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WP3 Coordinators: Dr. Jan Vanaverbeke and Prof. Dr. Magda Vincx

(Partner 4, UGent, Belgium)

Edited by: Prof. Dr. Steven Degreear, Dr. Jan Vanaverbeke and Dr. Luc van Hoof

Contributors:

Degraer, S., L. Buhl-Mortensen, J. Carlström, K. Cronin, N. Dankers, I. Galparsoro, R. Gerits, D. Goldsborough, S. Holen, R. Jak, K.R. Johnson, P. Jones, T. Kirk Sorensen, L. Lieberknecht, M.L. Pace, E. Pecceu, C. Pipitone, J. Piwowarczyk, W. Qiu, C. Rockmann, C. Schipper, V. Stelzenmüller, G. Sutton, J. Vanaverbeke, V. Vassilopoulou, T. Vega Fernandez, L. Van Hoof.

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1. ABSTRACT

MONITORING AND EVALUATION IN MARINE SPATIAL PLANNING: THEORETICAL FRAMEWORKS AND EMERGING ISSUES FROM REAL-LIFE CASE STUDIES.

The EU funded project MESMA addresses the challenge of practical and interdisciplinary approaches to monitor and evaluate spatially managed areas. The project addresses the challenge of practical and interdisciplinary approaches to monitor and evaluate SMAs by suggesting an integrated set of management tools comprising concepts, models and guidelines. The MESMA integrated framework has been applied to and tested in nine European case study areas stretching from the Black Sea over the Mediterranean and North-East Atlantic into the Baltic and Barents Sea. The cases studied vary in stage of implementation of Marine Spatial Planning (MSP) and the occurrence of spatially managed areas. This paper aims at drawing lessons from the nine case studies on place based management with the specific objective to highlight common issues in relation to MSP.

Our case study analysis demonstrates that the implementation of MSP will always remain highly diversified in the real world. MSP both as strategic, forward looking planning and as a public process (or a combination hereof), may be found in European waters. The European Habitats and Bird Directives as well as MSFD have often been a trigger to move towards more integrated management strategies, such as MSP.

The debate of where to organize policy formulation and implementation is as much central to MSP as the objectives of such policy. Although the need for regional coordination and cooperation is for example underlined in the MSFD and the MSP Directive, a formal stance on the organization of regional cooperation and the development of plans across different user groups seems to be lacking in the European ideas on MSP. Legal constraints to full MSP implementation become particularly clear in transboundary areas, between EU member states and even more between EU and non-EU countries. In those cases national interests often get higher priority than the promotion of sustainability in the entire SMA.

The following issues emerged during the case study analysis:

- The concept of MSP is still open to very diverse interpretations.
- There is a lack of an integrated cross-sector MSP process in many EU countries. It has become apparent that in those cases, the long-term collective goal of sustainable use of the sea proves more difficult to achieve than short-term goals put forward by private sectors.
- The case studies illustrate that although participation is considered essential in MSP theory, MSP is often implemented as a top-down process in the real world, where governments decide and stakeholders need to follow. The introduction of MSP however provides opportunities for consultation and participation, which may speed an integrated approach towards development licensing.

- A special issue is the cooperation between national administrations especially between different EU countries EU and non-EU states.
- Communication issues between stakeholders as well as between stakeholders and management bodies were shown to be hampered by a seeming lack of capacity of the stakeholders to partake in public consultations and 'consultation fatigue' in the form of low/decreasing attendance at consultation and information events. Tools to aid dissemination of planning process data and information to stakeholders were documented and developed by MESMA.
- In those case studies where Spatially Managed Areas are located across international borders, national interests often seem to gain priority over cross-border joint interests that would promote sustainability. Cross-border collaboration on spatial management indeed proved difficult to organize and manage, but may be facilitated by international organisations such as international science organisations and regional conventions.
- The lack of a proper understanding of sustainability issues and the ecosystem base may limit the immediate application of Marine Spatial Planning. The main areas of concern are a lack of scientific knowledge about the reference status and the inability to predict the effects of multiple cumulative impacts on interacting ecosystem components.
- While our case studies with fully developed and implemented integrated plans have monitoring and evaluation included, other case study examples illustrated that monitoring and evaluation are not always considered that crucial.
- Active adaptive management requires proactive anticipation of the need to change practices, learn from experience and adapt strategies accordingly. It is then necessary to define appropriate indicators, and then to monitor these against pre-set targets ensuring adopted solutions lead to the anticipated goals of Marine Spatial Planning.

2. INTRODUCTION

Marine spatial planning (MSP) has emerged as a means of resolving potential cross- and inter-sectorial conflicts over maritime space (Douvere and Ehler 2010). MSP seeks to manage human activities while balancing multiple ecological, economic and/or social objectives such as sustainable use and conservation (Katsanevakis et al. 2011; Jay, Ellis et al. 2012; Carneiro 2013). Thus, MSP is regarded to also resolve cross-border conflicts and supports the implementation of ecosystem based marine management in European waters. The implementation of place based management measures is increasingly advocated worldwide as an important step towards operationalizing an ecosystem-based management of marine and coastal areas (Katsanevakis et al. 2011). In this context, recent literature variously refers to place based management, integrated management plans (Olsen et al. 2007), ocean zoning (Day 2002), marine spatial planning (MSP) (Ehler and Douvere 2009), sea-use planning (Anonymous 2005), ecosystem-based marine spatial planning (Foley et al. 2010) or coastal and marine spatial planning (CMSP) (Halpern et al. 2012). Hence, the concept of MSP is still open to very diverse interpretations (Gilliland and Laffoley 2008). Various definitions of MSP can be found, e.g.:

- Strategic, forward-looking planning for regulating, managing and protecting the marine environment, including the allocation of space, which addresses the multiple, cumulative and potentially conflicting uses of the sea (Gilliland and Laffoley 2008).
- MSP as a public process of analysing 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 (Douvere and Ehler 2009).
- MSP as a process of public authorities of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives (EU COM/2010/0771, 2010) (Commission of the European Communities 2013).
- Coastal and marine spatial planning as a comprehensive, adaptive, integrated, ecosystem-based and transparent spatial planning process, based on sound science, for analysing current and anticipated uses of ocean, coastal, and Great Lakes areas. (Beck et al 2009).

To encourage discussion on the implementation of MSP, the EU published the “Roadmap on Maritime Spatial Planning: Achieving Common Principles in the EU” (Anonymous, 2008), describing ten key principles on MSP, among which the incorporation of monitoring and evaluation. The 10 principles relate to:

1. Using MSP according to area and type of activity
2. Defining objectives to guide MSP
3. Developing MSP in a transparent manner
4. Stakeholder participation
5. Coordination within Member States –simplifying decision processes
6. Ensuring the legal effect of national MSP
7. Cross-border cooperation and consultation
8. Incorporating monitoring and evaluation in the planning process

9. Achieving coherence between terrestrial and maritime spatial planning –ICZM
10. Strong data and knowledge base.

Stelzenmüller et al. (2013) recently noted that practical and interdisciplinary approaches to monitor and evaluate spatially managed areas (SMAs) in coastal and offshore waters are being increasingly demanded. This is particularly the case in the EU, where the policy and regulatory frameworks for MSP are still under development. Throughout the EU funded project MESMA (www.mesma.org) and the local context of nine southern and northern European MESMA case studies on place based management, tools for monitoring and evaluation of SMAs have been developed and tested.

The present paper highlights a series of findings of research carried out in the nine case studies, which aimed to identify trends, communalities, differences and other key attributes of the various practices and approaches that have been adopted in each case study. For the purpose of this paper, these findings are not comprehensively analysed, but are expected to trigger further detailed analysis. A number of key issues have been identified, which have been grouped in respect of their logical connection to the EU key principles of MSP. A first set of issues refers to the MSP scope and objectives (principles 1 and 2). A second set of issues refers to points relevant to stakeholder participation and as such also transparency in MSP development (principles 3 and 4). Principles 5, 6, 7 and 9 were grouped under the umbrella of cooperation, coherence and the legal effect of MSP. We finally identified several issues on the need for an appropriate knowledge base for adaptive management (principle 10).

3. THE EU MARINE SPATIAL PLANNING LANDSCAPE

The main policy drivers for MSP in the EU fall into four main categories (Qiu and Jones, 2013):

- Environmental legislation, which includes the Birds Directive (2009/147/EC), Habitats Directive (92/43/EEC), Environmental Impact Assessment Directive (85/337/EEC), Strategic Environmental Assessment Directive (2001/42/EC), and the Marine Strategy Framework Directive (MSFD, 2008/56/EC).
- Legislation on marine renewable energy, which includes the EU Climate and Energy Pack (2008) and the Renewable Energy Directive (Directive 2009/28/EC).
- Fisheries regulation, particularly the Basic Regulation on the Common Fisheries Policy (CFP), which is currently undergoing a reform (COM(2011) 425 final).
- The Integrated Maritime Policy (IMP) (Regulation (EU) No 1255/2011).

These policies differ in focus (economic or ecological), include different stakes (and hence stakeholders) and focus on different ways of setting rules. Given the tensions between MSFD and CFP (De Santo and Jones, 2007), the IMP seeks to incorporate them both (van Hoof and van Tatenhove, 2009). Among these policy drivers, only the IMP has explicit provisions for a system of integrated, cross-sectorial MSP. Other policy drivers have direct influence on the allocation of marine space for a particular purpose, such as nature conservation, fisheries and marine renewable energy, thereby affecting the availability of marine space for other sectors. It is worth noting that while there are synergies between some policy drivers, there are also tensions to be addressed, such as the weak links between EU fisheries regulation and environmental legislation. In addition, there are also potential tensions between the MSFD, which provides for ecosystem-based management of the ocean, and the IMP, which primarily focuses on promoting economic development or 'blue growth'. Such synergies and tensions represent opportunities and challenges for the emergence of a clear vision for MSP (Qiu and Jones, 2013).

MSP may be the tool to bridge the gap between these objectives, though it is left to individual EU member states (MSs) to decide how this is implemented. The proposed MSP Directive highlights the need for the coherent and integrated implementation of the EU policy initiatives relevant for the oceans, seas and coasts through an integrated process and the need for cooperation between MSs on MSP (Commission of the European Communities, 2013). Yet, the Directive does not detail the way in which this is to be achieved other than calling for each MS to establish and implement a maritime spatial plan or plans and an integrated coastal management strategy or strategies (Commission of the European Communities, 2013).

In addition, the European Commission requires MS action to aim for coherence of management across sea basins and along coast lines, where relevant, including collaborative and appropriate data collection as well as data exchange (Commission of the European Communities, 2013). The main concern is whether in pursuing this regional cooperation the European Union (EU) and the MSs are competent to devise a

properly functioning institution to achieve trans-boundary cooperation and integration. It can be queried whether such new institution or perhaps alternative (legal) framework will weaken the environmental commitments established under the MSFD. It is questionable whether the proposed MSP Directive adds value to the already crowded policy landscape, as the MSFD, IMP and other policy drivers that already provide for the implementation of MSP for different purposes. The emphasis should, instead, be on strengthening synergies and addressing tensions between different policy drivers, particularly the MSFD and the sectorial policies for which it provides a framework (Qiu and Jones, 2013).

4. MONITORING AND EVALUATING SPATIALLY MANAGED AREAS: THE MESMA FRAMEWORK AND CASE STUDIES

The EU funded project MESMA addresses the challenge of practical and interdisciplinary approaches to monitor and evaluate SMAs by suggesting an integrated set of management tools comprising concepts, models and guidelines. This interlinked concept is referred to as the MESMA integrated framework (Stelzenmüller et al., 2013). Its central component is a flexible dual framework which guides the user through an indicator based assessment of the effectiveness of a spatial management plan, as well as through a governance analysis (Figure 1).

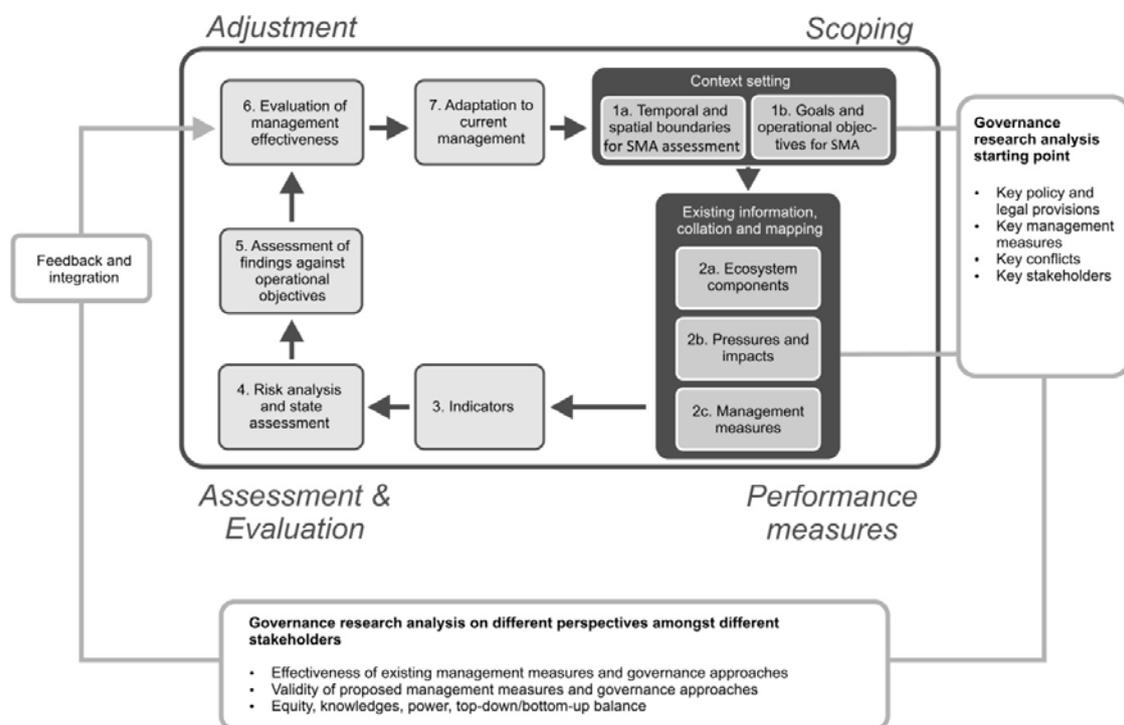


Figure 1. The MESMA integrated framework for evaluating the effectiveness of a spatial management plan, a double-looped cycle of steps to monitor and evaluate marine spatial planning. The central framework (within the dark outline) is an ecosystem-focused analysis of objectives, indicators and outcomes, split into seven steps : (1) definition of (1a) the spatial and temporal boundaries and (1b) goals and objectives; (2) identification, collation and mapping of existing information; (3) definition of performance measures or indicators together with their reference points; (4) risk analysis and state assessment; (5) summary of assessment results against operational objectives; (6) evaluation of management effectiveness; (7) summary of assessment results and formulation of recommendations. A separate framework for evaluating governance can be run in parallel to the central framework.

Spatial management can have multiple objectives and it is important to evaluate whether management measures actually achieve the desired results (Douvere and Ehler, 2011). The assessment can be carried out using structured tasks, described in the user manual. The iterative application of the assessment

allows to handle the key elements of scoping, performance measures, assessment evaluation and adjustment (Stelzenmüller et al., 2013). A parallel framework for governance analysis of the MSP process guides users through e.g. an institutional analysis and the identification of conflicts. In this context, we follow the proposed MSP Directive in defining a marine spatial plan as the spatial and temporal distribution of human activities in sea areas to achieve economic, environmental and social objectives (Commission of the European Communities, 2013).

Within MESMA, the central framework and the governance analysis framework were both tested in nine practical MSP case studies (CS; and sub case studies) from four sea basins across Europe. The CS initiatives were very diverse in objectives, spatial scales and planning stages, and span the various geographical regions of the European marine waters (North Sea, Pentland Firth, Barents Sea, Celtic Sea, Basque Country, Strait of Sicily, Ionian Archipelago, Baltic Sea and Bulgarian part of the Black Sea; see further details below and Table 1 and Figure 2).



Figure 2 Overview of the MESMA case studies.

Case Study	Sub case study	Marine spatial plan in place?	Marine spatial plan anticipated/in progress	Focus	Approach
	Southern North Sea	No, but national sectorial plans	No	Nature conservation/offshore wind energy targets	RA
	BPNS	No, sectorial zoning plan and sectorial management plans	Yes	Good Environmental Status according to MSFD	RA
	Dogger Bank	No, but national sectorial plans	Yes	Nature Conservation	RA

Case Study	Marine spatial plan in place?	Marine spatial plan anticipated/in progress	Focus	Approach
Sub case study				
Wadden Sea	Wadden Sea Plan, Seal Management Plan	--	Evaluation of a trilateral monitoring process in conservation perspective	SA
Skagerrak	No	Yes	Installation of Natura 2000 Special Area of Conservation (harbour porpoises, Habitats Directive)	RA
Pentland Firth, Scotland	No, but approaching completion with national and sectorial plans. In use for renewables licensing.	Yes	Installation of offshore renewable energy - wave/tide	RA
Barents Sea	Norwegian Integrated Management plan for the Lofoten – Barents Sea area (BMSP)	---	Evaluation of the BMSP	SA
Basque Country	No	No	Design of an integrated management plan	RA
Strait of Sicily	No	Yes	implementation of MSFD	SA
Inner Ionian Archipelago	No	No	Evaluation of existing sectorial plans	SA
Bulgarian part of the Black Sea	No	No	Implementation of WFD and Natura 2000	RA

Case Study	Sub case study	Marine spatial plan in place?	Marine spatial plan anticipated/in progress	Focus	Approach
	Baltic Sea	Baltic Sea Action Plan (BSAP)	---	Identify strengths and weaknesses of the BSAP	SA/ RA
	Östergötland	Yes	--	Review of environmental quality objectives and data availability	SA/ RA
	Puck Bay	No	Yes	Evaluation of Pilot Draft Plan for the West Part of the Gulf of Gdansk	SA
	Celtic Sea	No	Yes	Marine conservation planning	---

Table 1. Overview table of MESMA case studies, (1) development and implementation stage, (2) international and national context, (3) comprehensiveness or portraying a scope of focus human activities and pressures, (4) focus representative habitats. SA, state assessment of the spatial management; RA: risk analysis of the spatial management.

At a basin-wide scale, no full scale marine spatial plan is in place. In the Baltic Sea however, the Baltic Sea Action Plan (Anonymous 2007) is relatively close to achieving this ambitious goal. This cross-sectorial plan identifies the specific actions needed to achieve agreed environmental targets (e.g. GES). MSP is explicitly indicated as one of the tools that can be employed during its implementation phase. This plan distinguishes between measures to be implemented at the regional and national level, and measures to be implemented at the EU level (e.g. CFP) and globally (e.g. shipping controls defined by the International Maritime Organisation, IMO). One of the subnational plans investigated in MESMA is the plan in place at Östergötland, Sweden. Here, municipalities are responsible for the planning and must have a comprehensive plan covering the entire municipality, including the marine areas, taking account of national as well as wider regional interests.

In the Wadden Sea CS, the Netherlands, Germany and Denmark cooperate in the Seal Management Plan (Anonymous 2006a) and the Wadden Sea Plan (Anonymous 2010a). The Seal Management Plan is rather sectorial as it has a particular focus on seal conservation, albeit integrating human activities. The Wadden Sea Plan is the overarching framework for the integrated management of the Wadden Sea area.

The Integrated Management plan for the Lofoten – Barents Sea area in Norway (Barents Sea Plan, Anonymous 2006b) is a comprehensive and integrated marine spatial plan covering all ecosystem components and all human activities in the area, even extending to how human activities outside the plan area (e.g. land and coastal) affect the plan area. Zoning for petroleum industry, shipping and various levels of marine protection are included in the plan. The zoning plan designates e.g. where petroleum activities are allowed, not allowed or allowed under stricter conditions than normal.

The Pentland Firth case study in Scotland represents marine planning on a much more confined spatial scale. The previously undeveloped area is a designated ‘Marine Energy Park’ and is under immediate and intense pressure of development for marine renewable energy exploitation. Although the plan is not complete yet, it is already being used to resolve community and conservation issues in marine renewables licensing. The plan is also a pilot experience of the MSP process, to be later extended to the whole of Scottish waters, the fourth largest in the European Union.

MESMA’s other (sub)case studies focus on earlier stage MSP initiatives at the international (Dogger Bank, Strait of Sicily), national (Belgium) or subnational (Skagerrak, Celtic Sea, Basque Country and Puck Bay) scale. For the Ionian Archipelago and the Bulgarian part of the Black Sea, no formal MSP is being undertaken; however non-governmental, science-driven MSP exercises are on-going. Hence, the term MSP is applied to very different types of initiatives, as reflected in the diversity of the MESMA case studies sampled in European waters.

5. EMERGING ISSUES FROM MESMA CASE STUDIES

MSP SCOPE AND OBJECTIVES

There is a lack of an integrated cross-sector MSP process in many EU countries as illustrated by e.g. Basque Country, Bulgarian part of the Black Sea and Ionian Archipelago. It has become apparent that in those cases, the long-term collective goal of sustainable use of the sea proves more difficult to achieve than short-term goals put forward by private sectors. In the Southern North Sea (SNS) case study for example, where no regional spatial plan nor plans to create one exist, sustainable use is high on the EU agenda, but since implementation of the EU Directives is at the national level, there is a lack of cooperation and coherence of how to implement the high level EU goals nationally and in a way that it also fits with what the neighbouring states are doing. The European Habitats, Birds and Marine Strategy Framework Directives can trigger moves towards the development and implementation of more integrated management strategies, in contrast to the sectorial zoning plans that were in place in most of the case study sites (e.g. Strait of Sicily). Government policy in the United Kingdom for example, is directed towards multi-use of marine areas. This is evident in Scotland where there is a 'presumption of use' in Special Area of Conservation (SAC, Scottish Government 2009). Also the Forewind Dogger Bank wind farm concession has a large overlap with the Dogger Bank UK Special Area of Conservation (SAC). Integrated marine planning is prompted in the UK under the Marine and Coastal Access Act (2009), which requires the establishment of a representative MPA network, but not comprehensive, pre-emptive ocean zoning for all activities. By contrast, the Wadden Sea plan started from a purely nature conservation perspective and moved towards a sustainability perspective only since 2002 through stronger involvement of stakeholders by means of the Wadden Sea Forum.

A lack of priority given to ecological conservation considerations at the base of sustainability can be addressed by providing plans for the designation of MPAs. In the Skagerrak CS for example, there is currently increased data collection activity, as well as conflict and impact analyses to ensure that fisheries management measures counter the actual harbor porpoise (*Phocoena phocoena*) bycatch issue within 2015. Also in the Belgian part of the North Sea, the scientifically-underpinned (Degraer et al., 2009) designation of the SAC "Vlaamse Banken" strongly contributed to incorporating ecological conservation issues in the currently drafted MSP. This also applies to the National Marine Park of Zakynthos in the Ionian Archipelago case study. However, in many cases where areas are not immediately designated as protected areas, the reasons are found in a perceived lack of scientific evidence to justify a designation and a consequent societal perception of less importance. This contrasts with political tolerance of unknown environmental impacts of industry and development. These are more often subject to a 'deploy and monitor' strategy, where it is taken for granted that ecological impacts will become clear through monitoring of the industrial activities (e.g. shipping and hydrocarbon exploration in the Italian part of Strait of Sicily, salt discharge from the industrial salt caverns in the Puck Bay MPA). Industrial activities in

EU waters however have to meet strict requirements including impact assessments. One could argue that scientists are often not able to predict unknown effects and monitoring is proposed as a safeguard.

Table 2. Similarities and dissimilarities between the MESMA case studies. Strategic approach: forward-looking planning for regulating, managing and protecting the marine environment, including the allocation of space, which addresses the multiple, cumulative and potentially conflicting uses of the sea. Public approach: MSP as a public process of analysing 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.

	MSP scope and objectives	Stakeholder participation	Cooperation	Knowledge base for adaptive management
	<i>Approach?</i>	<i>Where in process?</i>	<i>Transboundary?</i>	<i>Indicator selection and monitoring</i>
Southern North Sea	Strategic	No participation	International tuning (via OSPAR)	No indicators, no monitoring
BPNS	Public process	Active/Early	National	Indicators, no monitoring
Dogger Bank	Strategic (political level) and public (MASPNOSE project)	Political level: informed/late MASPNOSE: active/early	International tuning	Indicators, no monitoring
Wadden Sea	Initially strategic, changing to public process	Active/late	International Plan	Indicators and monitoring
Skagerrak	Strategic	Active/late	General international cooperation regarding mammal conservation	Indicators and monitoring
Pentland Firth, Scotland	Non-statutory pilot for statutory public process	Active/Early	No international boundaries but consultation over far field effects	Indicators and monitoring
Barents Sea	Public Process	Active/Representative	national	Indicators and monitoring
Strait of Sicily	Public process	Informed/late	International tuning	Indicators and monitoring
Inner Ionian Archipelago	Public	Informed/early	National (Regional)	Indicators, limited monitoring
Bulgarian part of the Black		Informed, early	International Plan	Indicators, and monitoring

Sea				
Baltic Sea	MSP as a public process	Active/early	International plan, supported by national implementation plans	Indicators and monitoring
Ostergötland	Strategic	Active/early	Regional plan (covering only a small part of the nation)	Indicators and monitoring
Puck Bay	Strategic	Informed/late	National	No indicators and monitoring, but the need for both is underlined
Celtic Sea	Set out to be strategic, but flawed process	Early, yet variable throughout the process	National (with limited international consultation)	Monitoring programme not yet defined

STAKEHOLDER PARTICIPATION

The case studies illustrate that although participation is considered essential in MSP theory, MSP is often implemented as a top-down process in the real world, where governments decide and stakeholders need to follow. Proper participation is time-consuming and resource-intensive. A genuine dialogue, including an open-minded evaluation, discussion and incorporation of stakeholder inputs is indispensable, as to arrive to a sense of partnership and beyond (Arnstein 1969).

Between 1999 and 2003, attempts to establish multiple use MPAs in Belgian waters through Royal Decrees failed because of being imposed through a top-down process. Only in a later phase, when the process became more transparent and participatory, MPA establishment started to be effective and successful (Bogaert et al., 2009). The same pattern is actually displayed in Sicilian MPAs. Analogously, the process of closing an area for renewables in the Basque Country CS with low participation of fishermen, raised conflicts. This led to a negotiation process and financial compensation that delayed the concession. Who to consult during public participation may finally also be a major concern. For the Dogger Bank cross-border Natura 2000 spatial planning process for example, stakeholders were only allowed on invitation by the North Sea Regional Advisory Council (NSRAC).

Case study examples further showed that consulting stakeholders at an early stage of the MSP trajectory and throughout the MSP process results in a more holistic and publicly transparent process. In the Pentland Firth case study, the initial assertion of marine renewable sites by The Crown Estate with little consultation created conflicts with other stakeholders which are taking time to resolve. The introduction of the MSP process has provided venues for consultation and participation which have speeded the integrated approach towards development licensing.

Communication is not only an important dimension in the stakeholder-governmental body relationship. Meaningful dialogue is an essential ingredient of all interactions arising in the context of transboundary issues (regions, national, subnational, sectorial management bodies). In the Strait of Sicily for example, poor coordination across administrative boundaries can be partly ascribed to difficulties in communication. Firstly, communication between EU states and African counterparts is very limited. Secondly, communication between EU countries is impaired by national administrations which display sharp contrast in their organization and structure, e.g. between Maltese and Italian administrations. Finally, redundancies and antagonisms can be observed within national administrations, which often stem from the specific distribution of competences and responsibilities among the Italian, Sicilian and local government officials. Other examples of poor stakeholder communication are found in the Basque Country and the Pentland Firth CSs, where national objectives for energy security drove a policy of rapid marine renewable development with little or no stakeholder consultation, raising conflicts with local objectives of traditional industries, including fisheries. Contrastingly, a different pattern is found in Östergötland as in other Swedish counties, where the Swedish National Board of Housing, Building and Planning defined a process for revising a comprehensive municipality plan. Half of this process concerns consultation with e.g. authorities of all relevant sectors.

Communication issues between stakeholders as well as between stakeholders and management bodies occur frequently. This can be especially observed when sustainable use and conservation or restoration goals are not clearly defined or translated to real world objectives, as is the case for most marine Natura 2000 sites in Greece. In addition, stakeholder participation in the MSP process can be hampered by a lack of knowledge and capacity of the stakeholders to partake in public consultations. Many important stakeholders, such as fishers, are not organised into groups and lack the resources and time to respond. Evidence gathered at the Pentland Firth stakeholder workshops (Johnson et al. 2011; Kerr and Johnson 2013) point to extensive 'consultation fatigue' in the form of low/decreasing attendance at consultation and information events. Anger is an unfortunate but effective driver of attendance (Johnson 2011). Also in the Wadden Sea, the fisheries sector withdrew because of disillusionment with the Wadden Sea Forum, despite this being the most important stakeholder platform for trilateral management discussions. Stakeholder fatigue was also observable in the Dogger Bank MSP process, as this became protracted and the stakeholders' role increasingly unclear. In Greece, stakeholder meetings are organized mainly in the frame of specific research projects, in which fishermen are reluctant to take part and hence perceive themselves as not being consulted in the decision making process (Vassilopoulou et al., 2012). In the Strait of Sicily, the communication gap between stakeholders and management bodies was highlighted by the fishermen strike that closed off the industrial port of Trapani in response to the government disregard of their views about the Egadi MPA zoning scheme.

One way to improve communication is to make data and information available to all parties involved in the planning process. A number of tools to aid in clear dissemination of the planning process to stakeholders were documented and developed by MESMA. The availability of clear information presented in an appropriate manner can greatly enhance stakeholders' ability to grasp and appreciate the complex spatio-temporal dynamics of systems and processes that must be taken into account. Such information can also assist by improving the general accessibility of fundamental ecological concepts, so that these can become part of an acceptable integrated world view. A considerable number of new and updated thematic maps were specially produced for and shared during stakeholder workshops in the Dogger Bank MSP process. In this case, the strategic value and importance of visualising key scientific and use knowledge during the consultation process was strongly recognised, and furthermore the objectives and positive outcomes of a more sustainably managed ecosystem became more tangible for the parties involved.

COOPERATION, COHERENCE AND THE LEGAL EFFECT OF MSP

Several legal constraints become apparent during the MSP process and when trying to implement spatial management plans. These limitations become even more striking in transboundary areas where differences in management frameworks and competing national interests provide additional challenges, as demonstrated by the Dogger Bank case study. In the Basque Country and Strait of Sicily CSs, some activities held in the inner waters are managed by local administration (e.g. fisheries and MPAs designation), but the permission for other activities (e.g. renewables) is given by the central government,

raising interest conflicts between both administrative bodies. Belgium functions as a multi-level government where competences are scattered across the local, regional, federal and European levels. The maritime competences are divided between the federal state and the Flemish region, and the competences within each level are fragmented over several departments (Somers and Maes, 2011). This complexity was partly solved by a separate Minister for the North Sea who has a mandate to coordinate all federal matters related to the North Sea policy at ministerial level (Bogaert et al., 2008). Similarly, the UK Joint Ministerial Committee coordinates policy and practice in e.g. Scottish waters. Legal issues are also prominent in the Strait of Sicily, where legal and administrative frameworks deeply differ between Italy, Malta, African counterparts as Libya and Tunisia, and the high seas managed by the IMO.

Cooperation initiatives can be either strengthened or weakened by the present and historical views on planning, models of society, role of the public sector, persistence of institutions, social and cultural values, and the rights of citizens (Faludi, 2007; Nadin and Stead, 2008). The most evident examples are in the management of fisheries and nature conservation in areas surrounded by both EU and non-EU states. For example, Turkish trawlers exploit shared stocks in the Aegean Sea during periods when the operation of Greek trawlers is prohibited, which has been identified as an issue of major concern by Greek trawl fishers (Vassilopoulou *et al.*, 2012). Another example is provided by the management of the Mammellone bank off the coast of Tunisia, which is simultaneously regarded as an area devoted to nature conservation by Italy, and as a trawl fishing ground by Tunisia. Regional Conventions may play an important role here. The intergovernmental Helsinki Commission (HELCOM) for example, that developed the Baltic Sea Action Plan includes EU MSs and all nine coastal Baltic countries including Russia. At the same time however, the Baltic Sea Action Plan does not even call for the institutional or legal tools to enhance its implementation, which is entrusted to Contracting Parties and based on their current legislation and choice of incentives. Differences between EU countries can also be difficult to surmount. Territorial cohesion is the area where MSs and the European Commission share power and responsibilities, and examples of how this idea is slowly expanding into the marine realm exist, e.g. the North Sea coordination on the wind power plants (Backer, 2011). The proposed MSP Directive however does not set rules for territorial cohesion other than stipulating the need for cooperation and coordination.

In those cases where SMAs are located across international borders, national interests get priority above cross-border joint interests that would promote sustainability in the entire SMA. The Dogger Bank case study has illustrated that cross-border collaboration on spatial management is very complex and difficult to organize and manage. For example, there is difficulty in data exchange between countries, especially in the field of monitoring of fisheries activities through VMS data (Stelzenmüller et al., 2013). International organisations such as the International Council for the Exploration of the Sea (ICES), may facilitate data sharing, as illustrated by an ICES data call on fisheries data resolving such problems in the Dogger Bank case study. Regional Conventions such as HELCOM, OSPAR and the Barcelona and Black Sea Conventions may also act as a regional environmental focal point providing information about the state of or trends in the marine environment and the efficiency of measures to protect the marine environment. The United

Kingdom for example has announced the intention to use the OSPAR Quality Standard Reviews (QSRs) as the basis for initial assessment and subsequent monitoring for the purpose of UK MSFD compliance. Success of management measures implemented for the protection of species at a local scale also depends on the parallel management measures implemented in other countries and the designation of trans-boundary spatial management plans, such as the proposed cross-border fisheries management plan for the Dogger Bank SACs. The Skagerrak harbour porpoises for example belong to the greater North Sea population and conservation targets for the population can therefore not be achieved through national efforts alone, but require a regional effort as defined by e.g. the ASCOBANS agreement. In the Mediterranean Sea the ACCOBAMS agreement on cetaceans plays an analogous role.

A KNOWLEDGE BASE FOR MANAGEMENT

MSP can be perceived as the main tool for sustainable governance of the seas (Costanza et al., 1998; Douvere, 2008). However, lack of a proper understanding of sustainability issues and the ecosystem base may limit the immediate application of MSP. The main areas of concern are a lack of reference status and the inability to predict the effects of multiple cumulative impacts on interacting ecosystem components. Even in the relatively pristine waters around the Pentland Firth, the assessments carried out under the Water Framework Directive identified pollution and damage in some areas. The effects of climate change complicate distinguishing between causes and effects (Want et al. 2012). Moreover, current methods are very limited to assess cumulative impacts (Stelzenmüller et al., 2010). Usually empirical studies focus on single or few elements with a small array of simple interactions rather than on whole systems (Sala, 2004; Valiela, 2008). As a step towards a more holistic approach, HELCOM has combined their assessment tools into one preliminary holistic assessment of ecosystem health of the Baltic Sea (Anonymous 2010b). The output is presented as an interpolated map of the Baltic Sea, together with two diagrams presenting the summary of the integrated ecosystem health and the interim confidence rating of the assessment for each of the 14 sub-basins.

The ultimate goal of MSP is a more rational use of the sea space (Ehler & Douvere, 2009), and specific results can range from structured processes for spatial decision making to maps that describe alternative uses in given areas. While not always applied in practice, theoretical MSP frameworks are made of successive steps (Arkema, 2006; Ehler & Douvere, 2009; Backer, 2011; Katsanevakis et al., 2011) which include monitoring and evaluation. Both are crucial for adaptive management (Douvere & Ehler, 2011). Our case study examples illustrated that monitoring and evaluation are however not always considered that crucial. A systematic collection of data on selected indicators to evaluate the extent of progress towards the achievement of management goals and objectives (*sensu* Kusek and Rist, 2004) may be found in our case studies with fully developed and implemented integrated plans (i.e. Barents Sea MSP and Baltic Sea Action Plan cross-sectorial plan), while this is less the case for all other case studies, varying from the lack of indicators and monitoring (e.g. Puck Bay), partial implementation of indicators and monitoring for certain sectorial plans (Strait of Sicily), to the full application of indicators and monitoring (e.g. Pentland Firth). In the Dogger Bank process emphasis was on spatial designation and less on desired

monitoring and evaluation although this was stressed by the NSRAC with a plea for adaptive management. If adaptive, management is not to be purely reactionary, it must be active. Active adaptive management requires proactive anticipation of the need to change practices, learn from experience and adapt strategies accordingly (Kaufman et al., 2009). The area covered by the Pentland Firth case study in Scotland is under immediate and intense pressure to develop large scale wave and tidal energy arrays. There are extensive unknowns about technologies and their interactions with the natural environment. In order not to delay deployments, the government has adopted a policy of 'deploy and monitor' which will have to give rapid and early warning of needs to adapt deployment and marine management plans (Marine Scotland 2012). This policy is in uneasy partnership with the 'precautionary principle' which is also a key objective in the UK National Marine Plan. In the Strait of Sicily, renewable development and hydrocarbon exploitation are currently being licensed with little or no information about their ultimate ecosystem effects. Thus, monitoring and an adequate indicator selection and operationalization are however largely lacking. By contrast, in the Baltic Sea Action Plan, the explicit adaptive management practice is formally structured around responses of management to monitoring, e.g. stipulating that the objectives and targets should be periodically reviewed and revised using a harmonised approach based on the most updated information and feedback from monitoring actions.

In order to use the adaptive approach it is necessary to first define the appropriate ecological, social and economic indicators, and then to monitor these over time against pre-set targets ensuring adopted solutions lead to the anticipated goals of MSP (Hockings, 2003; Douvère & Ehler, 2011). Indicators can be quantitative or qualitative, and in order to be useful for management, they have to be readily measurable, cost-effective, concrete, interpretable, grounded in scientific theory, sensitive, responsive and specific (Belfiore et al., 2006; Diedrich et al., 2010; Douvère & Ehler, 2011). Indicators also need to reflect the concerns of stakeholders and be widely understandable to them (Douvère and Ehler, 2011; Olsen et al., 2011). The use of indicators, reference conditions and targets in EU MSs is broadly defined in European Directives (Borja et al., 2010, 2011). In the Baltic Sea, HELCOM provides Baltic Sea Environment Fact Sheets, periodic assessments on specific topics, as well as core indicator reports. The main principles for the development of core indicators are that they describe the status or pressures on the scale of the entire sea area, have a scientific basis (including target and boundary) and reflect anthropogenic pressures, and thus enable the improvement of the reported status through management measures.

6. CONCLUSIONS: CASE STUDY HIGHLIGHTS FOR FUTURE ELABORATION ON MSP IN EUROPEAN WATERS.

- During the case study analyses it became clear that the concept of MSP is still open to very diverse interpretations. The general feeling however was that this should not be considered a problem provided MSP is undertaken in accordance with the ten EU standard MSP principles.
- There is a lack of an integrated cross-sector MSP process in many EU countries. It has become apparent that in those cases, the long-term collective goal of sustainable use of the sea proves more difficult to achieve than short-term goals put forward by private sectors.
- The case studies illustrate that although participation is considered essential in MSP theory, MSP is often implemented as a top-down process in the real world, where governments decide and stakeholders need to follow. The introduction of MSP however provides venues for consultation and participation, which may speed an integrated approach towards development licensing. Who to consult during public participation is a major concern here.
- Although meaningful dialogue is considered essential within all transboundary interactions (regions, national, subnational, sectorial management bodies), our case studies demonstrated that many issues are yet to be resolved among which communication between EU and non-EU states, between national administrations in different EU countries, and within national administrations. Such transboundary dialogue may further be hampered by legal constraints with different sectors managed by different administrations.
- Communication issues between stakeholders as well as between stakeholders and management bodies were shown to be hampered by a lack of knowledge and capacity of the stakeholders to partake in public consultations and 'consultation fatigue' in the form of low/decreasing attendance at consultation and information events. Tools to aid dissemination of planning process data and information to stakeholders were documented and developed by MESMA.
- In those case studies where SMAs are located across international borders, national interests often get priority above cross-border joint interests that would promote sustainability. Cross-border collaboration on spatial management indeed proved difficult to organize and manage, but may be facilitated by international organisations such as international science organisations and regional conventions.
- The lack of a proper understanding of sustainability issues and the ecosystem base may limit the immediate application of MSP. The main areas of concern are a lack of reference status and the inability to predict the effects of multiple cumulative impacts on interacting ecosystem components. Usually empirical studies focus on single or few elements with a small array of simple interactions rather than on whole systems.
- While our case studies with fully developed and implemented integrated plans have monitoring and evaluation included, other case study examples illustrated that monitoring and evaluation are not always considered that crucial.
- Active adaptive management requires proactive anticipation of the need to change practices, learn from experience and adapt strategies accordingly. It is then necessary to first define the appropriate indicators, and then to monitor these against pre-set targets ensuring adopted solutions lead to the anticipated goals of MSP.

7. REFERENCES

- Anonymous (2005). Visions and strategies around the Baltic Sea 2010. Policy Document Connecting Potentials, VASAB Gdańsk (Poland).
- Anonymous (2006a). Conservation and Management Plan for the Wadden Sea Seal Population 2007- 2010. 16 pp. <http://www.waddensea-secretariat.org/management/SMP/SMP%202007-2010.pdf>
- Anonymous (2006b). Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report no. 8 of the Storting. The Royal Norwegian Ministry of the Environment. 144 pp.
- Anonymous (2007). Baltic Sea Action Plan. HELCOM Ministerial Meeting Krakow, Poland, 15 November 2007. 101 pp.
- Anonymous (2008). Communication from the Commission. Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU. Commission of the European Communities. Brussels, 25.11.2008. COM(2008) 791 final.
- Anonymous (2010a). Wadden Sea Plan 2010. Eleventh Trilateral Governmental Conference on the Protection of the Wadden Sea. Westerland/Sylt, 18 March 2010.
- Anonymous (2010b). Ecosystem Health of the Baltic Sea 2003–2007: HELCOM Initial Holistic Assessment. Balt. Sea Environ. Proc. No. 122.
- Arkema KK, Abramson SC, Dewsburry BM (2006). Marine ecosystem-based management: from characterization to implementation. *Front Ecol Environ* 4(10): 525-532.
- Arnstein SR (1969). A ladder of citizen participation. *Journal of the American Planning Association* 35(4): 216-224.
- Backer H (2011). Transboundary maritime spatial planning: a Baltic Sea perspective. *J Coast Conservation* 15: 279-289.
- Beck, MW, Z Ferdaña, J Kachmar, KK Morrison, PH Taylor and others (2009). Best Practices for Marine Spatial Planning. The Nature Conservancy, Arlington, VA.
- Belfiore S, Barbieri J, Bowen R, Cicin-Sain B, Ehler C, Mageau C, McDougall D, Siron R (2006) A handbook for measuring the progress and outcomes of integrated coastal and ocean management. IOC Manuals and Guides 46, ICAM Dossier 2, UNESCO, Paris, France.
- Bicchi F (2006). "Our size fits all": Normative power Europe and the Mediterranean. *Journal of European Public Policy* 13(2): 286-303.
- Bogaert, D., Cliquet, A., De Waen, D., Maes, F. 2008. The delimitation of marine protected areas in Belgium. An Analysis of the Decision Making Process. In Bogaert ,D., Maes, F. (eds.) *Who Rules the Coast. Policy Processes in Belgian MPAs and Beach Spatial Planning*, Antwerpen, MAKLU, 2008; 59-105.
- Bogaert, D., Cliquet, A., Maes, F. 2009. Designation of marine protected areas in Belgium: A legal and ecological success? *Marine Policy* 33, 878-886.
- Borja, Á., Elliott, M., Carstensen, J., Heiskanen, A.S., van de Bund, W., 2010. Marine management - Towards an integrated implementation of the European marine strategy framework and the water framework directives. *Marine Pollution Bulletin* 60, 2175-2186.
- Borja, Á., I. Galparsoro, X. Irigoien, A. Iriondo, I. Menchaca, I. Muxika, M. Pascual, I. Quincoces, M. Revilla, J. Germán Rodríguez, M. Santurtún, O. Solaun, A. Uriarte, V. Valencia, I. Zorita, 2011. Implementation of the European Marine Strategy Framework Directive: A methodological approach for the assessment of environmental status, from the Basque Country (Bay of Biscay). *Marine Pollution Bulletin*, 62: 889-904.
- Carneiro, G. (2013). "Evaluation of marine spatial planning." *Marine Policy* 37(0): 214-229.
- Costanza R, Andrade F, Antunes P, van den Belt M, Boersma D, Boesch DF, Catarino F, Hanna S, Limburg K, Low B, Monitor M, Gil Pereira J, Ryaner S, Santos S, Wilson J, Young M (1998). Principles for sustainable governance of the oceans. *Science* 281: 198-199.
- Day V (2002) Zoning lessons from the Great Barrier Reef marine park. *Ocean Coast Manage* 45: 139-156
- Degraer, S., U. Braeckman, J. Haelters, K. Hostens, T. Jacques, F. Kerckhof, B. Merckx, M. Rabaut, E. Stienen, G. Van Hoey, V. Van Lancker & M. Vincx (2009). Studie betreffende het opstellen van een lijst van potentiële Habitatrichtlijngebieden in het Belgische deel van de Noordzee. Final report by order of FSP Environment, Marine Environment. 93 pp.

Diedrich, A., Tintoré, J., Navinés, F., 2010. Balancing science and society through establishing indicators for integrated coastal zone management in the Balearic Islands. *Marine Policy* 34, 772-781.

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

Douvere, F. & Ehler, C., 2011. The importance of monitoring and evaluation in adaptive maritime spatial planning. *J. Coast. Conserv.* 15:305-311.

Ehler C and 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 Manuals and Guides ICAM Dossier 6. UNESCO, Paris, 99 pp.

Faludi A (2007). Making sense of the territorial agenda of the European Union. *European Journal of Spatial Planning* 25: 1-21.

Foley MM, Halpern BS, Micheli F, Armsby MH, Caldwell MR, Crain CM, Prahler E, Rohr N, Sivas D, Beck MW (2010) Guiding ecological principles for marine spatial planning. *Marine Policy* 34:955-966

Franquesa, R., 2004. Fishermen cofradías in Spain: Economic roles and structural changes. Proceedings of the IIEFET Conference, Japan.

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

Guidetti P, Milazzo M, Bussotti S, Molinari A, Murenu M, Pais A, Spanò N, Balzano R, Agardy T, Boero F, Carrada G, Cattaneo-Vietti R, Cau A, Chemello R, Greco S, Manganaro A, Notarbartolo di Sciarra G, Russo GF, Tunesi L (2008). Italian marine reserve effectiveness: Does enforcement matter? *Biological Conservation* 141: 699-709.

Halpern BS, Diamond J, Gaines S, Gelcich S, Gleason M, Jennings S, Lester S, Mace A, McCook L, McLeod K, Napoli N, Rawson K, Rice J, Rosenberg A, Ruckelshaus M, Saier B, Sandifer P, Scholz A, Zivian A (2012) Near-term priorities for the science, policy and practice of Coastal and Marine Spatial Planning (CMSP). *Mar Policy* 36: 198-205

Hockings M (2003) Systems for assessing the effectiveness of management in protected areas. *BioScience* 53(9):823-832.

Jay, S., G. Ellis, et al. (2012). "Marine Spatial Planning: A New Frontier?" *Journal of Environmental Policy and Planning* 14(1): 1-5.

Johnson, K., Kerr, S., Side, J. and Jackson, A., 2011. Wave and Tidal Energy in the Pentland Firth Area - stakeholders, who needs them? (report of the SRDG/MESMA workshop on 9th February 2011), ICIT Heriot-Watt University, Orkney. Available at:

<http://www.mreds.co.uk/pdfs/Stakeholder%20Workshop%20Report.pdf>

Johnson, K., 2011. Diary of a stakeholder meeting - the industry meets the fishers, A report of the meeting between marine energy developers and the fishers of Orkney on Wednesday 9th March 2011 in the Kirkwall Hotel, ICIT, Heriot-Watt University, Orkney. Available at: <http://www.icit.hw.ac.uk/download.htm>

Jones A (2006). Narrative-based production of state spaces for international region building: Europeization and the Mediterranean. *Annals of the Association of American Geographers* 96(2): 415-431.

Katsanevakis S, Stelzenmüller V, South A, Sørensen TK, Jones PJS, Kerr S, Badalamenti F, Anagnostou C, Breen P, Chust G, D'Anna G, Duijn M, Filatova T, Fiorentino F, Hulsman H, Johnson K, Karageorgis AP, Kroencke I, Mirto S, Pipitone C, Portelli S, Qiu W, Reiss H, Sakellariou D, Salomidi M, van Hoof L, Vassilopoulou V, Vega Fernández T, Vöge S, Weber A, Zenetos A, ter Hofstede R (2011). Ecosystem-based marine spatial management: a review of concepts, policies, approaches, and critical issues. *Ocean and Coastal Management* 54(1): 807-820.

Kaufman L, Karrer LB, Peterson CH (2009) Monitoring and evaluation. In McLeod KL and Leslie HM (Eds.), *Ecosystem-Based Management for the Oceans*. Washington, D.C., Island Press, 3-12.

Kerr, S., Watts L., and Johnson K., 2013. ISSMER Workshop Report (detail to follow -> Kate)

Kusek JZ, Rist R (2004) Ten steps to a results-based monitoring and evaluation system. The World Bank, Washington.

McBride M, Wilson KA, Bode M, Possingham HP (2007). Incorporating the effects of socio-economic uncertainty into priority setting for conservation investment. *Conservation Biology* 21(6): 1463-1474.

- Nadin V and Stead D (2008). European spatial planning systems, social models and learning. *disP* 172(1): 35-47.
- Olsen SB, Olsen E, Schaefer N (2011) Governance baselines as a basis for adaptive marine spatial planning. *J. Coast Conserv* 15: 313-322.
- Pardo I, Prato G (2011). Disconnected governance and the crisis of legitimacy. In: Pardo I, Prato G (eds.). *Citizenship and the legitimacy of governance*. Ashgate, Farnham: 230 pp.
- Qiu W, Jones PJS (2013) The emerging policy landscape for marine spatial planning in Europe. *Marine Policy* 39:182-190
- Reid, P.C. & L. Valdés (2011). ICES status report on climate change in the North Atlantic. ICES Cooperative Research Report No. 310. 262 pp.
- Sala E (2004). The Past and present topology and structure of Mediterranean subtidal rocky-shore food webs. *Ecosystems* 7: 333–340.
- Scottish Government, 2009. Marine (Scotland) Bill, Policy Memorandum, Para. 54, p12, Scottish Parliamentary Corporate Body, Edinburgh.
- Somers, E., Maes, F. 2011. The law Applicable on the Continental Shelf and in the Exclusive Economic zone: The Belgian Perspective, *Ocean Yearbook* 25, 249-276.
- Stelzenmüller, V., et al. (2010). "Quantifying cumulative impacts of human pressures on the marine environment: A geospatial modelling framework " *Marine Ecology Progress Series* 398: 19-32.
- Stelzenmüller, V., P. Breen, et al. (2013). "Monitoring and evaluation of spatially managed areas: A generic framework for implementation of ecosystem-based marine management and its application." *Marine Policy* 37: 149–164.
- Valiela I (2006). *Global coastal change*. Blackwell, Oxford: 368 pp.
- van Hoof, L. and J. van Tatenhove (2009). "EU marine policy on the move: The tension between fisheries and maritime policy." *Marine Policy* 33: 726-732.
- Vassilopoulou V., A. Dogrammatzi, K. N. Papadopoulou, A. Palialexis, J. Haralabous and S. Q. Eliasen, 2012. Trawl fishers' perceptions as complementary inputs in developing effective management plans in the context of the Mediterranean multi-species fisheries. *ICES CM* 2012/ I:27.
- Want, A., M.C. Bell and J.C. Side. (in press) Methodologies for the study of the ecological consequences of wave energy extraction on the rocky shoreline of Orkney. *Marine Ecology: an Evolutionary Perspective*.