners have various ecosystem-based monitoring programs. Some of these programs have long standing time series such as the biota yearly surveys occurring in marine, estuarial and freshwater system. In addition, environmental and natural resources departments also conduct some surveys regarding pollutants and habitat quality. Given the state of the LOMA development and implementation, large scale reviews of the management plans have not yet been undertaken. Even though LOMA plans are in development, DFO and its Federal and Provincial conduct program level reviews tied to performance indicators and strategic outcomes. These reviews guide the development of strategic scientific research plans as well as program implementation strategies.

Marine Spatial Planning Approach to Large Oceans Management Area

Eastern Scotian Shelf Integrated Oceans Management (ESSIM) (http://www.mar.dfo-mpo.gc.ca/e0010285) The DFO is in the early stages of implementing marine spatial planning to advance implementation of the Eastern Scotian Shelf Integrated Oceans Management (ESSIM) Plan. The ESSIM Plan provides strategic direction and guidance for ocean and coastal management, and includes objectives that are best implemented via spatial and temporal planning approaches to ocean management. DFO recently initiated policy-related research in collaboration with WWF-Canada to develop policy-setting direction on marine spatial planning in Canada. The research outputs aimed to examine the application of marine spatial planning as an appropriate policy instrument to deliver and enhance integrated coastal and ocean management in Canada. The research advice is being considered nationally in the context of DFO's Integrated Management Program. DFO also initiated legal expert discussions and policy-related research by a consultant legislative auditor to examine the fit between marine spatial planning and the authority of federal acts governing the use of Canada's oceans. This research examined several pieces of federal legislation in terms of either their stated tacit approval or silence to grant ministerial authority to plan for and implement marine spatial planning. This research enhanced our understanding of the context of and legislative requirements for marine spatial planning within Canada's ocean management regulatory framework. Marine spatial planning is an ongoing work plan item for DFO as well as the Regional Committee on Coastal and Ocean Management, which strives to integrate federal and provincial oceans management policy and program implementation in the Maritime Provinces. Areas of current focus to advance marine spatial planning operationally on a Scotian Shelf-wide scale include: developing sector-based and collaborative action plans to advance integrated management objectives and priorities; compiling regional information, data and mapping of human use for decision support and guidance; developing information products to inform planning and management activities, including environmental assessments; developing communication tools to inform the public and stakeholder groups on ocean and coastal management themes; and applying human

use spatial mapping data and information in bioregional Marine Protected Area network planning.

Marine Spatial Planning Approach as part of a Class Environmental Assessment

Canadian Oysters Aquaculture Class Environmental Assessment (http://www.ceaa-acee.gc.ca/050/document-eng.cfm?document=23640): Operating within federal and provincial regulatory requirements, a class environmental assessment (CEA) was conducted for suspended oyster aquaculture activities on the Eastern coast of the province of New Brunswick, Canada (Canada, 2007). The CEA was initiated as a means of reducing the bureaucratic processes and costs for aquaculture lease applications. Up to that point, individual lease application required an environmental assessment that had to address several federal and provincial regulatory requirements. In addition, concerns were being raised as to the carrying capacity of the bays considered for aquaculture development. The CEA used an integrated management approach to identifying valued ecosystem components (VECs) that comprised of key fish habitat, inter-tidal zones, fisheries, recreational activities, navigation, and migratory birds and their susceptibility to this activity. Subsequently, regulatory and policy requirements were combined using a spatial planning approach. The resulting document identified of zones for aquaculture leases and appropriate mitigation measures in the form of best management practices and buffer zones addressing the susceptibilities of the VECs. Given that the CEA normalizes the environmental requirements; all lease applications do not require an individual environmental assessment. The resulting integrated management plan provides effective and auditable mitigation measures and also enhances the efficiency of the lease approval process in terms of approval time and costs.

Success Factors

- Ecosystem basis for management

Extensive scientific work has been accomplished in developing guidance documents regarding "Ecologically and Biologically Significant Areas", "Ecologically Significant Species" and "Ecologically Significant Community Properties" including "Ecosystem Overview and Assessment Reports". These have resulted in a significant inventory of ecosystem components in the large oceans management areas. Risk analysis methodologies guidance is being developed to assist with the identification of ecosystem level cumulative environmental effects for ecosystems that are under intense pressure from human activities.

- Formalized governance and engagement structures

Governance and engagement structures are in operation in each of the LOMAs. These structures bring together the Federal, Provincial and Territorial jurisdictions in a forum to facilitate policy fragmentation dialogue in relation to ecosystem-based management of coastal and oceans resources. Attached to these structures are stakeholder advisory bodies. DFO formalized scientific advisory processes are used for the development of science-based management policies.

- Environmental assessment regulatory coordination and declaration processes

All environmental assessments are coordinated under the Federation Coordination Regulations under the authority of the Canadian Environmental Assessment Act. The goal of federal coordination is to ensure that the activities and obligations of federal

authorities, industry stakeholders and the public involved in an environmental assessment are carried out in an efficient manner operating within regulated timeframes. Combined with the regulatory requirements for developing strategic and class assessments in terms of scoping, identification of valued ecosystem components and management measures, the public declaration and legal standing of such documents are valued instruments in the development and implementation of marine spatial plans.

Challenges

Although cumulative impacts assessments between a sensitive ecosystem component and a specific pressure are achievable, scientific and technical knowledge of ecosystem level cumulative environmental effects that are linked classes of pressures is generally lacking. Ecosystem science being descriptive in nature, a risk approach is needed that would combine environmental effects monitoring with driver/pressure cumulative contributions to the effects. A better understanding of these links would inform the development of ecosystem level cumulative environmental effect risk thresholds that would guide the development of management strategies and targets applied to drivers and pressures. Such knowledge would also provide the basis for the development of marine environmental quality guidelines.

Specific Scientific Requirements

There is a need to establish cumulative environmental effects monitoring requirements in line with ecosystem-based management objectives. The EU Good Environmental Status criteria are considered as a good starting basis for such effects monitoring requirements. Attached to these criteria, there is also a need to identify risk thresholds that would guide management priority setting and actions. A risk threshold would provide the means of establishing risk profiles for management areas used to identify key issues and ensuring that management action is addressing the most significant issue in the spatial area.

3.4.2.2 Germany

Driver for MSP in the EEZ is wind farm development in relation to other human activities, responsible agency in the EEZ is BSH, German Laender are responsible within territorial waters (Mecklenburg-Vorpommern, Schleswig-Holstein, Lower Saxony). Aim of MSP is to balance uses and ecosystem needs along the three equally weighted pillars of sustainability. In all German sea areas legally binding maritime spatial plans are in force.

Resources and personnel have been allocated in the agencies responsible for setting up the plans. Additional conceptual or research needs to be funded through obtaining additional project funding (e.g. EU-Interreg funding for BaltSeaPlan project).

Pre-planning in the EEZ: Because of distance to coast a special way has been chosen: Initial stocktake of licences, activities, demands and interests have been derived from a questionnaire sent out to agencies and stakeholders in the beginning of the process.

Stakeholder participation was organised in form of a consultation on a draft plan and the SEA report. In hindsight it might have been better to develop plan objectives together with key stakeholders from the beginning and include stakeholders earlier in the development of the draft plan.

Existing conditions were defined and analysed in the form of an environmental report organised along the SEA directive. According to SEA environmental conditions

and potential effects of human activities have been assessed. Economic, social and cultural dimensions of sea uses have not been analysed in detail except identification of sectoral interests as communicated by stakeholders. Experience shows that socio-economic effects of planning should be part of an obligatory assessment procedure.

The plans in Germany in general outline areas with priority for specific uses, reservation areas for specific uses and suitable areas. In EEZ limitation due to legal constraints from UNCLOS (e.g. military use cannot be included in MSP in the EEZ) and from missing competence (CFP developed at EU level, not nationally) must be mentioned. Therefore fisheries is not included in the MSP..

The plans have been approved by the government and MSP measures have been implemented and enforced such as the rules set up in the EEZ for approvals of developments such as no new windfarm developments within Natura 2000 sites or designated priority areas for shipping.

The existing MSPs for the German EEZ are the first ones to be developed in Germany and have only been in force since autumn/winter 2009). For the EEZ an evaluation is foreseen for offshore wind energy in 2012.

Challenges / shortfalls encountered

Main points: Fisheries is not included although fisheries is one of the environmentally and economically most relevant activities on the sea. Earlier involvement of agencies and stakeholders in the objective setting.

Recognised needs for science:

In general: the need for knowledge is outlined in the SEA report.

- Spatial data for spawning and nursery areas are needed (at which resolution?) as are data on distribution, movements, species. The science is now available, but how it can be included in future versions of MSP is yet open. How do these areas develop in the future?
- Information / methods for assessing / modelling cumulative effects (many wind farms, but also from a spatial combination of several uses) are needed, there is no agreed procedure;
- Information on impacts from wind farms on migratory birds (in a cumulative perspective) are highly uncertain, knowledge on behaviour of bird species is little.

3.4.2.3 Netherlands

Governance

The Dutch Government is responsible for Marine and Maritime Policies of the Dutch EEZ in the North Sea. Although regional and local authorities develop spatial plans on land, the Ministry of Infrastructure and the Environment provide spatial plans for the 'North Sea'.

The Dutch National Water Plan

In 2009, the first National Water Plan was drafted for the planning period 2009–2015. The Water Plan has been approved by parliament in December 2010 and formulates a response to developments in the field of climate change, demographics and the economy, and furthers sustainable water management. The main policy change provided in the National Water Plan for the North Sea is a proactive approach towards activi-

ties on sea. Activities of national priority have been determined and future wind farm areas have been put on spatial map. This policy is elaborated further in the North Sea Policy Document. For the purposes of the further elaboration of the National Water Plan, the Integrated Management Plan for the North Sea 2015 (IBN 2015) will be updated in 2011. This management plan gives clarity to all how the Dutch government will handle applications for permits at sea.

The Policy document on the North Sea and other information such as the Integrated management plan can be found on www.noordzeeloket.nl

Link to the policy document:

http://www.noordzeeloket.nl/Images/Policy%20Document%20on%20the%20North%20Sea%202010-2015_tcm14-4375.pdf

Policy and legal framework

There is an MSP policy in place which has an objective: 'To enhance the economic importance of the North Sea and maintain and develop the international and ecological and landscape features by developing and harmonizing suitable economic activities in the North Sea, taking into account the ecological and landscape features of the North Sea'.

Permitting & licensing

Permits and licenses are provided by different agencies (e.g. the Ministry of Economical Affairs provides permits for oil and gas extraction), but the majority of permits are provided by Rijkswaterstaat North Sea. The Integrated Management Plan North Sea will be updated based on the National Water Plan in 2011.

Consultation

Consultation took place on the integrated maritime spatial plan in a formal way through an advisory committee of stakeholders on a national level and through informal means in the way of workshops and bi-lateral contacts.

Sector conflict management

Sectors and activities are regulated by the MSP system. It is mentioned that plan makers try to formulate an attractive perspective for all stakeholders, although in some cases this is not always possible and political choices need to be made. At several stages during the plan-making, issues are discussed with the Interdepartmental Directors Consultative Committee for the North Sea, and in this way potential conflicts are identified at an early stage and options for solving the conflicts can be identified.

The evaluation of the process of drawing up the North Sea Policy document is ongoing and will be finished later in 2011.

3.4.2.4 Norway

Norway announced through the Report to Parliament No. 12 (2001–2002) Clean and rich seas the ambition to make Integrated Management Plans for all its marine areas. The IMPs include spatial management, but extends beyond purely spatial planning. Three Integrated Management plans for marine areas were announced; For the Barents Sea and marine areas off the Lofoten islands, the Norwegian Sea, and for the Norwegian parts of the North Sea and Skagerak. As of 2011, two are made (Barents

Sea and Lofoten (2006, update 2011), and Norwegian Sea (2009)), one remains (North Sea and Skagerak, planned for 2013).

The authority and overall responsibility for the work is assigned to the Ministry of the Environment, as leader of the inter-ministerial steering group for making IMPs. For the scientific background for the work with the Barents Sea plan three advisory groups have been established: The scientific forum, and groups for monitoring issues and risk analysis. A reference group consisting of affected interest-groups has been available for the advisory groups. It is stated in the updated Barents Sea/Lofoten plan that the reference group is being considered replaced with better arenas for participation and involvement by interest groups.

Even though the Barents Sea/Lofoten plan covers a very large marine area, the public and media focus have very much been on issues related to petroleum developments around the Lofoten islands. These areas are not opened for petroleum activities (seismic shootings have been performed, but explorative drilling is not allowed). The government announced, at the same time as it released the update of the Barents Sea plan (March 2011), that it would not perform an impact assessment of petroleum activities in the areas. Such an IA is a necessary prerequisite for opening up the areas to petroleum activities. The production of the Integrated management plan for the Norwegian Sea has received much less media and public attention than the process for the Barents Sea/Lofoten plan.

In the Norwegian sea IMP, the Norwegian Government states that it will prioritise to get more knowledge on ecosystem-based management, the structure and functioning of marine ecosystems, the seabed and seabirds, the prevention of accidents that may result in pollution, and the socioeconomic issues related to management of the marine environment.

For the Barents Sea plan, the 2010 update of the plan has particularly been based on new knowledge on environmental values and important resources for value creation in the area and changes in environmental conditions, the impacts on the ecosystem and environmental risks. The scientific basis for evaluating social and economic conditions and ecosystem values is improved compared to the 2006 plan, with particular emphasis on areas near Lofoten. This new knowledge is largely produced as a result of knowledge gaps having been identified in the 2006 plan. The 2010 update of the Barents Sea plan have some themes and policy areas which it partly refers, as international law issues, climate policy, security policy and industrial policy, but declares that is does not explicitly treat them, recognising this as a shortcoming.

The government emphasizes that a key challenge is to learn more about the effects, extent and pace of climate change and ocean acidification, and the factors that affect the resistance of the ecosystems of the Barents Sea -Lofoten Islands to change. There is also need for more knowledge about the combined effects of ocean acidification and climate change, how they interact with each other and with the effects from human activities such as fisheries, petroleum and shipping.

A major challenge in the work with the management plans is understanding the importance of environmental qualities and natural resources in the marine plan areas for value creation and society. There is need both for better process understanding and model tools to evaluate these relationships. This includes understanding the societal significance of ecosystem services that are not related to one particular industry, and currently not traded in a market.

Another major challenge is related to risk management and risk understanding. It is important to achieve a joint risk understanding across authorities and scientists, including further development of the criteria for choosing relevant information for assessment of environmental risks. Methods to assess societal effects of accidents involving acute pollution, as well as environmental consequences on fish, seabirds, marine mammals and the coastal zone.

3.4.2.5 Poland

The Polish Ministry of Infrastructure has appointed the Maritime Offices (in Gdynia, Slupsk and Szczecin) as the responsible bodies for preparing MSP in Poland. Resources and personnel have been allocated and/or promised for Maritime Offices to develop MSPs for Polish EEZ. Any additional conceptual or research needs have to be funded through external projects (e.g. EU-Interreg funding for BaltSeaPlan)

Pre-planning for the MSP has been organised by discussing initial interests and demands at meetings and seminars. Stakeholder participation was organised in the form of a consultation on a preliminary MSP for the Western Part of the Gulf of Gdansk.

Existing conditions have been defined and analysed for the Western Part of the Gulf of Gdansk. However, economic, social and cultural dimensions of this area have not been analysed yet. Some fishery and tourist interests have been expressed by the regional authorities.

There has been some effort to inform present stakeholders (mainly transport and fishery) about future other uses of Polish Marine Areas, however this has not been well received by present stakeholders.

The preliminary MSP for the Western Part of the Gulf of Gdansk has been prepared but it is not yet ready for submission for approval. MSP measures have not yet been implemented or enforced even in selected pilot areas. However a preliminary evaluation of the MSP has been performed for the Western Part of the Gulf of Gdansk, but no further monitoring has been done. This MSP is in very early stages and therefore no adaptations have been applied as yet.

Recognised needs for science:

- Spatial data for spawning and nursery areas are needed (at which resolution), distribution, movements, species, …., science now available, but how it can be included in future versions of MSP is yet open.
- Information / methods for assessing / modelling cumulative effects (many wind farms, but also from a spatial combination of several uses) are needed, there is no agreed procedure.
- Information on impacts from wind farms on migratory birds (in a cumulative perspective) are highly uncertain, knowledge on behaviour of bird species is missing.
- Information on the acoustic effects of pile driving and on effects of noise created by wind farms is needed, particularly about effects on mammals and fish.

3.4.2.6 UK - Scotland

There are two main MSP projects in Scotland, the National Marine Plan and the plan developed to manage the development of offshore wind energy (The offshore Wind

Plan). In addition the Saltire Prize was a plan set up to stimulate the technological development of wave and tidal energy.

National Marine Planning

The Marine (Scotland) Act 2010 introduced a new statutory marine planning framework to manage competing demands for the use of the sea whilst protecting the marine environment. The National Marine Plan is being developed in accordance with the policies set out in the UK Marine Policy Statement (MPS), which sets out the specific requirements and responsibilities from the two contributing pieces of legislation (The Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009).

The NMP includes setting economic, social and marine ecosystem objectives and objectives relating to the mitigation of, and adaptation to, climate change. The national plan must also state Scottish Ministers' policies on the contribution of designated conservation sites to the protection and enhancement of the sea.

The pre-consultation Draft National Marine Plan along with an interim Sustainability Appraisal (SA), which includes a Strategic Environmental Assessment (SEA) were published for a 12 week consultation on 15 March 2011. This will be followed by a formal consultation later in 2011 with a view to deliver the final plan in spring/summer 2012. Thereafter the plan and objectives will be kept under review, in line with the appropriate legislation.

The pre-consultation draft National Marine Plan[7] is a single document covering both inshore waters (MHWS to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The National Marine Plan will apply to reserved functions (as well as devolved).

Achieving involvement of our stakeholders from the beginning of the process was vital in the creation of the National Marine Plan. The participation process involved a wide range of stakeholders including key agencies, planning authorities, private sector including fisheries representatives, tourism and recreation organisations, shipping, ports and harbours, marine renewables sector, voluntary sectors and members of the public. Initial meetings were held to consult stakeholders on the scope and content of the Plan. A Statement of Public Participation (SPP)[8] was published in January 2011 followed by the publication of the current 12 week pre-consultation. This SPP gives the process and participation timetable involved in creating the National Marine Plan and as the National Marine Plan process develops, the SPP will be updated to give details on future events and information on events as they have occurred.

The production of Scotland's Marine Atlas: Information for the National Marine Plan has been a key evidence base for developing the Plan providing analysis of current and future conditions of the marine area. Scotland's Marine Atlas is available at: www.scotland.gov.uk/marineatlas.

Comparison of process with UNESCO

The UNESCO Guide has been a useful aid and we have taken a similar approach including:

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[7] http://www.scotland.gov.uk/Topics/marine/seamanagement/national

[8] Statement of Public Participation (SPP)

- Engagement with stakeholders;
- Continuous cycle – plan, implement, review, plan…etc.;
- Sector planning approach;
- Objective setting;
- Use of compatibility matrix;
- Defining and analysing existing conditions;
- Defining and analysing future conditions.

The UNESCO Guide has good emphasis on quantified objectives however the guide does not include "vision" setting – which has been included in the pre-consultation draft National Marine Plan.

The pre-consultation draft National Marine Plan has less spatial – based detail and does not include a zoning plan as described in the UNESCO Guide. However, we will further develop the Plan and explore the potential interactions and synergies between sectors. The next draft of the Plan will include greater integration of the objectives and outline futures.

Regional Marine Planning

The National Marine Plan sets the wide context for planning within Scottish waters, however regional marine planning will allow more local ownership and decision making about the specific issues within a smaller area.

A 12 week consultation of the 'Marine Regions: Defining their boundaries' closed on 18 February 2011. An analysis of the responses is being carried out and a report will follow in due course. Twelve public events were held during the consultation process – these were in the main hosted and organised by Local Coastal Partnerships.

The consultation is focussing on the physical units used for planning purposes – where the boundary lines should be drawn both along the coast and seaward. The responses to the consultation are currently being analysed.

Marine Planning Partnerships: The current intention is that regional planning will be taken forward by locally led marine planning partnerships, who will have formally delegated planning powers for their area. In some cases these are likely to build on existing partnerships, such as long-standing Local Coastal Partnerships, or bodies put in place to oversee pilot planning initiatives set up under the Scottish Sustainable Marine Environment Initiative (SSMEI). Marine Scotland and the Scottish Coastal Forum have commissioned further advice on the governance and operational working practices of marine planning partnerships.

Details of the Offshore Wind Plan and Saltire Prize are in Annex 6.

3.4.3 Conclusions from ToR d

This ToR has highlighted that there are different approaches to MSP depending on the initial vision and objectives for the MSP.

The input from each country and discussions around both ToR a and ToR d have highlighted the need to focus on certain issues/challenges to ensure that the approach taken by each MS is consistent. Therefore, this process has highlighted specific science needs that could steer the work of specific ICES WGs.

These included:

1) Ecosystem Goods and Services
   - Specific information on species such as spatial data for spawning and nursery areas, distribution and movements of species. Some science is available, but a method of effectively capturing fisheries information for inclusion in MSP needs to be resolved.

2) Social and Cultural Issues
   - Understanding the importance of aesthetic and spiritual values in the marine planning - There is need both for better understanding of the processes and model tools to evaluate these relationships.
   - Understanding the societal significance of ecosystem services that are not related to one particular industry, and currently do not have an economic value.
   - Methods to assess societal effects of accidents involving acute pollution.

3) Cumulative Effects
   - There is no agreed procedure for assessing cumulative effects of certain developments (e.g. windfarms). Therefore established methods for assessing or modelling cumulative effects are needed.
   - There is a need to establish cumulative environmental effects monitoring in line with ecosystem-based management objectives. The EU Good Environmental Status criteria are considered as a good starting basis for such effects monitoring.
   - Information on the acoustic effects of pile driving during the construction of wind farms is needed, particularly about effects on mammals and fish.

4) Risk Assessment
   - There is a need to identify risk thresholds that would guide management priority setting and actions with reference to risk threshold and management targets for the development of strategies to address the most significant issues in the spatial area.
   - Risk management and understanding risk. It is important to achieve a joint understanding of risk across authorities and scientists, including further development of the criteria for choosing relevant information for assessment of environmental risks.

Common Issues

- Key drivers for MSP in different countries are different e.g. space for marine renewables;
- Cumulative impacts from same sector (e.g. marine renewables) and between sectors (e.g. fishing and marine renewables);
- Trans-boundary issues relating to differing national objectives and key drivers;
- Maintaining the 'freedom of the seas' clause in UNCLOS;
- Prioritisation methods for sectors and conflict resolution e.g. exclusion zones, buffer areas;
- Management plans for different sectors in the different zones;

- Unplanned/unforeseen consequences, such as effects on non-maritime sectors e.g. fly zones;
- Consensus on or coordinated scientific advice on impacts of human activities on species and habitats, particularly listed species and habitats (appropriate assessment requirements);
- The MSP process is potentially data expensive, particularly with regard to identifying and quantifying the impacts of certain activities on species and habitats i.e. application of appropriate indicator thresholds;
- Compensation process inconsistent across MS.

As a result of the discussion on ToR d this WG aims to take up specific scientific questions to develop advice to MSs with regard to MSP, such as socio-cultural dimensions and capturing fisheries information. This is reflected in the ToRs for 2012 (see Annex 9).

3.5 Receive a report on the Strategic Initiative on Coastal and Marine Spatial Planning and plan for the suggested ICES ASC Joint Theme session in 2012 (ToR e)

During 2010 there has been intense involvement of WGMPCZM with STIG-MSP. The current chair (Andreas Kannen) participated in meetings with STIP-MSP in Copenhagen and Nantes and in the STIG-MSP workshop in Lisbon (WKCMSP). In WKCMSP several members of WGMPCZM participated actively including presentations and lead of working groups.

For further cooperation WGMPCZM proposes:

- a joint session at the ASC 2012 (see 3.5.1) and
- suggests a draft proposal for a concept for a workshop on simulating the development of MSP for large scale hypothetical wind farm development as discussed within STIG-MSP during the Lisbon workshop (see 3.5.2).

3.5.1 Suggestion for a joint session from WGMPCZM and STIG-MSP for the ASC 2012 including abstract

Title: The use and misuse of science in MSP

Conveners: Chairs and members from WGMPCZM and STIG-MSP

Abstract

It is recognized that an ecosystem-based management (EBM) approach aims at sustainable use of natural resources providing ecosystem goods and services, the context of marine EBM can be defined as the approach that consists in taking primary considerations for marine ecosystem health in the management of human activities affecting marine and coastal area. The intent is that the ecosystem components which are key to maintaining the ecosystem structure, functions and environmental quality, are not significantly impacted by activities and are maintained at appropriate temporal and spatial scales over time. EBM is effectively made operational via marine spatial planning processes that bring together ecosystem and socio-economic knowledge to identify management priorities for the development of ecosystem objectives.

At each stage of any MSP initiatives, there is a broad range of scientific knowledge requirements. The scoping stage of MSP requires knowledge of existing ecological spatial and temporal ecosystem component in addition to comparable data regarding human use in terms of ecosystem goods and services. The subsequent assessment

stage needs to ascertain the interactions between ecosystem components and existing drivers and pressures in order to develop management strategies that will form the basis of the plan. Although considerable discussions have occurred regarding the need to address science policy gaps in decision-making, the challenge of transforming scientific data and information into management measures remains.

Within the context of developing management strategies and measures in marine spatial planning, papers are welcomed along the following topics:

- Approaches in assessing cumulative environmental effects or impacts and establishing management thresholds and targets.
- Application of Good Environmental Status to identify risks or providing guidance in setting marine spatial planning priorities.
- Risk to ecosystem goods and services as a means for setting management objectives.

3.5.2 Draft suggestion for an MSP simulation exercise for STIG-MSP in the STIG-MSP workshop planned for autumn 2011

In response to the request for collaboration with STIG-MSP WGMPCZM proposes a concept for a workshop on simulating the development of MSP for large scale hypothetical wind farm development as discussed within STIG-MSP during the Lisbon workshop.

Abstract

Demonstrate how ICES can contribute to the development of a marine spatial plan for renewable marine energy (wind, wave and tidal stream) at North Sea scale to produce 200–500 Gw of energy. The plan should minimise interactions with existing users, including the development of a coherent series of MPAs. Account should be taken of technical opportunities and constraints, for example the limitations of monopole foundations and the potential for floating wind turbines at water depths greater than 120 m, and of the developing initiatives for a European SUPERGRID, in particular the North Sea Grid initiative.

3.6 Report on the ICES 2010 ASC Theme Session B: The risk of failing in integrated coastal zone management progress and the publication of any suitable papers (ToR f)

Conveners: Roland Cormier (Canada), Beatriz Morales-Nin (Spain), and Josianne Støttrup (Denmark)

The ICES Annual Science Conference 2010 session focused on coastal zones, one of three major thematic axes of the ICES Strategic Plan. The ecosystem based approach to the management of human activities as the leading principle for integrated coastal zone management implies that knowledge on key ecosystem processes and properties in the coastal zone should be the core of information that ICES could add into the process of ICZM.

The session contributed to the ICES Science Plan 2009-13 as per the following priority areas:

- Marine spatial planning, including the effectiveness of management practices (e.g. Marine Protected Areas (MPAs)), and its role in the conservation of biodiversity;

- Contributions to socio-economic understanding of ecosystem goods and services, and forecasting of the impact of human activities;
- Influence of development of renewable energy resources (e.g. wind, hydropower, tidal and waves) on marine habitat and biota.

Economic, environmental and demographic pressures are converging sharply in the coastal regions, creating a complex situation that presents a multi-dimensional challenge to their effective and sustainable management and governance from the social, economic, cultural and environment perspective. Tools, including spatial planning tools, are needed to effectively assist in the decision-making processes given that traditional users and interests are now being joined in the coastal area by new industries, recreational opportunities and development interests.

With the implementation of an ecosystem-based approach to integrated management of the aquatic environment, risk analysis decision-making tools and processes are being developed with the aim of assessing human activity against ecosystem component vulnerabilities. Therefore, it is considered important that indicator systems be developed within the context and in conjunction with management frameworks that will ensure their implementation. In order for this to occur, decision-makers at all levels must be involved at all stages of the process. Using classical risk analysis processes, these tools may provide a systematic way of gathering, evaluating, recording and disseminating information leading to recommendations for management consideration in response to identified ecosystem vulnerabilities.

The presentations were organized along the following themes:

- Bringing together the risk characterisation and the indicator characterisation approaches within an integrated decision-making framework.
- Developing a general framework for the indicator selection process for ICES countries. Within that framework should be the clear definition of objectives and the integration of the indicator system into the overall management process.
- Investigate the usefulness of assessing ecosystem goods and services as a tool to link the ecosystem approach to management, the assessment of human impacts and subsequent decision making.
- Investigate how the type of integrated assessment processes can be included in "Ecosystem-based Management" and thus also be included in a decision making framework for ocean and coastal management.

A total of 31 papers (17) and posters (14) were presented coming from 10 countries namely Canada (5), Denmark (1), Finland (3), France (10), Germany (2), Latvia (1), Norway (2), Spain (2), United Kingdom (4) and United States (1). Presentations covered different levels of research, development and implementation of ICZM tools and practices. Some of the presentations discussed current work being done by the ICES ICZM working group. In addition, the results of relevant EU funded projects were also presented as well as management strategies being developed and implemented in Canada.

Topics ranged from integrated management discussing the need for parallel approaches between strategic policy setting and management measure implementation. Several presentations discussed decision-making tools demonstrating the use of spatial and scenario analysis models and techniques. Risk analysis approaches were also discussed highlighting the need to integrate natural and social sciences in the deci-

sion-making process. Within an integrated management context, it is important that social scientists use their knowledge about communication and social interaction in decision-making processes in order to bridge gaps between environmental scientists, management and stakeholders.

The end of session discussion focused on the lack of uptake of scientific knowledge and modelling into management decision-making processes. This led to a discussion as to who should drive or lead the process regarding the needs of scientific knowledge. General views were that management and stakeholders have the most important role in framing the environmental problem and formulating the question to the sciences. Formal advisory processes, similar to fisheries advisory processes, may enhance the formulation of the questions to ensure that relevant science addresses relevant environmental issues and scale.

The role of the ICES ICZM working group was also discussed in terms of leading the development of a structured framework and implementation for ICZM including the perspectives of spatial planning in the coastal zone. Given that spatial planning and coastal zone management are emerging as a significant integrator of the sciences and management, session participants suggested that the results of the session could inform the working group as to upcoming topics for discussion among members.

Resolution (see Annex 8)

The report covering the output from Theme Session B (Marine spatial planning) of the ASC 2010, edited by Roland Cormier (Canada) and Ian Davies (UK), as reviewed and approved by the Chair of the Science Committee, will be published in the ICES Cooperative Research Report. The estimated number of pages is 150.

3.7 Evaluate potential for collaboration with other EGs in relation to the ICES Science Plan and report on how such cooperation has been achieved in practical terms (e.g. joint meetings, back-to-back meetings, communication between EG chairs, having representatives from own EG attend other EG meetings) (ToR g)

Members of WGMPCZM are involved in several other EGs under SCICOM. Some exchange also occurred between the chair of WGMPCZM and individual members of WGMS (formerly WGFS) under ACOM. However, the most important cooperation is currently with the STIG-MSP (see chapter 3.5 for past and proposed cooperation and joint activities). Other STIGs, in particular those dealing with the EU Marine Strategy Framework Directive (MSFD), are invited to familiarise with the activities of WGMPCZM because MSP is one tool also suggested under the MSFD.

4 Any other business

4.1 Next Meeting and ToRs for 2012

WGMPCZM recommend to meet 20–23 March 2012 at the ICES Headquarters in Copenhagen. A room has already been reserved by the secretariat.

New ToRs, specified from those of this year have been formulated (Annex 9).

Recommendations are listed in Annex 10.

A resolution for an ICES Internal Publication (Category 1) has been formulated (Annex 8, see ToR f).

Annex 1: List of participants

Working Group Marine Planning and Coastal Zone Management

22–25 March 2011, Hamburg, Germany

NAME	COUNTRY
Lodewijk Abspoel	Netherlands
Eugene Andrulewicz	Poland
Roland Cormier	Canada
Amy Diedrich	Spain
Ian Davies	UK
Clare Greathead	UK
Andreas Kannen (Chair)	Germany
Nico Nolte	Germany
Eirik Mikkelsen	Norway
Laura Piriz	Sweden
Vanessa Stelzenmüller	Germany

Annex 2: Agenda

Working Group Marine Planning and Coastal Zone Management

22–25 March 2011, Hamburg, Germany

Lunch and coffee breaks are kept flexible

22 March

11:30-18:00 Convene at vTI

- Welcome (Chair), Housekeeping announcements (Host and Chair)
- Introduction of participants, Agenda approval
- Announcements, Review of ToRs, organisation of the report
- ToR a: Report on the development and use of MSP specifically identifying good practice and gaps in priority based decision making and objective setting in IM and ICES countries; (lead by Amy Diedrich)
- ToR d: Update and report on IM activities, including ICZM and MSP in different ICES countries including information on initiatives towards integrated governance in the CZ; (lead by Clare Greathead)
- Discuss future activities on ToR a and ToR d
- Collect inputs for the report, report writing

23 March

9:00-18:00 Convene at vTI

- ToR b: Prepare a review of existing practices in Quality assurance including a review of formal management standards for its use in IM; (lead by Vanessa Stelzenmüller)
- Discuss future activities on ToR b
- ToR c: Prepare a review of the measurement and application of ecosystem goods and services in IM; (lead by Andreas Kannen)
- Discuss future activities on ToR c
- Collect inputs for the report, report writing

24 March

9:00-18:00 Convene at vTI

- ToR f: Report on the ICES 2010 ASC Theme Session B: The risk of failing in integrated coastal zone management progress and the publication of any suitable papers; (Roland Cormier)

- ToR e: Receive a report on the Strategic Initiative on Coastal and Marine Spatial Planning and plan for the suggested ICES ASC Joint Theme session in 2012; (Andreas Kannen)

- ToR g: Evaluate potential for collaboration with other EGs in relation to the ICES Science Plan and report on how such cooperation has been achieved in practical terms (e.g. joint meetings, back-to-back meetings, communication between EG chairs, having representatives from own EG attend other EG meetings); (Andreas Kannen and others involved in other ICES Expert Groups)

- Potential inputs for ASC 2011 and LOICZ OSC 2011

- Discuss future activities on ToRs e, f, g

- Collect inputs for the report, report writing

25 March

9:00-14:00 Convene at vTI

- Read and discuss draft report

- Formulate new ToRs for 2012

- Identify location and date for WGMPCZM meeting in 2012

- Report writing

Annex 3: Presentation on BaltSeaPlan

2009 Planning the future
2012 of the Baltic Sea

BaltSeaPlan - Turning Maritime Spatial Planning into Reality

Nico Nolte, Federal Maritime and Hydrographic Agency, Hamburg
Hamburg, 22 March 2011

Baltic Sea Region Programme 2007-2013
Part-financed by the European Union
(European Regional Development Fund)

BaltSeaPlan Objective

Develop, introduce and implement
Maritime Spatial Planning
throughout the Baltic Sea Region
in a coherent matter.

or:
BaltSeaPlan will support BSR countries to turn MSP into reality !

BaltSeaPlan

Facts & figures

Approved on 24 October 2008 within 1st call of the Baltic Sea Region Programme (former INTERREG)

Baltic Sea Region Programme 2007–2013

- project duration 2009 - 2012
- budget: 3.7 m Euro
- 14 partners from 7 countries

2

BaltSeaPlan

Partners

Germany:
- Lead Partner: Federal Maritime and Hydrographic Agency / BSH
- World Wide Fund for Nature Germany, Baltic Sea Unit / WWF
- Ministry of Transport, Building and Regional Development of Mecklenburg-Vorpommern

Poland:
- Maritime Office in Szczecin
- Maritime Office in Gdynia
- Maritime Institute in Gdansk

Denmark:
- National Environmental Research Institute / NERI

Sweden:
- Royal Institute of Technology / KTH
- Swedish Environmental Protection Agency / SEPA

Estonia:
- Baltic Environmental Forum / BEF Estonia
- Estonian Marine Institute of University of Tartu

Lithuania:
- Coastal Research and Planning Institute / CORPI
- Baltic Environmental Forum / BEF Lithuania

Latvia:
- Baltic Environmenatal Forum / BEF Latvia

3

BaltSeaPlan

Because of increasing use demands and potential conflicts between different uses and/or with marine nature conservation (ecosystem sea) there is a need for integrated, comprehensive sustainable management of human activities

- © WWF Deutschland
- Illustration: Eric Liebermann

4

BaltSeaPlan

Maritime Spatial Planning is a supporting tool for sustainable development

© WWF Deutschland
Illustration: Eric Liebermann

Why MSP?

- Maritime Spatial Planning is a tool for analysing, co-ordinating and allocating the distribution of human activities in marine areas to achieve sustainable development by balancing economic, environmental and social objectives.

- political support for MSP:
- EU Blue Paper on Integrated Maritime Policy
- EU Commission: Roadmap for MSP: Achieving Common Principles in the EU
- EU Strategy for the Baltic Sea Region (horizontal action)
- HELCOM BSAP, VASAB Long Term Perspective

6

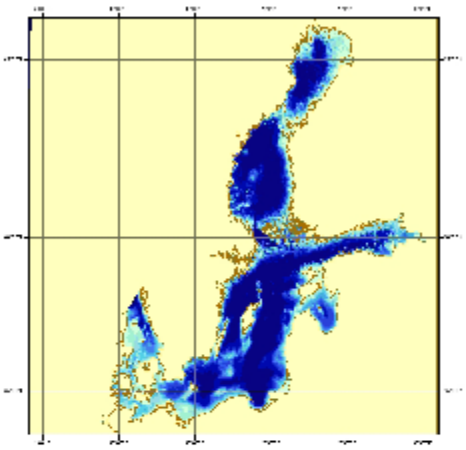
Benefits of MSP

in short:

- forward looking
- cross-sectoral, not fragmented ("the big picture")
- co-ordination of uses, thus minimising conflicts between uses and/or for the marine environment
- long-term planning gives security to all stakeholders

7

However...



- Little experience in the BSR with MSP
- National as well as trans-national co-operation is very important

8

Challenge AND Chance

MSP - transnationally wanted, however

- Nationally only few Baltic Sea Region countries introduced regulations on maritime spatial planning yet
- National maritime strategies - existing?

This is a chance

- to create a joint understanding
- to learn together from pilot initiatives
- to base new regulations on transnationally, coherent principles

Can BaltSeaPlan create enough influence?

- Make use of BaltSeaPlan! - Not only a matter of direct project partners, but all potential MSP stakeholders...

9

BaltSeaPlan project background

Previous work on MSP

- BaltCoast (2001-2005)
  - Introduces concept of MSP
  - Recommendations for BSR
- MSP Handbooks
  - PlanCoast, Balance, IOC
- VASAB
  - Compendium on MSP legislation
- MSP in Practice (examples)
  - Germany: EEZ; interest of BSH in international co-operation and coordination
  - Poland: Gdansk Bay

10

What will BaltSeaPlan do?

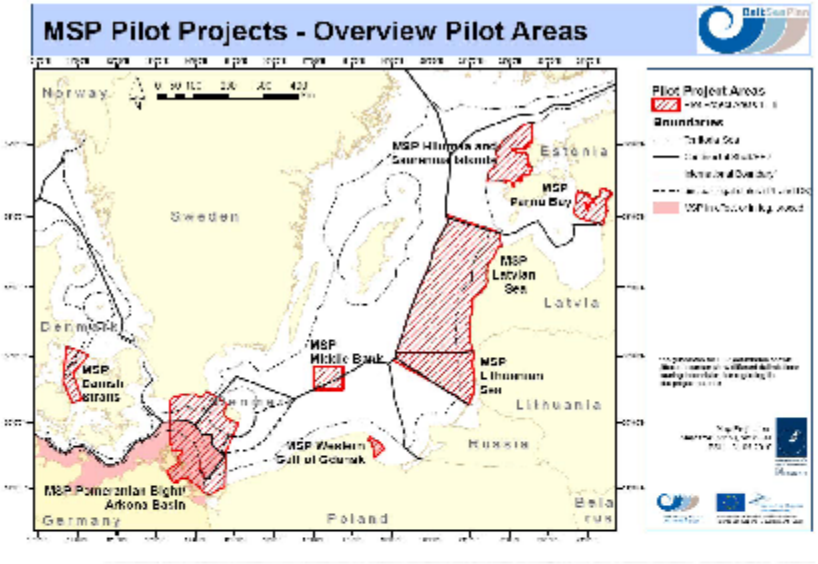
Pilot Projects:

Pomeranian Bight DE/PL/SE
Western Gulf of Gdansk PL
Middle Bank PL/SE
Western Baltic T-Route DK
Pärnu Bay EE
Hiiuma & Saaremaa Islands EE
Western Coast of Latvia
Lithuanian Sea

Stocktaking: • compilation of current sea uses • identification of data gaps • Generation of new GIS datasets	Data exchange and harmonisation according to the EU INSPIRE directive
Direct involvement of stakeholders	
8 local and cross-border pilot Maritime Spatial Plans (Pomeranian Bight and Middle Bank)	
Frameworks and methodologies for Maritime Spatial Planning and Strategic Environmental Assessment (SEA) on the sea	
Assessment of national priorities for offshore development => Proposals for National Maritime Strategies according to EU Blue Book	
Common spatial vision for the Baltic Sea under consideration of transnational interdependencies and cumulative impacts	
Policy recommendations for Maritime Spatial Planning	

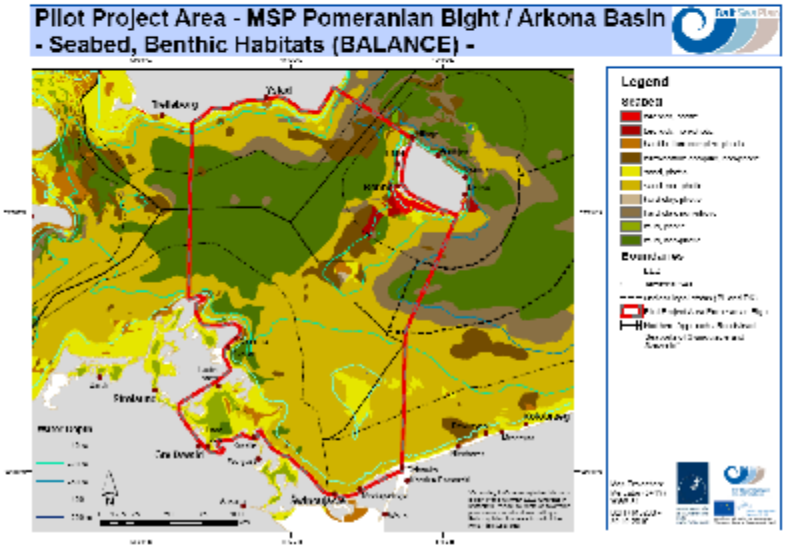
11

MSP Pilot Projects



12

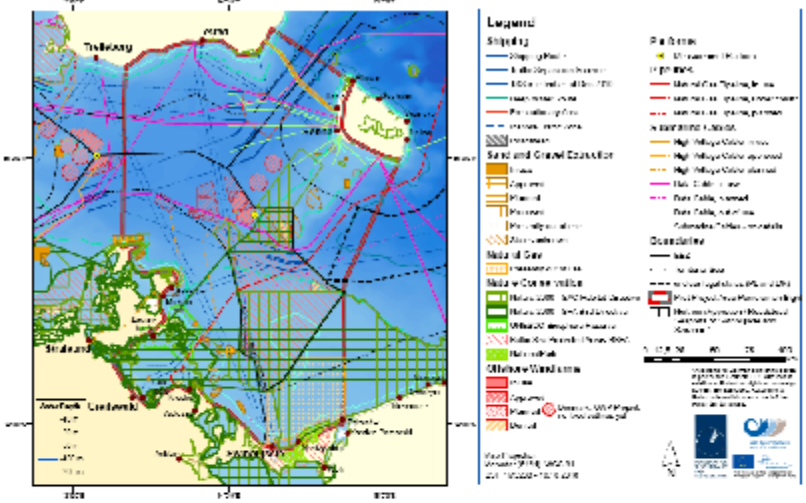
Stocktake



13

Stocktake

Pilot Project Area - MSP Pomeranian Bight / Arkona Basin - Stocktake: Uses and Nature Protection



14

Common spatial vision for the Baltic Sea 2030 - under preparation

- Transnational perspective

  Grounded in the existing policy context, analysis of international policy, input from analysis of national maritime strategies (by Maritime Institute Gdansk)
- identified main trends and drivers: renewable energy targets, shipping, nature conservation

  - what are the spatial needs of these trends and drivers?

  - Relevance for a spatial vision?
- main elements for common vision: healthy marine environment; coherent pan-Baltic energy network; safe, clean and efficient maritime transport; sustainable fisheries.

15

Common spatial vision for the Baltic Sea 2030 - under preparation

- need for transnational procedures for developing transport and infrastructure corridors, suitable energy areas and coherent nature conservation areas
  - appropriate rules and criteria? Priorities in case of conflicts?
- Identify issues/developments where a change/new tools for planning and management are needed (e.g. infrastructure corridors)
- importance of knowledge of the sea and good governance when implementing the common vision

16

Common spatial vision for the Baltic Sea 2030 - under preparation

- In 2030 all BS states have implemented necessary national structures for using MSP as a tool.
- National maritime spatial plans are in place based on transnational thinking.
- Transnational issues have been identified and translated into transnational MSP solutions.
- A pan-Baltic approach guides transnational uses/functions such as nature conservation, energy, shipping and fisheries.
- An effective international co-ordinating body has been established
- But: Spatial problems are solved at the best suitable level (subsidiarity).

17

Common spatial vision for the Baltic Sea 2030 - under preparation

1. In 2030 transnational and cross-border cooperation is working at all levels:

   - at the methodological level:
     agreeing joint principles for MSP and common methods,

   - at the strategic level:
     joint cross sectoral spatial planning,

   - at the operational/implementation level:
     e.g. common key infrastructure project planning.

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Thank you for your attention

Nico.nolte@bsh.de

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Annex 4: Publications and associated abstracts (where available) listed on the Web of Knowledge Search: "Marine / Maritime Spatial Planning" in Title, 2007–2011

2011

Agardy, T., G. N. di Sciara, *et al.* (2011). "Mind the gap Addressing the shortcomings of marine protected areas through large scale marine spatial planning." Marine Policy **35**(2): 226-232.

A blind faith in the ability of MPAs to counteract loss of biodiversity is fraught with risk especially when MPAs are poorly planned and when the consequences of establishing MPAs are not adequately thought out MPA shortcomings are categorized as one of five main types (1) MPAs that by virtue of their small size or poor design are ecologically insufficient (2) inappropriately planned or managed MPAs (3) MPAs that fail due to the degradation of the unprotected surrounding ecosystems (4) MPAs that do more harm than good due to displacement and unintended consequences of management and (5) MPAs that create a dangerous illusion of protection when in fact no protection is occurring A strategic alternative which fully utilizes the strengths of the MPA tool while avoiding the pitfalls can overcome these shortcomings integrating marine protected area planning in broader marine spatial planning and ocean zoning efforts.

De Santo, E. M. (2011). "Environmental justice implications of Maritime Spatial Planning in the European Union." Marine Policy **35**(1): 34-38.

This paper examines the implications of environmental justice in the regime for Maritime Spatial Planning (MSP) currently developing in the European Union (EU). An 'ecosystem-based approach' to marine management is enshrined in the new Integrated Maritime Policy and Marine Strategy Framework Directive and forms the basis of MSP. This concept is intended to encompass all aspects of an ecosystem, including the human element. Yet the modes of including meaningful public participation in the decision-making process for MSP remain undetermined. At the same time, the Aarhus Convention (on access to information, public participation in decision making and access to justice in environmental matters) empowers non-governmental organizations to hold EU Member States to account. Consequently the issue of transparency will gain increased importance, as will linkages between human and environmental rights. Such public interest-based activism on the part of NGOs has the potential to enforce the developing framework for stakeholder engagement within MSP, but it also has implications worth considering regarding the appropriate role of interest-based organizations in the international political arena.

*Liu, W. H., C. C. Wu, *et al.* (2011). "The role of local Government in marine spatial planning and management in Taiwan." Marine Policy **35**(2): 105-115.

As a result of population growth and economic development there has been a rapid increase in sea use around the island of Taiwan Such increased use is placing pressure on the marine environment and its resources Three draft territory laws (the Draft National Territory Planning Act the Land Re-conservation Draft Bill and the Draft Coastal Act) and the Local Government Act are neither consistent nor sufficiently comprehensive Consequently local Governments (municipalities and counties) experience difficulties in planning and managing their inshore waters This paper will discuss the role local Governments plays in marine spatial planning and management Local Government officials working in specialist marine affairs units from Kaohsiung and Keelung cities were surveyed to elicit their views with regards to management authority management capacity and resources officials commitment and intergovernmental coordination/collaboration with respect to inshore waters In-depth interviews were also conducted with local directors of specialist marine affairs units along with experts to identify the causes of problems brought to light through the survey and to propose potential solutions to these problems The study findings indicated that it is necessary to specify the marine spatial planning and management authority as well as the scope of local Governments in both the Coastal Act and Local Government Act In order to sustainably develop Tai-

wan s marine and coastal areas it is important that the following four primary factors (management authority management capacity and resources officials commitment and intergovernmental coordination/collaboration) be improved.

2010

Andrulewicz, E., Z. Otremba, *et al.* (2010). "Ongoing Technical Activities and Conservation Measures in Maritime Spatial Planning within Polish Marine Areas." Polish Journal of Environmental Studies **19**(3): 553-563.

This paper presents an overview of ongoing and planned technical developments and their impact in Polish Marine Areas versus nature conservation measures. Relevant information has been collected through the national contacts, through the screening of available environmental impact assessments (ETA), and from the authors' own experiences. We indicate growing environmental pressures from the new technical installations while some environmental effects are not well understood. We also point out that there is not sufficient knowledge about environmental effects of new large-scale installations (particularly regarding wind power parks, pipelines, and some coastal structures). We recognize potential conflicts with existing traditional activities (such as shipping and fishing) with planned new developments (such as wind farms and some coastal structures) and with the established protection measures (such as HELCOM BSPA and NATURA 2000 areas). Finally, we offer suggestions that should be useful in maritime spatial planning.

Baisner, A. J., J. L. Andersen, *et al.* (2010). "Minimizing Collision Risk Between Migrating Raptors and Marine Wind Farms: Development of a Spatial Planning Tool." Environmental Management **46**(5): 801-808.

An increased focus on renewable energy has led to the planning and construction of marine wind farms in Europe. Since several terrestrial studies indicate that raptors are especially susceptible to wind turbine related mortality, a Spatial Planning Tool is needed so that wind farms can be sited, in an optimal way, to minimize risk of collisions. Here we use measurements of body mass, wingspan and wing area of eight European raptor species, to calculate their Best Glide Ratio (BGR). The BGR was used to construct a linear equation, which, by the use of initial take-off altitude, could be used to calculate a Theoretical Maximum Distance (TMD) from the coast, attained by these soaring-gliding raptor species. If the nearest turbine, of future marine wind farms, is placed farther away from the coast than the estimated TMD, the collision risk between the turbine blades and these gliding raptors will be minimized. The tool was demonstrated in a case study at the Rodsand II wind farm in Denmark. Data on raptor migration altitude were gathered by radar. From the TMD attained by registered soaring-gliding raptors in the area, we concluded that the Rodsand II wind farm is not sited ideally, from an ornithological point of view, as potentially all three registered species are at risk of gliding through the area swept by the turbine rotor blades, and thereby at risk of colliding with the wind turbines.

Berkenhagen, J., R. Doring, *et al.* (2010). "Decision bias in marine spatial planning of offshore wind farms: Problems of singular versus cumulative assessments of economic impacts on fisheries." Marine Policy **34**(3): 733-736.

The current approval procedure for wind farm proposals in the German EEZ only considers site specific conflict analysis between the wind farm and fisheries. Due to the relatively small spatial coverage of the sites potential opportunity losses to the fisheries are always considered as low or negligible. Cumulative effects on fisheries that will occur once all proposed wind farms are in place are not yet considered adequately. However, those cumulative effects will be quite substantial because, in particular, opportunities to catch such valuable species as flatfish will be considerably reduced.

Brenner, J., J. A. Jiménez, *et al.* (2010). "An assessment of the non-market value of the ecosystem services provided by the Catalan coastal zone, Spain." Ocean & Coastal Management 53(1): 27-38.

A spatial value transfer analysis was performed to generate baseline estimates of the value of ecosystem services in the coastal zone of Catalonia, Spain. The study used the best available conceptual frameworks, data sources, and analytical techniques to generate non-market monetary value estimates that can be used to identify scarce ecosystem services among competing coastal uses. The approach focused on natural and seminatural, terrestrial and marine systems, which provide essential services that are not considered in current economic markets. Results show that in 2004 a substantial economic value of $3,195 million USD/yr was delivered to local citizens by surrounding ecosystems. In a spatially explicit manner, the approach illustrates the contribution made by natural environmental systems to the well being of communities in the coastal zone of Catalonia. It is hoped that this study will highlight the need to consider these coastal systems in future management strategies to ensure their proper maintenance and conservation.

Calado, H., K. Ng, *et al.* (2010). "Marine spatial planning: Lessons learned from the Portuguese debate." Marine Policy **34**(6): 1341-1349.

This paper presents and discusses legal, methodological and political frameworks for the development of the proposed Portuguese Marine Spatial Plan initiated in 2008. It considers lessons learned and is informed by discussions that have taken place since publication of the 'Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU'. New goals are based on horizontal planning tools that cut across sea-related sectoral policies and support joined up policy making. It is in this context that Marine Spatial Planning (MSP) emerged as an essential process for sustainable decision making. The OSPAR Commission undertook an overview of national planning systems within its administrative boundaries, which confirmed spatial plans reduced conflicts. However, problems exist accessing good quality data and dealing with entrenched sectoral views. Furthermore, the transboundary nature of marine resources requires cooperation between neighbouring states. In 2006, Portugal developed a 'National Sea Strategy' that recognized the importance of developing its maritime space while valuing marine habitats and biodiversity. MSP development of the Portuguese sea commenced in 2008 and findings are now evaluated. They showed adaptation of existing tools to be possible and desirable, provided undertaken cautiously and found conceptual ambiguities were barriers to conflict resolution. Furthermore they showed management strategies should be designed and analysed on a case by case basis, recognising temporal and spatial variations. (C) 2010 Elsevier Ltd. All rights reserved.

Dalton, T., R. Thompson, *et al.* (2010). "Mapping human dimensions in marine spatial planning and management: An example from Narragansett Bay, Rhode Island." Marine Policy **34**(2): 309-319.

The Narragansett Bay in Rhode Island is a complex mosaic of human activities and environmental features and while spatial distributions of physical, chemical, and biological elements are well documented in the Bay, there are limited data on spatial distributions of human activities. In this study, human uses of coastal waters in the upper Narragansett Bay are examined using an approach for characterizing and analyzing fine scale spatial and temporal data on human activities. Shipboard transect surveys of active water activities were conducted in the upper Bay on 50 days during the summer months of 2006-2007. The composition and configuration of different vessel types (recreational motor, recreational sail, row boat, commercial fishing, industrial, service, and official) were analyzed, and the impacts of proposed changes in land use policies and wastewater treatment technologies were investigated. Results indicated that recreational boaters comprised almost two-thirds of the upper Bay's users and used over one-half of the study area. Industrial activity was concentrated near Providence where RI's main port is located, and there was an active commercial fishery in the southern portion of the study area. Conditions like increasing cloud cover, weekend days, and the July 4th holiday were related to increased recreational use, while the closure of an upper Bay beach to swimming was associated with fewer commercial fishing vessels and more official boats, recreational motor boats, and service vessels. Findings indicated that upper

Bay waters near land converted from industrial zones to zones where residential housing or marinas are encouraged are likely to see a change in composition of vessels, with fewer industrial and official boats and more recreational motor boats, row boats, and service vessels. Enhanced wastewater treatment technologies and the resulting improvements in water quality are likely to make more waters in the upper Bay available to shellfish harvesting, spreading out existing fishing grounds and potential pressures on the ecosystem and on other users. By characterizing the spatial and temporal heterogeneity of human uses in the marine environment and analyzing how these uses relate to the complex human and natural systems in which they are embedded, this study and others like it can positively contribute to marine spatial planning and management efforts designed to achieve ecological, economic, and social objectives.

Foley, M. M., B. S. Halpern, *et al.* (2010). "Guiding ecological principles for marine spatial planning." Marine Policy **34**(5): 955-966.

The declining health of marine ecosystems around the world is evidence that current piecemeal governance is inadequate to successfully support healthy coastal and ocean ecosystems and sustain human uses of the ocean. One proposed solution to this problem is ecosystem-based marine spatial planning (MSP), which is a process that informs the spatial distribution of activities in the ocean so that existing and emerging uses can be maintained, use conflicts reduced, and ecosystem health and services protected and sustained for future generations. Because a key goal of ecosystem-based MSP is to maintain the delivery of ecosystem services that humans want and need, it must be based on ecological principles that articulate the scientifically recognized attributes of healthy, functioning ecosystems. These principles should be incorporated into a decision-making framework with clearly defined targets for these ecological attributes. This paper identifies ecological principles for MSP based on a synthesis of previously suggested and/or operationalized principles, along with recommendations generated by a group of twenty ecologists and marine scientists with diverse backgrounds and perspectives on MSP. The proposed four main ecological principles to guide MSP maintaining or restoring: native species diversity, habitat diversity and heterogeneity, key species, and connectivity and two additional guidelines, the need to account for context and uncertainty, must be explicitly taken into account in the planning process. When applied in concert with social, economic, and governance principles, these ecological principles can inform the designation and siting of ocean uses and the management of activities in the ocean to maintain or restore healthy ecosystems, allow delivery of marine ecosystem services, and ensure sustainable economic and social benefits.

Greathead, C., M. Gubbins, *et al.* (2010). "Predictive Models to Inform Spatial Planning for Scottish Marine Fish Farms." Coastal and Marine Geospatial Technologies **13**: 241-243.

Spatial planning for coastal aquaculture ensures that the locations of farms are suitable to all relevant stakeholders. The Scottish Government has published "Locational Guidelines", where lochs and voes around Scotland are divided into three Categories according to their sensitivity to further aquaculture development, to aid this process. Predictive modelling is used to estimate the degree of nutrient enhancement and benthic impact arising from existing aquaculture development. These are reviewed every three months and are then published on the Marine Scotland-Science (MSS) website. The models used for the assessment are described.

Norse, E. A. (2010). "ECOSYSTEM-BASED SPATIAL PLANNING AND MANAGEMENT OF MARINE FISHERIES: WHY AND HOW?" Bulletin of Marine Science **86**(2): 179-195.

In a 2009 paper by Worm *et al.*, fisheries biologists and conservation biologists found common ground in recommending spatial planning to benefit marine fisheries and biodiversity. Frontiers on land and in the ocean have few users relative to resources; as this ratio increases, governance suitable to the frontier no longer works because people's interests collide and biodiversity is lost. Increasing ocean uses and troubled fisheries are reasons to shift to ecosystem-based marine spatial planning and management, which reflect patterns and processes of both fish and people. Protecting places can eliminate

fragmentation, spatial and temporal mismatches caused by "siloed" sectoral management, where agencies that regulate different sectors in the same places largely ignore the needs of other sectors. Modern fishery management does not reflect the heterogeneity of fish populations and human uses. By reducing fishing mortality to zero, one spatial tool, marine reserves, restores large female fishes, which produce more eggs, and aids recovery of species in which females become males at larger sizes. Reserves can also maintain fishes' genetic structure. Australia created the "gold standard" for marine spatial planning in Great Barrier Reef Marine Park, a mosaic of ecosystems with differing availability to fishing. Other nations are adopting this approach. Even the best spatial plans will have problems that cross ecosystem boundaries, but advantages accrue to fishermen who stay within designated areas and let fish come to them. Areas can be deliberately configured to improve both biodiversity conservation and fishery yields and to save on fishermen's fuel costs.

*Ogden, J. C. (2010). "Marine spatial planning (MSP) A first step to ecosystem-based management (EBM) in the Wider Caribbean." Revista De Biologia Tropical **58**: 71-79.

The rapid decline of coastal ecosystems of the Wider Caribbean is entering Its fifth decade Some of the best science documenting this decline and its causes has been done by the laboratories of the Association of Marine Laboratories of the Caribbean (AMLC) Alarmed at the trends Caribbean conservation pioneers established marine protected areas (MPAs) which spread throughout the region Unfortunately many have little or no protection and are now known to be too small to be effective in sustaining coastal ecosystems Marine spatial planning (MSP) holds much promise to encompass the large geographic scales of the ecological processes and human impacts that Influence coastal ecosystems and adjacent lands The AMLC through the scientific expertise and the national political connections of its member institutions is well positioned to help implement a pilot project MSP a first step in ecosystem based management and has had considerable success elsewhere It holds our best chance of sustaining human use and conserving the coral reefs and associated ecosystems.

Ray, G. C. (2010). "Coastal and marine spatial planning: a policy waiting to happen." Aquatic Conservation-Marine and Freshwater Ecosystems **20**(4): 363-364.

Rees, S. E., L. D. Rodwell, *et al.* (2010). "The value of marine biodiversity to the leisure and recreation industry and its application to marine spatial planning." Marine Policy 34(5): 868-875.

The incorporation of the ecosystem approach into marine planning requires that all aspects of value associated with marine biodiversity are incorporated into the decision making process. An ecosystem services approach to valuing marine biodiversity is recognised as a framework by which economic, ecological and social values may be incorporated into the decision making process. There are sectors of the marine leisure and recreation industry (sub-aqua diving, sea angling and wildlife watching), which depend on the presence of natural marine resources in order to carry out their activity. Estimating the value of this direct use can provide an evidence base for the sustainable use of marine biodiversity when set against other competing economic interests in marine spatial planning. In the case study area of Lyme Bay, the marine leisure and recreation industry has been valued using both monetary and nonmonetary methods. The results show that the leisure and recreation industry is dependent on the diversity of sites (many of which are currently unmanaged) and that the industry is of economic significance and an area which has recently been closed to trawling activity enables the protection of some of the most valuable sites but has limited benefits for protecting the full resource base upon which this local industry depends.

Ritchie, H. and G. Ellis (2010). "'A system that works for the sea'? Exploring Stakeholder Engagement in Marine Spatial Planning." Journal of Environmental Planning and Management **53**(6): 701-723.

This paper aims to contribute to the current debate on Marine Spatial Planning (MSP) by exploring the issue of stakeholder engagement. MSP is an emergent policy field that

is subject to an increasing body of research, yet the role, scope and nature of participatory engagement within the process remains a neglected topic. This paper briefly reviews the nature of the 'marine problem', to which MSP is seen to be the response and describes the emergence of MSP policy in the UK with specific emphasis on participatory aspects. Drawing on the experience of terrestrial planning it discusses the potential benefits of stakeholder engagement in MSP and highlights some of the key issues that need to be taken into account when shaping stakeholder input into the process. It then goes on to describe the findings from a series of interviews with key stakeholders in the Irish Sea Region, which suggest that we need to develop a more critical and deeper understanding of how various interests frame the 'marine problem', and how they see their role in shaping the form of the MSP process. This highlights the importance of encouraging stakeholder involvement in MSP, the need to develop a shared vision of a 'sea interest'. Priorities are then set for research to support this important policy agenda.

Stojanovic, T. (2010). "The Development of Coastal Information Systems: The Role of Networks in Bringing Spatial Analysis into Planning and Management." Coastal and Marine Geospatial Technologies **13**: 265-272.

Developers and users of GIS face many challenges in producing successful IT tools. This chapter focuses on the domain of applied technology, and the issue of how to successfully transfer information to users in the coastal zone, where there are complex marine and terrestrial jurisdictions and responsibilities. The worldwide increase in the volume of spatial and environmental data has led governments and organisations to consider the approach of information management. The chapter reports the findings of research in the UK, which has detailed problems such as: "information overload"; commercial, political and environmental sensitivity of data, lack of information policy or good data handling practices; and the difficulties and failures in establishing distributed, interorganisational information systems. The solutions presented include metadata, interoperability, harmonisation (standards), semantic webs, information policy, information mapping and partnerships. The chapter concludes by focusing at the regional level, and describes the experience Severn Estuary Partnership, UK, in establishing a GIS Forum to bring together technicians, users and owners of GIS data within a network, and building on this, to work together to provide a framework, to resolve the current lack of co-ordination and harmonisation of GIS data to aid spatial planning on the Severn Estuary. The chapter also presents research findings about the information flows and data transfers between coastal stakeholders involved in coastal partnerships around the UK. Improved understanding of these issues will aid IT developers and coastal planners and managers in maintaining networks of relationships that enable them to have a good understanding of the coast and to support their decision-making.

Thoroughgood, C. A. (2010). "Marine Spatial Planning: A Call for Action." Oceanography **23**(1): 9-10.

2009

Ban, N. C. and C. J. Klein (2009). "Spatial socioeconomic data as a cost in systematic marine conservation planning." Conservation Letters **2**(5): 206-215.

A common objective in identifying conservation areas is to minimize conservation costs while achieving a set of conservation targets. Recent literature highlights the importance of incorporating socioeconomic costs into conservation planning. Here, we review how costs have been used in systematic marine conservation planning. Four approaches emerged from the literature: (1) uniform cost or area as a proxy for human use, (2) opportunity costs, (3) multiple socioeconomic costs, and (4) measures of naturalness or ecological impact of human activities. Most marine systematic conservation planning projects that used a spatially explicit socioeconomic cost focused on fisheries as the opportunity cost. No study has incorporated transaction or management costs into the design of marine protected areas using systematic conservation planning software. Combining multiple costs into one cost is one of the primary challenges of incorporating socioeconomic costs into conservation planning decision support tools. Combining

many costs is feasible when each cost is measured in the same unit (e. g., dollars), but this information is rarely available in marine planning. Where the objective of the planning exercise is to minimize impacts on multiple stakeholder groups, the use of separate scenarios or multi-zone software may be a viable option.

de Vivero, J. L. S., J. C. R. Mateos, *et al.* (2009). "Geopolitical factors of maritime policies and marine spatial planning: State, regions, and geographical planning scope." Marine Policy **33**(4): 624-634.

This article sets out to explore the extent to which the maritime policies that have been formulated in recent years are public policies on a par with other State-level policies, or whether the geographical domain where they are applied makes them exceptional. Maritime policy and territorial structure are very closely related, and it can be seen that maritime policies are beginning to shift towards the domain of State internal affairs, necessitating the rethinking of the way powers are distributed between territorial bodies that have the legal power to be involved in the formulation of these policies and some instruments, such as marine spatial planning.

Douvere, F. and C. N. Ehler (2009). "New perspectives on sea use management: Initial findings from European experience with marine spatial planning." Journal of Environmental Management **90**(1): 77-88.

Increased development pressures on the marine environment and the potential for multiple use conflicts, arising as a result of the current expansion of offshore wind energy, fishing and aquaculture, dredging, mineral extraction, shipping, and the need to meet international and national commitments to biodiversity conservation, have led to increased interest in sea use planning with particular emphasis on marine spatial planning. Several European countries, on their own initiative or driven by the European Union's Marine Strategy and Maritime Policy, the Bergen Declaration of the North Sea Conference, and the EU Recommendation on Integrated Coastal Zone Management, have taken global leadership in implementing marine spatial planning. Belgium, The Netherlands, and Germany in the North Sea, and the United Kingdom in the Irish Sea, have already completed preliminary sea use plans and zoning proposals for marine areas within their national jurisdictions. This paper discusses the nature and context of marine spatial planning, the international legal and policy framework, and the increasing need for marine spatial planning in Europe. In addition, the authors review briefly three marine spatial planning initiatives in the North Sea and conclude with some initial lessons learned from these experiences.

Maxwell, D. L., V. Stelzenmuller, *et al.* (2009). "Modelling the spatial distribution of plaice (Pleuronectes platessa), sole (Solea solea) and thornback ray (Raja clavata) in UK waters for marine management and planning." Journal of Sea Research **61**(4): 258-267.

Species distribution maps are needed for ecosystem-based marine management including the development of marine spatial plans. If such maps are based on predictive models then modelling procedures should aim to maximise validation success, and any uncertainty in the predictions needs to be made explicit, We developed a predictive modelling approach to produce robust maps of the distributions of selected marine species at a regional scale. We used 14 years of survey data to map the distributions of plaice, sole and thornback ray in three hydrographic regions comprising parts of the Irish Sea. Celtic Sea and the English Channel with the help of the hybrid technique regression kriging. which combines regression models with geostatistical tools. For each species-region combination we constructed logistic Generalized Linear Models (GLMs) based on presence-absence data using the environmental variables: depth, bottom temperature, bed shear stress and sediment type, as predictors. We selected GLMs using the mean squared error of prediction (MSEP) estimated by cross-validation then conducted a geostatistical analysis of the residuals to incorporate spatial structure in the predictions. In general, we found that species occurrence was positively related to shallow areas, a bed shear stress of between 0 and 1.5 N/m(2), and the presence of sandy sediment. Predicted species occurrence probabilities were in good agreement with sur-

vey observations. This modelling framework selects environmental models based on predictive ability and considers the effect of spatial autocorrelation on predictions, together with the simultaneous presentation of observations. associated uncertainties, and predictions. The potential benefit of these distribution maps to marine management and planning is discussed.

Punt, M. J., R. A. Groeneveld, *et al.* (2009). "Spatial planning of offshore wind farms: A windfall to marine environmental protection?" Ecological Economics **69**(1): 93-103.

Wind farms are often planned offshore where wind conditions are favourable and the visual impact is less important. Wind farms have both positive and negative effects on the marine environment. Negative effects include bird collisions, underwater sounds and electromagnetic fields, whilst positive effects constitute functioning as artificial reef and acting as no-take zones for fish, with possible spill-over effects. This paper presents a spatially explicit framework to analyze effects of wind farms on the marine environment and aims to evaluate how wind farms can contribute to protection of the marine environment through strategic and economically viable location choices. The functioning and the applicability of the model are demonstrated in a numerical example for the Dutch exclusive economic zone. We find that the careful spatial planning of wind farms is a key factor for profitability and environmental protection, and that, if carefully planned, the environment can benefit from offshore wind farms.

Street, T. (2009). "Marine Spatial Planning and New Ocean Uses." Sea Technology **50**(9): 77-77.

2008

Ardron, J., K. Gjerde, *et al.* (2008). "Marine spatial planning in the high seas." Marine Policy **32**(5): 832-839.

Although high seas resources are being exploited, reciprocal legal obligations to protect its environment have not been met. Marine spatial planning (MSP) is clearly a practical way forward, particularly for the high seas, where non-spatial monitoring is difficult, and where data gaps obstruct conventional management approaches. To ensure the effective application of MSP in the high seas, however, some institutional reforms are necessary. This paper outlines the main hurdles, summarizes existing high seas spatial protections, presents an example of a high seas marine protected area that resulted through MSP, identifies three institutional priorities, and suggests three immediate steps.

Crowder, L. and E. Norse (2008). "Essential ecological insights for marine ecosystem-based management and marine spatial planning." Marine Policy **32**(5): 772-778.

The abrupt decline in the sea's capacity to provide crucial ecosystem services requires a new ecosystem-based approach for maintaining and recovering biodiversity and integrity. Ecosystems are places, so marine spatial planners and managers must understand the heterogeneity of biological communities and their key components (especially apex predators and structure-forming species), and of key processes (e.g., population connectivity, interaction webs, biogeochemistry) that maintain them as well as heterogeneity of human uses. Maintaining resistance and resilience to stressors is crucial. Because marine populations and ecosystems exhibit complex system behaviours, managers cannot safety assume they will recover when stressors are reduced, so prevention is a far more robust management strategy than seeking a cure for degraded systems.

Douvere, F. (2008). "The importance of marine spatial planning in advancing ecosystem-based sea use management." Marine Policy **32**(5): 762-771.

During the past 10 years, the evolution of marine spatial planning (MSP) and ocean zoning has become a crucial step in making ecosystem-based, sea use management a reality. The idea was initially stimulated by international and national interest in developing marine protected areas, e.g., the Great Barrier Reef Marine Park. More recent attention has been placed on managing the multiple use of marine space, especially in areas where conflicts among users and the environment are already clear, e.g., in the

North Sea. Even more recent concern has focused on the need to conserve nature, especially ecologically and biologically sensitive areas, in the context of multi-use planning of ocean space. Despite academic discussions and the fact that some countries already have started implementation, the scope of MSP has not been clearly defined. Terms such as integrated management, marine spatial management, and ocean zoning are all used inconsistently. This is one of the reasons why its importance is not more seriously reflected at the levels of policy and decision-making in most countries. This article attempts to deal with this problem. It describes why MSP is an essential step to achieve ecosystem-based sea use management, how it can be defined and what its core objectives are. The article concludes with an analysis of the use and achievements of MSP worldwide, with particular focus on new approaches in Europe.

Ehler, C. (2008). "Conclusions: Benefits, lessons learned, and future challenges of marine spatial planning." Marine Policy **32**(5): 840-843.

This article summarizes briefly the principal conclusions from papers presented in this special issue on marine spatial planning. It identifies potential economic, ecological, and administrative benefits (and costs) that might be realized from the implementation of MSP. Finally, the article summarize lessons learned and identifies future challenges and directions for MSP, including the development of international guidelines for its implementation.

Flannery, W. and M. O. Cinneide (2008). "Marine spatial planning from the perspective of a small seaside community in Ireland." Marine Policy **32**(6): 980-987.

Marine spatial planning (MSP) is advocated as a means of managing human uses of the sea in a manner that is consistent with the maintenance of the ecological goods and services of the marine environment. Support for the process is evident at international and national levels but the degree to which it is acceptable to local level stakeholders is not clear. An Daingean (formely Dingle) is a small sea-oriented town situated on the southwest coast of Ireland in which marine-based tourism and other relatively new uses of the sea are pursued alongside traditional fishing activities. Stakeholders in An Daingean are found to be positively disposed to a local process of MSP that incorporates meaningful local involvement.

Fock, H. O. (2008). "Fisheries in the context of marine spatial planning: Defining principal areas for fisheries in the German EEZ." Marine Policy **32**(4): 728-739.

Method is presented to define principal areas for fisheries at high spatial resolution applicable to be implemented into marine spatial planning procedures. Vessel monitoring system (VMS) data from 2005 to 2006 are acquired to determine vessel-based fishing effort. Principal areas for the German exclusive economic zone (EEZ) are defined as areas in which 75% of the effort of either year is carried out. Examples are given for the 5 most abundant fisheries in the German EEZ in terms of vessel-based effort, i.e. gill netting, pelagic trawling, demersal otter board trawling and beam trawling > 300 and < 300HP. A historical comparison for demersal otter board trawling shows relative stability of spatial utilization patterns in the North Sea section of the EEZ.

Gilliland, P. M. and D. Laffoley (2008). "Key elements and steps in the process of developing ecosystem-based marine spatial planning." Marine Policy **32**(5): 787-796.

Marine spatial planning (MSP) is an essential tool for delivering an Ecosystem Approach and should add value to existing management measures for the marine environment. It should be based on a clear set of principles with a sustainable development purpose. Developing MSP can draw selectively on extensive experiences in terrestrial land use planning. A nested approach with appropriate planning activity at different spatial scales is recommended. Defining appropriate management units is important and particular effort will be required where these do not align with ecosystem boundaries. The timeframe for plans is tending to increase from around 10 to 20+ years, but review periods are required which enable a balance between stability and relevance. This article focuses on the key steps in the planning process of developing ecosystem-based MSP. The importance of setting specific objectives, including as a context for the full

range of relevant spatial data, and determining priorities is emphasised. It is also suggested that stakeholder engagement, including the way it is undertaken, is critical to different stages of the process.

Lynch, T. P. (2008). "The difference between spatial and temporal variation in recreational fisheries for planning of marine protected areas: Response to Steffe." Conservation Biology **22**(2): 486-491.

Maes, F. (2008). "The international legal framework for marine spatial planning." Marine Policy **32**(5): 797-810.

Increasing demand for ocean resources, both living and non-living, have already lead to loss of biodiversity, habitat depletion and irreversible damage to the marine environment. Furthermore, introduction of new kinds of sea uses, spatial extension of ongoing sea uses and the need to better protect and conserve the marine biological diversity will result in increasing conflicts among the various users, as well as between the users and the environment. Marine spatial planning as a process to allocate space for specific uses can help to avoid user conflicts, to improve the management of marine spatial claims, and to sustain an ecosystem-based management of ocean and seas. This article explores the rights and duties towards exploitation and protection of the marine environment under the jurisdiction of coastal states as reflected in two important global conventions, the United Nations Convention on the Law of the Sea and the Convention on Biological Diversity. Both Conventions provide the main legal framework for marine spatial planning that have to be taken into account in planning at the regional and national level.

Plasman, I. C. (2008). "Implementing marine spatial planning: A policy perspective." Marine Policy **32**(5): 811-815.

Marine spatial planning is often confronted with different types of hurdles that make the implementation of plans and strategies more difficult than scientists and planners-who have done most of the preparatory work-have foreseen. How does this situation come about? Is it due to the lack of interest or will of politicians? Are the technical proposals and plans too complex or too far from reality? Do they cost too much without comparable benefits? What can be done to avoid this? Based on recent experience within Belgium, some suggestions for more effective implementation of marine spatial plans are presented in this paper from a policy-making perspective.

Pomeroy, R. and F. Douvere (2008). "The engagement of stakeholders in the marine spatial planning process." Marine Policy **32**(5): 816-822.

Due to the interdependency that exists between the ecosystem resources and its users, successful implementation of ecosystem-based management depends on the identification and understanding of different stakeholders, their practices, expectations and interests. Today, many scientists and resource managers agree that the involvement of stakeholders is a key factor for a successful management regime in the marine environment. The way stakeholders are involved in the process must reflect, or at least address, the existing complexity of the specific context. A comprehensive method that allows doing this is by use of stakeholder analysis and mapping. This article will focus on the various types and stages of stakeholder participation in a marine spatial planning process, and will illustrate how to conduct a stakeholder analysis that allows the involvement of stakeholders in an adequate way that is sustainable over time.

St Martin, K. and M. Hall-Arber (2008). "The missing layer: Geo-technologies, communities, and implications for marine spatial planning." Marine Policy **32**(5): 779-786.

The assessment and management of marine resources is an increasingly spatial affair dependent upon emerging geo-technologies, such as geographic information systems, and the subsequent production of diverse layers of spatial information. These rapid developments are, however, focused on biophysical processes and data collection initiatives: the social landscape of the marine environment is undocumented and remains a "missing layer" in decision-making. As a result, the resource areas upon which stakeholders and communities are dependent are neither mapped nor integrated into plan-

ning processes. We report on a participatory method to map the presence of fishing communities at-sea. The lessons learned concerning the spatial representation of communities informs not only fisheries, but other sectors struggling to incorporate similarly the human dimensions of the marine environment in assessment and planning.

Stelzenmuller, V., S. I. Rogers, *et al.* (2008). "Spatio-temporal patterns of fishing pressure on UK marine landscapes, and their implications for spatial planning and management." Ices Journal of Marine Science **65**(6): 1081-1091.

The spatio-temporal distribution of fishing pressure on marine landscapes in offshore UK (England and Wales) waters is assessed, based on a time-series of fishing vessel monitoring system (VMS) data for UK and foreign fleets deploying beam and otter trawls, and scallop dredges. The results reveal that marine landscapes with coarse or mixed sediments and weak or moderate tide stress are heavily. shed. Marine landscapes experienced different intensities of fishing pressure depending on their spatial location in UK offshore waters and the regional heterogeneity of landscape types. Spatial patterns of fishing pressure vary by region, but within regions, patches of high fishing pressure remain centred at the same locations. When designing marine management plans, it is important to take account of the spatial extent and patchiness of fishing activity, and the consistency with which areas are shed in the same region from year to year. Descriptions of the spatial distribution of fishing pressures will become more meaningful at a local level if they also reflect the sensitivity of the habitats to those pressures. The further development of such sensitivity analyses, using life-history traits or measures of benthic production, is now becoming a priority.

2007

Douvere, F., F. Maes, *et al.* (2007). "The role of marine spatial planning in sea use management: The Belgian case." Marine Policy **31**(2): 182-191.

The expansion of offshore activities and the increasing need to meet international and national commitments to biodiversity conservation have led to an enhanced interest in marine spatial planning (MSP) as a tool for sea use management. Several European countries, on their own initiative or driven by European legislation and policy, have taken global leadership in implementing MSP. This article will discuss the Belgian experiences with MSP. It will give a short historical overview based on legal developments and review the implementation process of a 'Master Plan' as a spatial management policy for the Belgian Part of the North Sea. Additionally, this article will reflect on the research that has been done in Belgium to apply a land-use planning approach to the marine environment. The MSP process in Belgium shows that a spatial approach to sea use management is possible despite the lack of a legal zoning framework. However, it concludes that a legal basis for MSP, in addition to the current permit system, would provide a more strategic and integrated framework for ecosystem-based, sea use management.

Taussik, J. (2007). "The opportunities of spatial planning for integrated coastal management." Marine Policy **31**(5): 611-618.

This paper explains the nature of spatial planning and its incorporation into amended town and country planning legislation for England. It comments on current coastal management in England, including discussion on marine spatial planning, and examines how the new planning legislation provides opportunities for implementing aspects of coastal policy through planning, using shoreline management and coastal regeneration as examples. It considers how these opportunities may be developed for the Solent. The paper concludes that these opportunities must be seized if the longer-term sustainable future of the English coast is to be secured.

Annex 5: Detailed description of the application and issuing process of the building (consent) permits in the Dutch marine spatial planning process

PROCEDURE: Environmental Impact assessment (E.i.a.) procedure and license

A license is required for building, maintaining and removing a offshore wind farm, including the offshore cabling, on the grounds of the Public Works and Water Management Act. The Minister of Transport, Public Works and Water Management is authorised to make the decision concerning the granting of the application for the Water Act license.

The formal starting point of the e.i.a. procedure for drawing up the EIA commences with the publication of the preliminary memorandum by the competent authority. The authorized authority will makes the preliminary memorandum available for inspection, so that everyone has the opportunity to contribute their opinion to it. The Commission for the Environmental Impact Assessment and other legal advisors has been requested to make recommendations on the guidelines (nine weeks after the preliminary memorandum has been made available for public inspection). After receiving their recommendations, the competent authority must establish the definitive guidelines. The EIA will then be drawn up by the initiator and submitted to the competent authority, who will assess the acceptability of the EIA before publishing it. The EIA must be made available for public inspection simultaneously with the announcement of the license applications. This announcement will be made by means of publications in the Government Gazette and various national newspapers. There will follow a period for consultation and assessment of the EIA by the Environmental Impact Assessment Commission.

The decision on the application for a Water Act license will be partially taken on the grounds of the environmental information in the EIA that will be drawn up. The Water Act-license application is expected to run simultaneously with the procedure of the General Administrative Law Act (section 3.4 Awb).

There are several laws and regulations that have to be considered when licenses in the Dutch Exclusive Economical Zone of the North Sea must be gained.

These regulations are for instance:

- Sea Water Pollution Law (Wet Verontreiniging Zeewater)
- Environmental Administration Law (Wet Milieubeheer)
- Spatial Arrangement Law (Wet Ruimtelijke Ordening)
- Environmental Protection Law (Natuurbeschermingswet)
- Water Act
- Wreckage Law (Wrakkenwet)
- Monuments Law (Monumentenwet)
- Excavation Works Law (Ontgrondingenwet)
- North Sea Installations Law (Wet Installaties Noordzee)
- (Sea) Bottom Protection Law (Wet Bodembescherming)
- IMO sea lanes

Required issues within the framework of the Environmental impact assessment and the license for a wind farm are:

- Coordinates of the borders of the wind farm
- The design of the wind farm
- Impact of the proposed activities on the other sea users
- Impact on the ecosystem (birds, fish, benthos an sea mammals)
- Construction plan
- Exploitation plan (O&M; operations and maintenance)
- Health and safety plan
- An lighting plan
- A calamity plan
- Indication for the exploitation
- Decommissioning plan

The procedure in time:

- Submission of the start document within the framework of an Environmental impact study (EIS).
- The North Sea Authority; the ministry of Infrastructure and the Environment (IenM) judged the start document and replay in three weeks.
- IenM provides the initiator with the results of the judgement and any interests of other sea users and information about the procedures and deadlines for the Enironmental Impact Study. IenM also appointed a account manager.
- With guidelines the Environmental impact report is made and submitted. After five weeks comments are given by IenM.
- During drafting the Environmental impact report (EIR) also the license application can be drafted.
- After five weeks comments are given on the concepts of the EIR and the license application and the acceptability of the documents.
- Within 8 weeks after the documents are approved, they will be published for comments and opinions from interested stakeholders (term 6 weeks).
- Five weeks after the last term , the Environmental impact commission give advice about the EIS.
- IenM formulates a decision that will be published for comments (6 weeks).
- Up to 6 months the project developer received the decision about the license and the license.

Important elements of the license are:

The license is temporarily and after issuing the license the start of constructing the wind farm must be started within 2 seasons. A bank guarantee must be given for the decommissioning of the wind farm it is not allowed selling licenses without permission of the minister.

The Water Act- license comes with prescriptions on issues such as: Location, baseline studies, safety measures, depth and quality of cable laying, certification of the installations , maintenance, reports and logs, calamities, environmental monitoring programme and decommission.

The permit for land cable must be organised with the community authorities.

Additional requirements and measures can be set by V&W, after the environmental assessments and studies and could be added as prescriptions with the license.

Annex 6: Further ICZM and MSP information submitted by MS

Netherlands

Summary update of ICZM in The Netherlands

The organisation of coastal management and policy

Area-oriented approach and numerous managers

The Dutch coast involves numerous stakeholders and managers. The large number of actors involved requires a policy for the coastal zone that is designed and determined in partnerships and consultative bodies. An important new insight is that these networks are primarily designed on area-specific lines. Government authorities, private and non-governmental stakeholders have no difficulty in meeting up with one another in order to manage the coast on an integrated basis and to formulate new insights relating specifically to the condition of their area. The issue of coastal protection is often a dominant topic alongside nature management, economic development and access to coastal resorts. In addition, the management of the coastal zone has acquired a more integrated character.

Alongside the central government, provincial authorities, municipal authorities, water management authorities, and drinking water companies are actively involved. Private actors and non-governmental organisations are also clearly playing a role at the project level. The project organisations involved in the Weak Links Project (strengthening 13 specific weak points in the Dutch coastal zone) and - first and foremost - the Delta Program Coast sub program are examples of area-based and, in particular, area-specific development. The national water consultations (NWO) are an example of broad consultations about national issues in the area of water quality, freshwater supplies and flood protection, with the involvement of the national government, regional authorities and municipal authorities.

National policy; Short- and long-term coherency

The major policy and management plans and memoranda from the period 2006–2010 are structurally interdependent in the short, medium and long terms. In addition to their mutual coherency, which is an important ICZM recommendation, the drafting of individual documents is linked to the ICZM recommendations.

Coherency with respect to current policy, management and maintenance of the coastal zone is a feature of the Spatial Planning Policy Document (Nota Ruimte, 2006), the Coastal Policy Guideline (Beleidslijn Kust, 2007), the National Water Plan (2009) and the North Sea Policy Document (Beleidsnota Noordzee, 2009). These documents provide frameworks based on protective considerations for spatial planning in the coastal zones and ensure coordination with other functions, including drinking water supplies, recreation, nature, housing and economic development.

The Dutch National Water Plan

In 2009, the first National Water Plan was drafted for the planning period 2009–2015. The Water Plan has been approved by parliament in December 2010 and formulates a response to developments in the field of climate change, demographics and the economy, and furthers sustainable water management. This plan also replaces the policy for the North Sea in the Spatial Planning Policy Document (Nota Ruimte, 2006). This area is elaborated further in the North Sea Policy Document. For the purposes of the

further elaboration of the National Water Plan, the Integrated Management Plan for the North Sea 2015 (IBN 2015) will be updated in 2011. The recommendations made by the Delta Committee (2008) relating to coastal policy have been largely adopted in the National Water Plan with a view to maintaining coastal protection by means of sand replenishment. The cabinet has decided to allow the height of the coastal foundation to increase with sea level rises by bringing in sand. The sand will be spread along the coastline in a natural way. In addition, the government has opted for the coordinated development of different areas. In the present coastal zone, the balanced development of nature, the economy and accessibility must be possible.

Water Act

The Water Act went into effect in December 2009. The Water Act regulates the management of surface waters, water defences and ground- water. It also improves the coordination of water policy and spatial planning. In addition, the idea is to make a contribution to cutting red tape in the form of regulations, permit systems and administrative procedures.

The act also provides for the allocation of functions in the coastal zone; for the use of water in areas such as shipping, drinking water supplies, agriculture, industry and recreation. On the basis of the function, requirements are drawn up for the quality and spatial planning of the water bodies. The structure of the act provides for close collaboration between government authorities, both vertically and horizontally, by routing all initiatives through procedures that start at the municipal level.

International collaboration at the sub national level Dutch partners play an active role in European projects working on specific components of integrated coastal zone management.

COPRA:

Resulted in 2007 in criteria and indicators for sustainability on the local and regional scale; Quality coast indicators.

OURCOAST:

This three-year project for strengthening and facilitating the exchange of "best practices" for the planning and management of coastal zones started in 2009.

CONSCIENCE:

Filling in knowledge gaps relating to sustainable coastal management.

SPICOSA:

A research program focused on the development of an independent research framework for the evaluation of policy options for sustainable coastal zone management.

HARBASINS:

Made recommendations in 2008 for the establishment of a harmonised management strategy for coastal and transitional waters.

SUCSCOD:

Launched in 2009 with the aim of furthering the application of the ICZM principles at various governmental levels in the North Sea countries.

SUSTAIN:

A follow-up to the COPRA project (2010), focusing on a new set of sustainability indicators at the local and regional levels.

Knowledge and innovation

Joint fact-finding

The Coast sub-program has opted for an open-ended knowledge agenda, which will be drawn up and implemented in close collaboration between the central government, regional and local government authorities, the corporate sector and other stakeholders. That process will include Joint Fact-Finding, an interactive form of know- ledge development and knowledge sharing. The aim is to establish shared and accepted know- ledge as a foundation for policy and political decisions. The most is made of the knowledge, experience and ideas of the stakeholders from the worlds of policy, management, public and corporate life, consultancy and research.

New plans: exploiting local opportunities In the Netherlands, the implementation of the spatial policy for, and management of, the coastal zones is kept regional and area-based as much as possible. The national frameworks are established at the national level. In this way, the central government provides broad direction and government authorities involved in implementation can assume their responsibilities better and fulfil them on spatially differentiated lines. In this way, opportunities arise for these government authorities to develop, in conjunction with non-governmental organisations and local residents and companies, effective solutions for specific local issues, to make the most of opportunities, and to deliver tailored local solutions.

The national government has responded to this challenge by imposing fewer regulations and adopting a more supportive role. This also includes the transfer of knowledge. The proposed approach, which is effectively intended to create broad support, has been maintained and further elaborated in the establishment of the policy and management plans during the period 2006–2010. The underlying principle for the integrated management of the coast in the Netherlands results in regional knowledge development and innovative projects. In addition, it continues to implement the thinking behind the third Coastal Policy Document (2002), focusing on "soft where possible, hard where necessary". This "dynamic maintenance" of the coast has been a feature of a number of local projects and, in addition to the sustainable long-term protection of the coast, it provides for the establishment of the different use functions and the natural dynamics of the coastal zone system.

Sand replenishment in the coastal zone

"Building with Nature" knowledge program The "Building with Nature" program (BwN), the Dutch hydraulic engineering sector's knowledge and innovation program, was launched in 2008 and it will continue until 2012. The participants in BwN include virtually the entire hydraulic engineering industry, national government and the scientific world.

"Building with Nature" is a concept that grants a central role to eco-dynamic development and design, and intrinsic sustainability. This innovative concept opens up the opportunity of exploiting the dynamics of the natural system during design, construction and management in the coastal zone.

Natural forces are used to establish hydraulic infrastructure and, at the same time, to create opportunities for that very nature. In addition, the program responds to the rapid increase in demand from clients to build with respect for, and preferably strengthening of, natural values. It has the potential to make a major contribution to updating the EU policy in the area of nature protection and climate change in coastal zones.

Ecological sand extraction pit

The coast of North and South Holland has to be sustained continuously with sand because it will gradually erode otherwise. The coastal zone is maintained by means of sand replenishment. The sand is taken from large extraction pits off the North Sea coast. Research is being conducted at present to see how these pits can be managed ecologically in the form of large ribbed structures aligned with the dominant current. These structures allow life on the seabed to recover faster than is the case with the standard, flat, extraction pits. Research into the planning and the ecological design of extraction pits makes possible the genuinely sustainable development of the Holland Coast over a time scale of 50 to 100 years.

Sand Engine project

The "Sand Engine" project - a crooked peninsula to the north of Ter Heijde - was an idea originating from the cabinet's Innovation Platform (2003). January 2009 saw the publication of the initial environmental impact assessment memorandum and also the EIA for the Delfland Coast "Sand Engine" Pilot Study. The Sand Engine involves an enormous amount of sand being deposited on the Delfland coast. The crooked peninsula, with a length of 2 km, will initially cover an area of approximately 75 hectares and it will project about 1 km into the sea. It is expected that natural processes will spread the sand and extend the section of the coast behind the peninsula. This will con- tribute to coastal protection in the longer term and create more space for nature and recreation. The Sand Engine is an innovative pilot study intended to generate knowledge about coastal development, building with nature and new ways of maintaining and strengthening the coast. One of the considerations in all this is climate change and the expected sea level rise. If the Sand Engine proves to be effective, re- search will take place to determine whether this approach can also be used at other locations along the coastline. The project will be jointly financed by the central government and the provincial authority of South Holland. Construction of the Sand Engine started in January 2011.

Delta dikes; "poldering" in the coast

In the National Water Plan, the cabinet stated that it would be launching an exploratory study of the possibilities and limitations of Delta dikes. A Delta dike is a robust dike that is so high, wide or strong that the probability of uncontrolled flooding is practically zero. The exploratory study is intended to establish a picture of whether delta dikes provide a solution in the longer term for the consequences of climate change and constitute a realistic alternative for the development, design and implementation of concrete measures. The study is expected to result in early 2011 in recommendations for the ministry responsible on the basis of a technical, administrative/legal, and financial analysis. Communications and spatial quality factors will also be covered. The concept of the unbreakable dike is relevant for the coastal zone. When addressing a specific protection issue (i.e., a weak link) the problem will be tackled in an integrated way in collaboration with the various stakeholders.

Knowledge dissemination

Coastal zone research is not only intended to develop and disseminate knowledge, but also to lead to its successful application in the Netherlands and elsewhere. This is illustrated by a range of international contacts between the United States and the provincial authority of Zeeland in the area of flood protection. The Netherlands very much wishes to achieve the widespread, and therefore international, dissemination of

its knowledge and expertise relating to the sustainable and integrated management of coastal zones.

UK - Scotland

There are two main MSP projects in Scotland, the National Marine Plan and the plan developed to manage the development of offshore wind energy (The offshore Wind Plan). In addition the Saltire Prize was a plan set up to stimulate the technological development of wave and tidal energy.

National Marine Planning

The Marine (Scotland) Act 2010 introduced a new statutory marine planning framework to manage competing demands for the use of the sea whilst protecting the marine environment. The National Marine Plan is being developed in accordance with the policies set out in the UK Marine Policy Statement (MPS), which sets out the specific requirements and responsibilities from the two contributing pieces of legislation (The Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009).

The NMP includes setting economic, social and marine ecosystem objectives and objectives relating to the mitigation of, and adaptation to, climate change. The national plan must also state Scottish Ministers' policies on the contribution of designated conservation sites to the protection and enhancement of the sea.

The pre-consultation Draft National Marine Plan along with an interim Sustainability Appraisal (SA), which includes a Strategic Environmental Assessment (SEA) were published for a 12 week consultation on 15 March 2011. This will be followed by a formal consultation later in 2011 with a view to deliver the final plan in spring/summer 2012. Thereafter the plan and objectives will be kept under review, in line with the appropriate legislation.

The pre-consultation National Marine Plan is available on the Scottish Government website at:

http://www.scotland.gov.uk/Topics/marine/seamanagement/national.

The pre-consultation draft National Marine Plan is a single document covering both inshore waters (MHWS to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The National Marine Plan will apply to reserved functions (as well as devolved).

Achieving involvement of our stakeholders from the beginning of the process was vital in the creation of the National Marine Plan.

The participation process involved a wide range of stakeholders including key agencies, planning authorities, private sector including fisheries representatives, tourism and recreation organisations, shipping, ports and harbours, marine renewables sector, voluntary sectors and members of the public.

Initial meetings were held to consult stakeholders on the scope and content of the Plan. A Statement of Public Participation (SPP) was published in January 2011 followed by the publication of the current 12 week pre-consultation. This SPP gives the process and participation timetable involved in creating the National Marine Plan and as the National Marine Plan process develops, the SPP will be updated to give details on future events and information on events as they have occurred.

The Plan also introduces key challenges of marine sectors and the objectives to deliver these based on an integrated approach. There are 16 sectors which outline:

- Key challenges
- Objectives
- Background
- Current situation
- Environmental impacts
- Economic impacts
- Spatial constraints
- Future - short, medium and long term goals

The production of Scotland's Marine Atlas: Information for the National Marine Plan has been a key evidence base for developing the Plan providing analysis of current and future conditions of the marine area. Scotland's Marine Atlas is available at: www.scotland.gov.uk/marineatlas.

Comparison of process with UNESCO

The UNESCO Guide has been a useful aid and we have taken a similar approach including:

- Engagement with stakeholders;
- Continuous cycle – plan, implement, review, plan…etc.;
- Sector planning approach;
- Objective setting;
- Use of compatibility matrix;
- Defining and analysing existing conditions;
- Defining and analysing future conditions.

The UNESCO Guide has good emphasis on quantified objectives however the guide does not include "vision" setting – which has been included in the pre-consultation draft National Marine Plan

The pre-consultation draft National Marine Plan has less spatial – based detail and does not include a zoning plan as described in the UNESCO Guide. However, we will further develop the Plan and explore the potential interactions and synergies between sectors. The next draft of the Plan will include greater integration of the objectives and outline futures.

Regional Marine Planning

The National Marine Plan sets the wide context for planning within Scottish waters, however regional marine planning will allow more local ownership and decision making about the specific issues within a smaller area.

A 12 week consultation of the 'Marine Regions: Defining their boundaries' closed on 18 February 2011. An analysis of the responses is being carried out and a report will follow in due course. Twelve public events were held during the consultation process – these were in the main hosted and organised by Local Coastal Partnerships.

The consultation is focussing on the physical units used for planning purposes – where the boundary lines should be drawn both along the coast and seaward. The responses to the consultation are currently being analysed.

Marine Planning Partnerships: The current intention is that regional planning will be taken forward by locally led marine planning partnerships, who will have formally delegated planning powers for their area. In some cases these are likely to build on existing partnerships, such as long-standing Local Coastal Partnerships, or bodies put in place to oversee pilot planning initiatives set up under the Scottish Sustainable Marine Environment Initiative (SSMEI). Marine Scotland and the Scottish Coastal Forum have commissioned further advice on the governance and operational working practices of marine planning partnerships.

The Offshore Wind Plan

The Scottish Government published a plan for developing offshore wind in Scottish territorial waters on 18 March 2011. 'Blue Seas, Green Energy' sets out the Scottish Governments vision for developing offshore wind up to 2020 and beyond. It was developed using a number of established methods:

- Strategic Environmental Assessment
- Habitats Regulations Appraisal
- Socio-economic Assessment
- Public and Sectoral Consultation

Using the evidence base collected under the streams of work set out above the Plan has identified six areas for development of offshore wind in the short term, up to 2020:

- East region – Forth Array, Inch Cape, Neart na Gaoithe (Firth of Forth & Tay)
- West Region – Argyll Array (Tiree), Islay
- North East Region – Beatrice (Moray Firth)

The Plan has also identified 25 areas of search for potential development beyond 2020. 'Blue Seas, Green Energy' can be viewed online here:

http://www.scotland.gov.uk/Topics/marine/marineenergy/wind

Strategic Environmental Assessment

Strategic Environmental Assessment is a strategic approach and provides a high level overview of broad potential impacts, and therefore does not aim to prejudge project level issues. It does not grant planning permission or a marine licence but has a key role highlighting residual issues which can be picked up at licensing stage e.g. through project level Environmental Impact Assessment (EIA) and project level Appropriate Assessment. Prospective developers will need to consider these issues and the findings of the SEA will be taken forward within the licensing process as a starting point for more detailed assessment.

The SEA process formed an integral part of the preparation of the Plan, to ensure that environmental considerations were incorporated within the decision making process and to ensure that offshore wind energy proposals are sustainable. It identified the significant environmental effects of the plan and its reasonable alternatives. The find-

ings of the assessment were set out in the SEA Environmental Report which can be viewed online at:

http://www.scotland.gov.uk/Topics/marine/marineenergy/wind

The SEA makes use of available information, but it is acknowledged within the Environmental Report that further research will be required as the Plan is implemented, at both the strategic and local levels. The Post Adoption SEA Statement sets out a framework for this. Marine Scotland have committed to establishing a knowledge gaps research analysis group to identify and prioritise research gaps for offshore wind and wave and tidal energy. The outputs from this further work will be reviewed every two years.

Consultation

The SEA Environmental Report was subjected to public consultation alongside the Draft Plan for developing offshore wind in Scottish territorial waters. The consultation began in May 2010 and formally ended in September 2010. 856 responses were received to the consultation, of which 118 were from organisations and the remainder (738) were from individuals. 82% of responses related to 3 of the short term options contained within the draft Plan.

In addition to the formal written consultation process, the Scottish Government held seven meetings with key sectoral stakeholders and organisations and 23 public meetings were held across Scotland, which were attended by approximately 500 people.

A summary report of the consultation responses is available online at:

http://www.scotland.gov.uk/Publications/2010/12/22153227/0. The summary report of the consultation responses is part of the overall package of work that was used to inform Scottish Ministers decision on the Final Plan for offshore wind development in Scottish Territorial Waters.

Habitats Regulations Appraisal

A Habitats Regulations Appraisal is a process to determine whether a Plan or Project will have a likely significant effect on sites designated for their nature conservation interest under the European Birds and Habitats Directives.

The HRA assessed whether the integrity of the European sites would be adversely affected by development of the Plan. It focuses specifically on the effects to Special Areas of Conservation, Special Protection Areas and Ramsar sites. All of which provide protection to species and habitats considered to be of European importance. Following screening, a large number of sites – 370 – were taken forward into the assessment phase.

The HRA did cover the short and medium term options and followed guidance issued by Scottish Natural Heritage for undertaking HRAs and was followed with guidance and oversight from a Project Steering Group which included representatives from the Scottish Government, Scottish Enterprise, Highlands and Islands Enterprise, SNH, JNCC, The Crown Estate, Scottish Renewables, The Whale and Dolphin Conservation Society, Scottish Environment Link and RSPB.

The HRA concluded that there was a need for a clear process for Plan implementation. An Iterative Plan Review process was identified which sets out how additional data should be included to ensure the integrity of sites is protected. The HRA also identified that as a matter of law each project will be required to undergo project-

level Appropriate Assessment. The HRA provided direction to these future project level AAs by identifying mitigation measures to be considered at the project stage. The final HRA and mitigation measures can be viewed online at:

http://www.scotland.gov.uk/Topics/marine/marineenergy/wind.

Socio-Economic Assessment

The SEA process and related consultation demonstrated a clear demand amongst communities and stakeholders (such as shipping and fisheries representatives) for more information on the socio-economic implications of the draft Plan.

The socio-economic assessment was commissioned to provide the Plan with evidence on strategic questions around: the significance of national and regional impacts on other sectors; the extent of associated carbon savings, jobs and GVA; and the overall impact on jobs and GVA in the regions affected by the short term options – providing valuable data on aspects of the Plan relevant to most stakeholders.

The completed part of the Socio-Economic Assessment assesses impacts on other marine sectors, such as fishing, shipping, recreation and tourism, over a range of high to low impact scenarios at the regional and national level. This is sufficient to guide us on the issues to be addressed in more detail at the regional and project level.

The study was been overseen by a Project Advisory Group (PAG) comprising the most relevant stakeholder groups at national and regional levels. The PAG met twice, where the members reviewed and commented on the methodology and draft findings of the study. In addition, a brief presentation of the study objectives was made at five regional stakeholder events organised by Marine Scotland in January 2011.

Further research on all aspects of the socio-economic assessment will be considered as part of our 2 year Plan review process, which is in line with our approach on SEA and HRA.

The Socio-economic Assessment is available to view online at:

http://www.scotland.gov.uk/Topics/marine/marineenergy/wind.

The Saltire Prize

The Saltire Prize is the world's largest Government innovation prize (£10m) designed to stimulate innovation across the world that will significantly accelerate the commercial deployment of wave and tidal energy technologies.

The Saltire Prize will be awarded to the team that can demonstrate in Scottish waters, a commercially viable wave or tidal stream energy technology that achieves the greatest volume of electrical output over the set minimum hurdle of 100GWh over a continuous 2 year period using only the power of the sea. The electrical output will be generated during a 5 year Grand Challenge Period running from 30 June 2012 and ending on 30 June 2017.

The Scottish Government (SG) and The Crown Estate (TCE) are working collaboratively to create new opportunities for Saltire Prize competitors, primarily through further sea-bed leasing rounds for wave and tidal technologies. The SG is responsible for the marine planning, licensing and execution of The Saltire Prize. TCE is respon-

sible for the delivery of leasing rounds specifically designed to support and increase the competition for the Saltire Prize.

Considerable work has been undertaken to seek out the best locations deployment of wave and tidal projects - avoiding the main environmental sensitivities and conflicts with existing users to allow development to be implemented within the competition timescales.

Marine Planning Process

Since December 2009, Marine Scotland has taken forward the initial steps to apply a marine planning approach to identify potential areas for development under The Saltire Prize Programme. The marine planning approach comprises of 2 distinct stages:

1) A Scoping Study to assess our Western and Northern territorial waters – building upon the Scottish Governments Marine Renewables SEA (2007) and the Developer's survey (2009);

2) Regional Locational Guidance to further analyse the areas identified in the Scoping Study.

The Scoping Study identified 6 potential areas for development of wave or tidal energy generation by considering the main resource, environmental sensitivities and existing user issues around Scotland. The Regional Locational Guidance further considered regional sensitivities and issues to identify the least contentious development opportunities for development within these areas to confirm the suitability, or otherwise, for wave and tidal energy generation under the Saltire Prize Programme and further Scottish Leasing Round(s). This process also took account of other factors including available grid infrastructure to support development.

Following consultation, the Regional Locational Guidance has identified the following areas as potentially suitable for development through further lease bidding:

- West of Hebrides (Wave)
- West of Shetland (Wave)
- South West of Shetland (Wave)
- West of Mull of Kintyre (Tidal)
- South West of Islay (Tidal)

In response to feedback from the consultation and discussions with the emerging wave and tidal industry and other stakeholders, The Crown Estate has designed a new approach to leasing for Saltire Prize projects. This was announced on 22 September 2010. This will involve a series of six-month application windows, the first of which opened on 11 October 2010. Companies will be invited to apply for projects of up to 30 MW installed capacity. The results of the first round of applications are expected to be announced soon and the second application window will open in April 2011.

Annex 7: Summaries of the progress of MSP in each MS against the 'step-by-step' approach presented in the UNESCO report

http://www.unesco-ioc-marinesp.be/uploads/documentenbank/d87c0c421da4593fd93bbee1898e1d51.pdf

Canada

UNESCO Guideline	Large Oceans Management Area	Class Environmental Assessment (CEA)
1. Has the need and authority for MSP been established?	No. MSP is pursed through existing Integrated Oceans Management.	No. MSP is considered as a management measure in environmental assessments. All EAs are conducted under the authority of the *Canadian Environmental Assessment Act*.
2. Has financial support been obtained	No. Program funding allocations are for integrated management initiatives and marine protected areas. Spatial planning is	No. Program funding allocations for environmental assessments in general.
3. Has the process been organised with pre-planning	Yes. The pre-planning phase included identification of eco-regions and their corresponding management areas as well as guidelines for ecological and socio-economic reporting.	Yes. Pre-planning is addressed during the scoping and public registry of an CEA.
4. Has stakeholder participation been organised	Yes. Each oceans management area as well as each strategic and class environmental assessments have formalized governance and public engagement structures and processes.	Yes. Governance, industry participation and public consultations are a regulatory requirement for all EA's in Canada.
5. Have existing conditions been defined and analysed?	Yes. Extensive ecological and biological and human use atlases have been developed and used for preliminary risk assessments and objective formulation.	Yes. CEA's initial inventory of biological and human use information is used for the definition of valued ecosystem components forming the basis for the management objectives.
6. Have future conditions been defined and analysed?	No. Future conditions considerations have been limited by the lack of knowledge on the state of cumulative environmental effects linked to corresponding driver/pressure management action thresholds.	Yes. Cumulative environmental impacts are considered in the development of spatial allocations and management measures.

7. Has the MSP been prepared and approved?	Yes. Integrated Management plans for two of the five LOMAs have been developed and made public (Integrated Management Plan for the Beaufort Sea: 2009 and beyond and the Eastern Scotian Shelf Integrated Ocean Management Plan - 2007) with one receiving formal endorsement (Beaufort Sea IM Plan).	Yes. The CEA was completed and approved.
8. Have the MSP measures been implemented and enforced?	Yes. The accountability of management measures, including spatial plans, lie within the jurisdictional mandate of federal and provincial authorities.	Yes. The CEA was declared under the *Canadian Environmental Assessment Act* as legal instruments for the management of the class of activity.
9. Has performance been monitored and evaluated?	No. From an ecosystem level monitoring perspective, DFO and its Federal and Provincial partners have, however, various ecosystem-based monitoring programs.	Yes. Each federal authority that signatory to the CEA is responsible for monitoring and evaluation. These plans are reviewed every 5 years.
10. Has the management process been adapted as a result of step 9?	No. However, DFO and its Federal and Provincial conduct program level reviews tied to performance indicators and strategic outcomes.	Yes. Due for review in 2012, the CEA is presently being audited for effectiveness and performance.

Germany

UNESCO Guideline	Project Position
1. Has the need and authority for MSP been established?	Yes, in territorial sea (TS) and in EEZ
2. Has financial support been obtained	Resources and personnel have been allocated in the agencies responsible for setting up the plans.
3. Has the process been organised with pre-planning	EEZ: Because of distance to coast a special way has been chosen: Initial stocktake of licences, activities, demands and interests have been derived from a questionnaire sent out to agencies and stakeholders in the beginning of the process
4. Has stakeholder participation been organised	Yes, in form of consultation on a draft plan and SEA report
5. Have existing conditions been defined and analysed?	Yes, in form of an environmental report organised along the SEA directive
6. Have future conditions been defined and analysed?	The plans outline areas with priority for specific uses, reservation areas for specific uses and suitable areas.
7. Has the MSP been prepared and approved?	Yes, the plans are approved by the government
8. Have the MSP measures been implemented and enforced?	Example from EEZ: Approval of wind farms has to consider some rules, e.g. no wind farm approvals within NATURA 2000 sites and in designated priority areas for shipping
9. Has performance been monitored and evaluated?	Not yet as plans are quite recent; for EEZ evaluation foreseen for offshore windenergy in 2012.
10. Has the management process been adapted as a result of step 9?	See No. 9

Netherlands

UNESCO Guideline	Project Position
1. Has the need and authority for MSP been established?	Yes. The authority has also been established: the ministry of Infrastructure and Environment.
2. Has financial support been obtained	Maritime Spatial Plan has been adopted in 2010.
3. Has the process been organised with pre-planning	Yes.
4. Has stakeholder participation been organised	Yes.
5. Have existing conditions been defined and analysed?	Yes.
6. Have future conditions been defined and analysed?	Yes.
7. Has the MSP been prepared and approved?	Yes in 2010.
8. Have the MSP measures been implemented and enforced?	Yes.
9. Has performance been monitored and evaluated?	Ongoing.
10. Has the management process been adapted as a result of step 9?	Not yet, planning period covers 2010-2015.

Norway

UNESCO Guideline	**Project Position** Barents Sea Plan and Norwegian Sea Plan
1. Has the need and authority for MSP been established?	Yes, through Report to parliament 2002, need and authority is established. Ministry of the Environment is in charge.
2. Has financial support been obtained	Yes. Government funding.
3. Has the process been organised with pre-planning	Yes. Both for scientific program and making of the plan itself.
4. Has stakeholder participation been organised	Yes. Public meetings during drafting phase + formal public hearing of proposed plan open for written response.
5. Have existing conditions been defined and analysed?	Yes.
6. Have future conditions been defined and analysed?	Yes. Future threats, and risk assessment of some of them.
7. Has the MSP been prepared and approved?	Barents Sea and Lofoten 2006, revised 2011. North Sea 2009.
8. Have the MSP measures been implemented and enforced?	Some are implemented and enforced. Others in process.
9. Has performance been monitored and evaluated?	For Barents Sea a partial review of measures from the 2006 plan is given in the 2010 update. Full update/review is planned to be ready well before 2020, with a focus on the period to 2040.
10. Has the management process been adapted as a result of step 9?	Not yet – too early.

Poland

UNESCO Guideline	Project Position
1. Has the need and authority for MSP been established?	Yes
2. Has financial support been obtained	Resources and personnel have been secured to develop MSP for the Polish EEZ
3. Has the process been organised with pre-planning	Several seminars and consultations have been organised in pre-planning stage
4. Has stakeholder participation been organised	There was a meeting organised to collect opinion of stakeholders about pilot MSP for the western part of the Gulf of Gdansk
5. Have existing conditions been defined and analysed?	Yes, in form of Environmental Impact Assessment for implementation of Pilot MSP for the Western Part of the Gulf of Gdansk
6. Have future conditions been defined and analysed?	The MSP accepts most of the areas for existing specific uses; however MSP also defines areas to be excluded from anthropogenic disturbances.
7. Has the MSP been prepared and approved?	The MSP for the Western part of the Gulf of Gdansk is on the track for governmental approval; however plans for the other selected areas are at the very beginning stage of preparation.
8. Have the MSP measures been implemented and enforced?	Most probably, MSP measures might be approved for the Middle Bank (southern part) which is shared with Sweden (northern part). This is due to plans and pressure for construction of wind farms.
9. Has performance been monitored and evaluated?	Some evaluations are done for the Western Part of the Gulf of Gdansk and for the southern part of the Middle Bank. These evaluations are not yet completed..
10. Has the management process been adapted as a result of step 9?	No

Sweden

UNESCO Guideline	Project Position
1. Has the need and authority for MSP been established?	The new Marine and Water Management Agency, established on 1 July 2011, will be responsible for MSP. This will be operational as soon as relevant legislation is passed by Parliament, with likely entry into force on 1 July 2012.
2. Has financial support been obtained	In the national budget for 2011 there are provisions for financing the introduction of MSP.
3. Has the process been organised with pre-planning	Not yet. Planning process not yet in place.
4. Has stakeholder participation been organised	Not yet. Provisions in proposed legislation. Details of the planning process still to be defined.
5. Have existing conditions been defined and analysed?	Not yet. Will be co-ordinated with the implementation of the EU Marine Framework Directive.
6. Have future conditions been defined and analysed?	Not yet. Planning process due to start next year (2012).
7. Has the MSP been prepared and approved?	First full-scale MSP likely to be approved in 2015 or 2016, at the earliest.
8. Have the MSP measures been implemented and enforced?	No; too early in the process.
9. Has performance been monitored and evaluated?	Too early.
10. Has the management process been adapted as a result of step 9?	Too early.

UK

UNESCO Guideline	**Project Position** Wind farm development plan for Scottish Territorial Waters	**Project Position** Draft National Marine Plan	**Project Position** Draft National Marine Plan
1. Has the need and authority for MSP been established?	Yes. Scottish Government (SG) policy is to encourage marine renewable energy, and a plan is needed to manage the process. Marine Scotland (part of SG) is statutory authority for marine planning	Yes. Marine Scotland (part of Scottish Government) is statutory authority for marine planning, as specified in the Marine (Scotland) Act 2010.	Marine and Coastal Access Act 2009 provided the legislative framework for developing Marine Planning systems across the UK, designating the Marine Plan Authority for each marine planning region, the Secretary of State is the Marine Planning Authority for English marine planning regions; the Act also provided for the establishment of the Marine Management Organisation and enabled the Secretary of State to delegate various marine planning functions to the Marine Management – the SoS will always be the marine plan authority.
2. Has financial support been obtained	Yes. Financial support is present as part of the routine allocation of funds to Scottish Government Directorates.	Yes. Financial support is present as part of the routine allocation of funds to Scottish Government Directorates.	Yes. Now the Marine Policy Statement has been adopted, the MMO has begun to develop Marine Plans. They are resourced to start this process from April 1.
3. Has the process been organised with pre-planning	Yes. It was recognised early that the Plan would need to be	Yes. It was recognised early that the NMP would need extensive	Yes. The Objectives in Our seas – a shared resource: High Level

	supported by SEA, Habitats Regulations Assessment and socio-economic assessment.	consultation with stakeholders to be supported by SEA, Habitats Regulations Assessment and socio-economic assessment.	Marine Objectives, published in April 2009, underpin the development of the Marine Policy Statement.
4. Has stakeholder participation been organised	Yes. Some key environmental stakeholders were involved in the project steering group. Two series of Public meetings were held in coastal areas close to potential development sites. The Plan and all supporting documents are currently available on SG website for public consultations.	Yes. Sectoral stakeholders covering industrial use, conservation, recreation, etc were consulted early in the process to discover their aspirations and concerns, and to seek expressions of their targets for 2015 and 2010. The Plan and all supporting documents are currently available on SG website for public consultations.	Yes: A draft statement of Public Participation (SPP) was published for consultation in Jan 2011
5. Have existing conditions been defined and analysed?	Yes. The Plan was developed through the use of a multi-layer GIS decision support tool which used current conditions (environmental, other uses, etc) as the input	Yes. The Plan took account of current conditions, but not in a strongly spatial sense. Some maps were included, but most were single-sector. The quality of the environment in relation to WFD was covered, and the 11 Descriptors of GES are included as part of the overall objectives.	In process
6. Have future conditions been defined and analysed?	Yes. The primary aim was to identify areas where consenting and licensing was relatively less likely to experience difficulties.	Yes. The establishment of sectoral visions for future conditions, and their relationship to SG objectives is a core feature of the Plan.	In Process

	The Plan was supported by SEA and HRA etc which analysed the potential environmental, and socio-economic impacts of the Plan.	The Plan was supported by SEA and HRA etc which analysed the potential environmental, and socio-economic impacts of the Plan.	
7. Has the MSP been prepared and approved?	Yes. The Plan and supporting documents have been approved by Ministers for issue for consultation.	Yes. The Draft Plan and supporting documents have been approved by Ministers for issue for consultation.	In Process
8. Have the MSP measures been implemented and enforced?	To an initial degree. The Plan process identified 3 potential development areas where there was strong local opposition. These are now considered inappropriate for development in the short term.	No. Too early in the process. However, parallel activities to create local planning bodies are underway.	In Process
9. Has performance been monitored and evaluated?	To a degree. The Plan identified medium term development areas (ie post 2020). The robustness of the spatial modelling used to identify the sites has been assessed, and it has been concluded that the medium term aspects of the Plan should be revisited in 2 years time, to take account of improved data sets and data handling procedures, and to extend the analysis beyond the 12 mile limit.	No. Too early.	In Process
10. Has the management process been adapted as a result	Yes. The commitment to periodic review and refreshment of the	No. Too early.	In Process
of step 9?	medium term aspects of the Plan has been strengthened, and a timeframe defined.		

Annex 8: Resolution for an ICES Internal Publication (Category 1)

The report covering the output from Theme Session B (Marine spatial planning) of the ASC 2010, edited by Roland Cormier (Canada) and Ian Davies (UK), as reviewed and approved by the Chair of the Science Committee, will be published in the ICES Cooperative Research Report. The estimated number of pages is 150.

The Working Group on Marine Planning and Coastal Zone Management agrees to submit the final draft of the proposed publication by December 2011.[9]

Supporting information

Priority:	Marine spatial planning has a rapidly increasing profile and importance in marine science and marine management in Europe, and more widely. The published literature is still surprisingly small, and there is a great need for better communication of all aspects of MSP. The proposed document is coherent with the ICES initiative on data for MSP.
Scientific justification:	The forthcoming ICES Cooperative Research Report represents a collation and synthesis of the papers presented at the Theme Session B of ASC 2010. This CRR will present up to date information on the most recent scientific studies carried out, and on the application of the planning procedures to marine systems. The content of the CRR will be presented in relation to the framework for MSP recently published by UNESCO.
Resource requirements:	The material in the report is largely available in preliminary form material prepared for the ASC, and therefore no specific additional costs are necessary.
Participants:	Approximately one month's work is required by the editor to finalise this draft.
Secretariat facilities:	About one month of the services of Secretariat Professional and General Staff will be required.
Financial:	Cost of production and publication of a 150-page CRR.
Linkages to advisory committees:	This product has been endorsed by SciCOM.
Linkages to other committees or groups:	Links to the ICES Strategic Initiative on Coastal and Marine Spatial Planning.
Linkages to other organizations:	National and international bodies dealing with marine planning will welcome the publication.

[9] **Extension of this deadline can be requested up to one month before the deadline's expiration. If an extension of the deadline is not agreed upon or if the final draft is not forthcoming, the ICES Secretariat will have the option of cancelling the resolution.**

Annex 9: Draft Terms of Reference for 2012

The **Working Group for Marine Planning and Coastal Zone Management** (WGMPCZM), chaired by Andreas Kannen, Germany, will meet at ICES HQ, Copenhagen, Denmark, 20–23 March 2012 to:

a) Update on ICZM and MSP in different ICES countries with a focus on the need for knowledge for the development of management strategies including scientific advice required in each stage of the process;

b) Re-examine ICES Member States progress in quality assurance in MSP and ICZM towards producing guidance and advice in implementation based on the results of the recommended workshop on this matter;

c) Review how the social-cultural dimensions of ecosystem services are (or can be) incorporated in MSP and ICZM

d) Review methods for capturing fisheries information for inclusion in MSP

e) Receive a report on the collaboration with the Strategic Initiative on Coastal and Marine Spatial Planning and plan for further cooperation;

f) Evaluate potential for collaboration with other EGs and other ICES initiatives in relation to the ICES Science Plan and report on how such cooperation has been achieved in practical terms (e.g. joint meetings, back-to-back meetings, communication between EG chairs, having representatives from own EG attend other EG meetings);

WGMPCZM will report by 25 April 2012 (via SSGHIE) for the attention of ACOM and SICOM.

Supporting Information

Priority	In order to maintain and improve the quality of ICES advice, the specific requirements for scientific advice in support of client initiatives on Marine/Maritime Spatial Planning and CZM need to be evaluated. In response to demands for ecosystem-based advice, ICES has adopted an ecosystem-based approach, including the coastal zone that would allow ICES to provide better holistic advice. Consequently these activities have high priority.
Scientific justification	Many ICES Study and Working groups address specific coastal zone issues and issues of relevance for maritime spatial planning. Others do not include coastal zone issues and planning aspects in their work, but have the expertise to, or could, with added expertise, address these issues. All the information being generated needs to be compiled and analysed to ensure consistent and integrated advice. The ecosystem based approach to the management of human activities as the leading principle for integrated planning and management implies that knowledge on the key ecosystem processes and properties in the coastal zone will be the core of the information ICES will be able to add into the process of ICZM. High Priority Research Topics in the ICES Science Plan that are relevant to the WG are: Marine spatial planning, including the effectiveness of management practices (e.g. Marine Protected Areas (MPAs); Contributions to socio-economic understanding of ecosystem goods and services, and assessment of the impact of human activities. Influence of development of renewable ocean energy resources (e.g. wind, hydropower, tidal and waves) on marine habitat and biota; Important components include spatial planning tools to assist IM practitioners; the socio-economic and cultural understanding of marine resources in the

	application of IM and the application of IM to address the interactions between commercially exploited species and natural systems. This work will contribute directly to the applications of emerging and present coastal directives (e.g. EU-WFD; EU-ICZM, Marine Strategy) and other local or trans-boundary management issues within ICES Member Countries.
Resource requirements:	New experts have been recruited during the past three years and there is a need to engage experts from USA and other ICES countries involved in Marine Planning and CZM and not participating actively within the WG. Currently the group involves experts from administrations as well as from different fields of science.
Participants:	ICES Member Countries working with marine planning and coastal zone issues. The Group is normally attended by 10–14 members and guests.
Secretariat facilities:	None.
Financial:	No financial implications.
Linkages to advisory committees:	There are obvious direct linkages with ACOM
Linkages to other committees or groups:	SCICOM and several Working Groups within this committee, in particular mariculture related groups, Working Group on Marine Systems (WGMS) under ACOM.
Linkages to other organizations:	EU, OSPAR, HELCOM, LOICZ, several EU funded projects.

Annex 10: Recommendations

Recommendation	For follow up by:
1. STIG-MSP accepts the invitation for a joint session at the ASC 2012 with the title "Use and Misuse of science in MSP and IM" as proposed in this report by WGMPCZM. (see chapter 3.5 for a session abstract)	STIG-MSP (SIASM)
2. In response to the request for collaboration with STIG-MSP WGMPCZM proposes in this report a concept for a workshop on simulating the development of MSP for large scale hypothetical wind farm development as discussed within STIG-MSP during the Lisbon workshop. STIG-MSP adopts this proposal. (see chapter 3.5 for the contents of the proposal)	STIG-MSP (SIASM)
3. SCICOM adopt the proposal for a publication of a cooperative research report on Theme Session b from ASC 2010. (resolution in annex 8)	SCICOM
4. STIG-MSP accepts an invitation from WGMPCZM on collaborative work concerning the review of methods for capturing fisheries information for inclusion in MSP (see ToR d for 2012), in particular by STIG-MSP providing information on relevant methods and data.	STIG-MSP, ICES Data Centre
5. ICES adopts a workshop planned by WGMPCZM on QA as an ICES workshop. (specifics to be sent separately to the secretariat)	ICES Secretariat (?)