Chapter 5

Maritime Spatial Planning: About the Sustainable Management of the Use of Our Seas and Oceans

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5.1. Introduction

> The law of the land cannot swim. Every major marine activity impacts on every other one. [...] Sometimes this impact is positive; sometimes it is negative. It is simply not possible, in any meaningful way, to deal with these activities separately.[1]

Sustainable development is at the heart of the European Union's agenda.[2] Its challenge is to ensure mutual reinforcement of economic growth, social welfare, and environmental protection. On 7 June 2006, the European Commission adopted the Green Paper "Towards a Future Maritime Policy for the Union: A European Vision for the Oceans and Seas."[3] With the Green Paper the European Union (EU) acknowledged for the first time that its policies on maritime transport, industry, coastal regions, offshore energy, fisheries, the marine environment, and other relevant areas had been developed separately. Attempts were made to ensure that their impact on one another was taken into account. But neither a governance structure was established that took care of the broader links between the different sectoral policies. Nor was the responsibility assumed for examining in a systematic manner how these policies could be combined to develop synergies and reinforce each other.

It is indisputable that fragmented decision making can result in the adoption of conflicting measures, which in turn has negative consequences on the marine environment or imposes disproportionate constraints on competing

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[*] The views expressed in this publication are those of the author and do not necessarily reflect the views of the European Commission.

[1] E. Mann Borgese, *The Oceanic Circle. Governing the Seas as a Global Resource* (Tokyo: United Nations University, 1998), p. 6.

[2] Commission of the European Communities, *Communication from the Commission to the Council and the European Parliament on the review of the Sustainable Development Strategy: A Platform for Action,* COM(2005) 658 final, 13 December 2005.

[3] Commission of the European Communities, *Towards a future maritime policy for the Union: A European Vision for the Oceans and Seas*, COM(2006) 275 final, 7 June 2006.

maritime activities. The mainly sectoral treatment of complex ecosystems like the seas and oceans makes is difficult to comprehend the potential impact of one set of activities upon another. The Green Paper launched a broad debate about a future maritime policy for the EU. A year-long consultation phase was organised involving all stakeholders, decision makers, and institutions in the shaping of the new policy. Nearly 500 contributions were received throughout this consultation phase, clearly revealing the enormous potential of the seas and the scale of the challenge that has to be embraced to achieve sustainable use and development of our seas and oceans.

The idea to forge a new vision for the management of our relations with the seas and oceans and to establish an integrated approach to maritime affairs that involves all relevant sectoral policies was broadly supported. Consequently, the various contributions led to the development of the so-called "Blue Book"—a policy white paper—which constitutes the foundation of a new integrated, inter-sectoral approach towards cooperation and effective coordination of all sea-related policies at various decision-making levels.[4] The new EU Integrated Maritime Policy recognises that all matters relating to Europe's oceans and seas are interlinked and that sea-related policies must be developed in an integrated manner if the desired results are to be achieved. The Blue Book was adopted with an accompanying Action Plan on 10 October 2007[5] and endorsed by the European Council in December 2007.

Of course, the development of an EU Integrated Maritime Policy did not happen "out of the blue." Facing the challenges of globalisation and competitiveness, climate change, degradation of the marine environment, maritime safety and security, and energy security, as well as overall sustainability, inevitably lead to more strategic and integrated thinking. In addition, this EU policy has to be seen in an international context.

There is first and foremost the United Nations Convention on the Law of the Sea (LOS Convention), adopted in 1982, which states in its preamble that "[...] the problems of ocean space are closely interrelated and need to be

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[4] Commission of the European Communities, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. An Integrated Maritime Policy for the European Union,* COM(2007) 574 final, 10 October 2007, available: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0575:FIN:EN:PDF> (accessed 29 April 2009) [hereinafter Blue Book].

[5] Commission Staff Working Document, *Accompanying Document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, An Integrated Maritime Policy for the European Union*, Brussels, SEC(2007) 1278, 10 October 2007, available: <http://ec.europa.eu/maritimeaffairs/pdf/ ActionPaper/action_plan_en.pdf> (accessed 29 April 2009).

considered as a whole [...]".[6] Other countries have established integrated regimes for the sustainable management of their oceans and seas. In 1997, Canada adopted the *Oceans Act* and became one of the first countries in the world to make a legislative commitment to a comprehensive approach for the protection and development of oceans and coastal waters.[7] The Act calls for the development of a national oceans strategy to guide the management of Canada's estuarine, coastal and marine ecosystems. Canada's Oceans Strategy, adopted in 2002, provides the overall strategic framework for Canada's oceans-related programmes and policies and introduces the aim of developing and implementing integrated ocean management plans.[8]

Another example of a state that has adopted an integrated maritime regime is Australia, which established a Marine Park Authority for the Great Barrier Reef and already in 1994 had adopted a 25-year strategic plan for the Great Barrier Reef World Heritage Area.[9] The plan outlines strategies for managing and preserving this coral reef ecosystem and provides the basis to ensure wise use and protection of the World Heritage Area. Eight different strategic areas are identified, including resource management, research and monitoring, and integrated planning. For each of these areas, the strategic plan provides 5-year and 25-year objectives to guide the sustainable use and management of each area. It is important to note that although protected, the Great Barrier Reef Marine Park is a multiple-use area.

These are just two examples from many. For instance, the United States is active in the sustainable management of human activities at sea (e.g., in the Gulf of Maine), and on 27 October 2001, China adopted the Law on the Management of the Sea Uses. These examples make no claim to be complete, but they do illustrate that the recent developments at the European level towards an integrated maritime policy echo similar dynamic approaches from around the world. All these initiatives follow the same conviction: we have to change how we make policies and take decisions to safeguard ocean sustainability.

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[6] *United Nations Convention on the Law of the Sea*, Montego Bay, 10 December 1982, 1833 *U.N.T.S.* 396 [hereinafter LOS Convention].

[7] *Oceans Act*, S.C. 1996, c. 31.

[8] Fisheries and Oceans Canada, *Canada's Oceans Strategy: Our Oceans, Our Future* (Ottawa: Fisheries and Oceans Canada, Oceans Directorate, 2002), available: <http://www.dfo-mpo.gc.ca/oceans-habitat/oceans/ri-rs/cos-soc/pdf/cos-soc_e.pdf> (retrieved 15 November 2008).

[9] Great Barrier Reef Marine Park Authority, *The Great Barrier Reef: Keeping it great* (Townsville: GBRMPA, 1994), available: <http://www.gbrmpa.gov.au/__data/assets/pdf_file/0005/2111/mp_017_full.pdf> (retrieved 29 April 2009).

The implementation of an integrated maritime policy requires adequate planning tools that cut across sea-related sectoral policies and supports unified policy making. Maritime spatial planning is considered to be one of the key tools in this regard. The following sections elaborate on the development of maritime spatial planning, its character and procedural steps, as well as the challenges that lie ahead in order to use maritime spatial planning to its maximum capacity in the European Union.

5.2. The Emergence of Maritime Spatial Planning

> We are at a crossroads in our relationship with the oceans.[10]

At the European level the term *maritime* spatial planning is favoured over marine spatial planning, despite the current situation whereby many countries use a different term. During the development of the EU Integrated Maritime Policy, emphasis was placed on the fact that integrated sustainable management is more than nature protection and conservation. The ecosystem-based approach, which underpins not only the Integrated Maritime Policy but also maritime spatial planning, requires the consideration of ecological and socio-economic aspects. The term *maritime* spatial planning highlights the importance of managing all sea-related sectors and human activities at sea in an integrated, well-balanced manner and in compliance with a healthy ecosystem.

5.2.1. The Current Situation: Use Without Coordination

Our interactions with the sea are more intense, more varied, and create more value than ever before. On the one hand technology and know-how allow us to extract ever more value from the sea, new uses such as offshore installations for renewable energy (particularly offshore wind farms) complement traditional uses, and more and more people benefit from the generated values. On the other hand the cumulative effect of this increased activity leads to competition for limited marine space and increases stress on marine ecosystems. The growing vulnerability of coastal areas, increasingly crowded coastal waters, the key role of the oceans in the world's climate system, and the continuous deterioration of

[10] Blue Book, n. 4 above, p. 2.

the marine environment all call for a stronger focus on our oceans and seas. The current fragmented decision-making framework in maritime affairs in Europe is inadequate in meeting these challenges. Policies on, for instance, maritime transport, fisheries, energy, surveillance and policing of the seas, tourism, the marine environment, and marine research have developed on separate tracks, which leads to inefficiencies, incoherencies, and conflicts of use.

The example of the Belgian part of the North Sea illustrates clearly the current situation of multiple uses of marine space without coordination. The scientific GAUFRE project (2003–2005)[11] was launched to deal with the high level of use in the Belgian part of the North Sea in a structural manner. The North Sea is one of the most exploited areas of water in the world, and the Belgian part of the North Sea lies at the hub of these activities. An assessment of the current activities in the rather small Belgian sector of the North Sea resulted in a chaotic picture of overlapping uses and an overuse of the available marine space by 264 percent.[12]

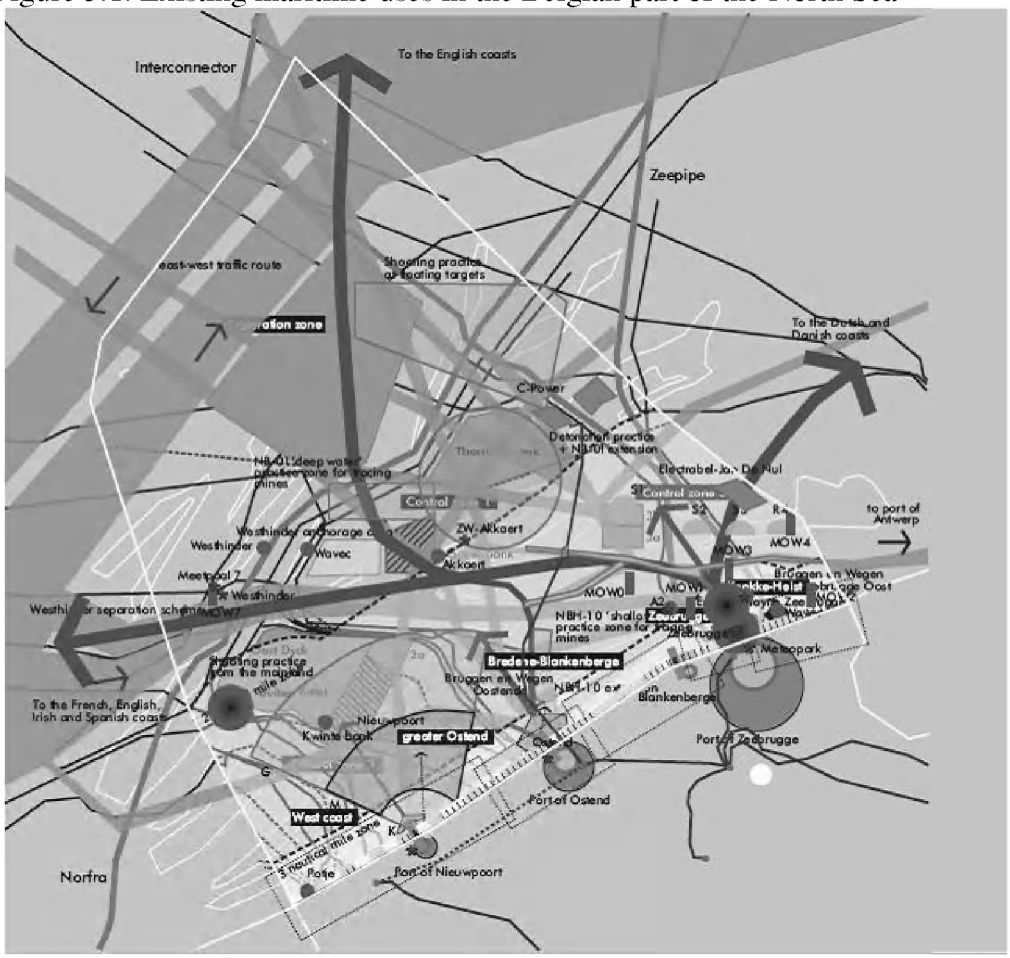
The GAUFRE project highlighted the urgent need for a spatial structure plan due to the demands of renewable energy at sea (offshore wind farms), the Common Fisheries Policy of the EU, and the requirement to delineate marine nature reserves (the Natura 2000 network)[13] in the Belgian sector of the North Sea. It must be emphasised that the Belgian example is not an exceptional case. The same picture of uncoordinated, potentially conflicting, high-density uses could be drawn for any other European sea basin.

[11] The project was made up of an interdisciplinary team of experts, representing legal sciences, socio-economic sciences, as well as experts in marine biology and marine geology.

[12] "The GAUFRE Project 2003–2005," available: <http://www.maritieminstituut.be/main.cgi?s_id=165=&lang=en> (retrieved on 29 April 2009).

[13] The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. These directives require EU Member States to identify areas for nature protection, which will in turn form a Europe-wide network of nature protection areas—the so-called Natura 2000 network, available: <http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm> (retrieved on 29 April 2009).

Figure 5.1. Existing maritime uses in the Belgian part of the North Sea



Source: "The GAUFRE Project 2003–2005," available at Universiteit Gent Maritiem Instituut website: <http://www.maritieminstituut.be> (retrieved 18 November 2008).

5.2.2. Maritime Spatial Planning: A Key Tool for Sustainable Decision Making

Existing planning frameworks have a largely terrestrial focus and often do not address how coastal developments affect the sea and vice versa. Maritime spatial planning (MSP) is a coordinated, integrated process that builds on an ecosystem-based approach.[14] It seeks to integrate all relevant maritime sectors

[14] The ecosystem approach refers to "the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its

and human activities; no sector is given priority over another. MSP therefore reaches beyond managing and protecting the marine environment. Its main objective is to allocate marine space in a rational manner and thus arbitrate between different sectoral or user interests. MSP provides certainty for investments through a reliable planning process that helps to secure the sustainable and integrated development of sea areas by balancing economic, social and environmental objectives.

Despite some similarities, MSP differs significantly from terrestrial or land use planning. Thus terrestrial planning systems cannot simply be transferred to the marine environment. MSP operates in a continuous three-dimensional environment and in complex ecosystems, and has to simultaneously address activities that take place on the seabed, in the water column, and on the water surface. These activities are usually not independent from each other but are permanently intertwined. MSP must take account of both fixed structures, such as oil rigs, pipelines or wind farms, but also the mobile nature of many maritime activities (such as fishing and navigation) that use space but not permanent structures. Additionally, the time dimension plays an important role in MSP. The compatibility or incompatibility of uses is highly dependent on the various seasonal stages of an ecosystem and might therefore significantly vary over time, e.g., compatibility between nature protection and fisheries, recreational fishing and commercial fisheries, or nature protection and marine tourism. This variation has to be taken into account when maritime spatial management decisions are made.

The most striking difference, however, between MSP and terrestrial planning is the legal framework in which the related activities take place. Land use planning takes place against a common background of land tenure rights which do not have a maritime equivalent. Instead, maritime activities are regulated through a range of sectoral laws, plans, and licenses/permits.

MSP is place-based management in the sense that it has to reflect the specific uses, needs and challenges of a given sea area. It is important to define the planning area in a transparent manner, involving all relevant stakeholders and decision makers, in order to avoid any misunderstandings or user conflicts throughout the process. This might result in a country deciding to develop a prescriptive maritime spatial plan only for a particularly vulnerable or densely

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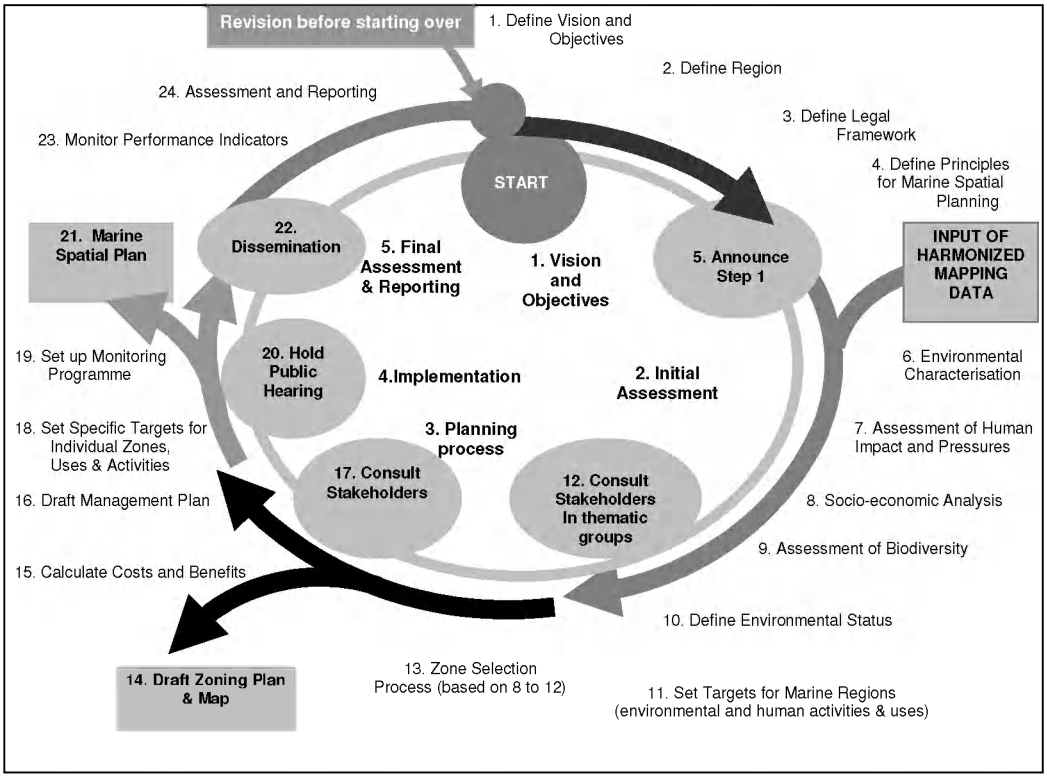
dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity." C. Ehler and F. Douvere, *Visions for a Sea Change. Report of the First International Workshop on Marine Spatial Planning,* Intergovernmental Oceanographic Commission and the Man and Biosphere Programme. IOC Manual and Guides 46: ICAM Dossier, 3 (Paris: UNESCO, 2007), p. 16.

used area where conflicts between different activities are likely to occur. More general management principles might suffice for an area with a lower density of uses. The decision on whether to opt for a stricter or more flexible approach should be subject to an assessment and evaluation process.

MSP is a circular process that—pursuant to the identification of the planning area—consists of the definition of objectives, the assessment of the present situation for which the best available data and information should be used, stakeholder involvement, the transparent and participatory development of a maritime spatial plan, the implementation of this plan, enforcement measures, evaluation, and subsequent revision or amendments to the plan. Figure 5.2 was developed by the BALANCE project and provides a good overview of the steps in the MSP process. The development of a maritime spatial plan is hence only one step in the entire process and by no means a final result.

Figure 5.2. Planning cycle as developed by the BALANCE project



Source: Jan Ekebom et al., *Towards marine spatial planning in the Baltic Sea, BALANCE Technical Summary Report 4/4,* May 2008, p. 21, available: <http://balance-eu.org/publications/index.html> (retrieved 29 April 2009).

MSP can be implemented through various instruments of which zoning is only one possible option. Current practice shows, however, that the delineation of zones for certain maritime activities is the preferred option. The reason for this choice might be that the process of zoning is well known from land use planning and is therefore a familiar way to deal with spatial management. Whether or not zoning is the best way to implement MSP or whether other instruments have to be developed that are tailor made for the specific demands of MSP is a matter of further research and debate.

5.3. Current Practices

> Knowing is not enough; we must apply. Willing is not enough; we must do.[15]

At the European level, MSP is a fairly new approach. Implementation of MSP is the responsibility of EU Member States, and the experiences at the national level remain limited. Despite the application of the subsidiarity principle, action at the EU level can provide significant added value. As announced in the Blue Book for the EU Integrated Maritime Policy and the accompanying Action Plan, the European Commission adopted on 25 November 2008 the Communication "Roadmap on Maritime Spatial Planning: Achieving Common Principles in the EU."[16] This Communication aims to facilitate the development of MSP and to encourage its implementation both at the national and EU levels. To support this objective, the Roadmap provides information on existing approaches in EU Member States and other international examples, as well as indicating international and EU legal instruments that have an impact on MSP. Based on this stocktaking exercise, the Roadmap identifies ten key principles for MSP that will form the basis for a broad debate on a common approach to MSP in the EU. These key principles are:

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

[15] Johann Wolfgang von Goethe (1749–1832).

[16] Commission of the European Communities, *Communication from the Commission, Roadmap on Maritime Spatial Planning: Achieving Common Principles in the EU*, COM(2008) 791, 25 November 2008.

5. Coordination within Member States – simplifying decision making
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 – relationship with integrated coastal zone management (ICZM)
10. A strong data and knowledge base

As follow-up to the Roadmap, the European Commission is currently organising a series of four workshops throughout 2009 to further discuss the applicability of the key principles and to develop a common understanding on MSP across the EU. Additionally, it is envisaged that two pilot projects will be launched in the Baltic Sea and the North Sea/North East Atlantic area to test the cross-border implementation of MSP. These pilot projects will be run in close cooperation with EU Member States, relevant stakeholders, and international organisations. Finally, the Commission will launch a study on the economic benefits of MSP. Up until now such benefits are assumed but cannot yet be proven by facts and figures. This study will help to identify reliable information in this respect.

5.3.1. Examples from European Countries

Some European countries have been the forerunners for the implementation of MSP, while others have more recently started to develop integrated management strategies for their sea areas. The activities vary significantly regarding their legally-binding function and their sectoral coverage. Some Member States have developed, on the basis of their terrestrial planning law, maritime spatial plans that will become executive order law once the consultation process is finalised (e.g., Belgium and Germany). Others have developed strategic or integrated management plans that are not legally binding but aim to give guidance to the maritime sector regarding, for example, the location of maritime installations (e.g., the Netherlands and Norway). Furthermore, policy framework documents—marine bills—have been prepared (e.g., by the United Kingdom and Scotland) or currently are under preparation (e.g., by Sweden) to implement a national integrated maritime policy and to steer future maritime development in a sustainable way. In all these policy setting documents, MSP plays an important role in implementing a coordinated approach to the allocation of marine space.

Most recently, Poland has adopted guidelines on maritime policy. These guidelines seek to upgrade the maritime dimension in all areas of the country's development. They are meant to be a basis for developing a regulatory system based on an integrated cross-sectoral approach to maritime affairs. The French government has launched the *Grenelle de la Mer*, applying the principles from the *Grenelle de l'Environment*, its long-term policy vision on ecological and sustainable development, to the oceans and seas. Further to the identified need for an integrated approach to the sea and new governance structures, the *Grenelle de la Mer* will develop a comprehensive strategy for the sea in the form of a law based on sound scientific, economic, and social assessment by the end 2009.

It must be emphasised that MSP not only has a present but also a forward-looking dimension. As far as current practice is concerned, EU Member States tend to focus mainly on the management of ongoing maritime uses and related licensing procedures. Given the ecosystem-based approach of MSP and the cross-border nature of all maritime activities, this approach can be seen as too short-sighted. Objective setting remains a sectoral-oriented process, which leads to an unrealistic account of user interests following on the slogan "no limits." This way of objective setting does not reflect the capacity and the performance of the ecosystem and therefore has to be changed. An integrated assessment of all sectoral demands and the mirroring of the assessment results with the capability of a given ecosystem will very likely lead to a revision of the present set of objectives. In order to use MSP to its maximum management and steering capacity, foreseeable uses and sectoral developments have to be taken into account, as well as the political climate that influences the development of the sea and the ocean.

Currently, there is a different approach to MSP in northern Europe compared to southern Europe. While many northern European countries have both a regime for integrated coastal zone management (ICZM) and MSP, the southern European states tend to focus their activities on the implementation of ICZM. The management of coastal zones has a long tradition in these countries, and recent developments like the ratification of the ICZM protocol under the Barcelona Convention strengthen this tradition. The very complex situation of the Mediterranean Sea (a large number of third countries and so far no exclusive economic zone claims by EU Member States) challenges the implementation of MSP. However, both the Barcelona Convention ICZM protocol and the experience of other EU Member States with the spatial management of territorial waters (e.g., Spain has launched a study to zone its territorial waters for offshore wind uses, and the German federal state of Mecklemburg Vorpommern has developed integrated maritime spatial planning

for its territorial waters) offer interesting opportunities for the elaboration of MSP particularly in complex sea areas like the Mediterranean and the Black Sea.

5.3.2. International Good Practices

Internationally, there are many good practices examples that can be highlighted regarding the use and implementation of MSP. Australia, with its management of the Great Barrier Reef, has the longest tradition. As mentioned above, the Great Barrier Reef Marine Park is a multiple-use area. The instrument of zoning is applied to help to manage and protect the values of the marine park. Zoning plans define what activities can occur in which locations, both to protect the marine environment and to separate potentially conflicting activities. Australia is currently the only country that has a sufficiently long experience with zoning (over 15 years), which has resulted in a monitoring and evaluation process of the ocean management activities at the Great Barrier Reef. This process was developed following extensive research and the most comprehensive community consultation process ever undertaken on an Australian environmental issue. It led, in 2004, to the introduction of revised zoning of the Great Barrier Reef Marine Park as part of the Great Barrier Reef Marine Park Authority's Representative Areas Program.[17]

In Canada, the Eastern Scotian Shelf Integrated Management (ESSIM) Plan was endorsed by the senior intergovernmental Regional Committee on Ocean Management in December 2006. This is the first integrated ocean management plan under the *Oceans Act* (see above). The initiative is a collaborative ocean planning process that considers the ecosystem and all of its uses comprehensively. The aim of the plan is to provide a common basis for commitment and action for sustainable use, conservation, and integrated ocean management in the Eastern Scotian Shelf planning area. To achieve this aim the plan is organised according to the following goals:

- Collaborative governance and integrated management
- Sustainable human use
- Healthy ecosystems

[17] Australian Government, Great Barrier Reef Marine Park Authority, available: <http://www.gbrmpa.gov.au/corp_site> (retrieved 29 April 2009).

The ESSIM plan employs a multi-stakeholder planning and objective-based approach to integrated ocean management. The objective-based management framework consists of a hierarchy of objectives, associated management strategies and actions, and a reporting system. Key elements are identified for effective implementation, monitoring, and evaluation of the plan. This initiative represents a long-term commitment to integrated ocean management.

These are only two of many examples that illustrate the rich international experiences in MSP that can benefit the development at European level and vice versa. Lessons are still to be learned and a number of challenges are ahead of us to improve the knowledge and skills that are needed to implement MSP in a meaningful way. The following section will touch upon some of these challenges.

5.4. Challenges for Implementation and Future Development of MSP

> An invasion of armies can be resisted, but not an idea whose time has come.[18]

5.4.1. MSP in the High Seas

According to the LOS Convention, a nation state has full jurisdiction in its internal waters and the territorial sea (up to 12 nautical miles) and sovereign rights for the purpose of economic exploitation (e.g., resources, energy) in the exclusive economic zone (up to 200 nautical miles). The possibility of regulating maritime uses in the high sea—in other words to implementing MSP in areas outside national jurisdiction—are very limited. This does not, however, mean that sustainable management of the high seas is not needed. As Elisabeth Mann Borgese stated, "In the seas and oceans, where everything flows, everything interacts with everything else, and resources are 'straddling', the notion of hard and fast 'boundaries' is rather meaningless to start with. It is impossible to manage resources or to protect the environment even within the largest Exclusive Economic Zone, if there is no management beyond the boundary."[19] The LOS Convention is not at its final stage. Regulations and

[18] Victor Hugo (1802–1885), *Histoire d'un crime,* 1852.
[19] Borgese, n. 1 above, p. 123.

rules have to be flexible enough to adapt to changing framework conditions. When the LOS Convention was adopted, the urgent need for sustainable management and the protection of the marine environment were probably not as obvious as they are today. Some success has been made regarding the protection of the marine environment in the high seas (one example in this respect is the PELAGOS sanctuary for marine mammals in the Mediterranean[20]). It might be worth considering whether the LOS Convention should be amended to facilitate the use of MSP in the high seas.

5.4.2. International Governance Structures

Current practice shows that a reliable governance structure is a pre-condition for meaningful and long-term sustainable management of marine resources. Further work needs to be done to develop governance structures, particularly at the international level, when sea basins are shared by several countries or, in the case of the EU, by different Member States. The United Nations Environment Programme Regional Seas Programmes might offer an opportunity to achieving this goal. However, the objectives of the Programme and the various regional seas conventions largely focus on the protection of the marine environment. If MSP is to be respected and accepted by all maritime sectors, its neutral position is of utmost importance. As illustrated above, MSP provides the appropriate framework to arbitrate between sectoral interests. This only works if all the sectors are treated as equals. Any situation that can lead to a biased MSP process must be avoided. This could become a difficulty if regional sea conventions are given the added responsibility of implementing MSP at the international level whilst their mandate is not broadened beyond environmental issues.

5.4.3. Cumulative Effects of Maritime Uses

MSP builds on the ecosystem approach. Ecosystem-based management requires the protection of the ecosystem, its functioning and processes; the recognition of all inter-connectedness within and among systems; the integration of

[20] The Pelagos Sanctuary, available: <http://www.tethys.org/sanctuary.htm> (retrieved 29 April 2009).

ecological, social, economic and institutional perspectives; and place-based management. In order to meet these requirements, assessment methods and instruments are needed that take the whole ecosystem into account. Currently, assessments are mainly carried out on a case-by-case basis (e.g., in the framework of an environment impact assessment for major infrastructure or installations) and in a national rather than cross-border context. Further research is urgently needed to develop appropriate tools and methodologies that help to measure the cumulative effects of human activities on an ecosystem.

5.4.4. Compatibility of Uses: The Different Dimensions of MSP

Knowledge about the compatibility of uses at sea remains very limited. Information that is available was mainly gathered with the focus on a certain situation or conflict (e.g., the reaction of migrating birds to a new offshore wind farm or the level of disturbance of marine mammals due to the installation and operational noise of windmills). The information is, therefore, generally site specific and results cannot necessarily be transferred to a similar situation or a different location. The question of compatibility is also closely linked to the cumulative effects of maritime activities. Although a specific location and activity might be compatible, compatibility might not be assured if the project in question is examined in the context of its adjacent uses. Furthermore, there are no reliable methods and instruments to measure the influence of the time dimension to compatibility. Research and further scientific input is needed to develop tools that better match the complex challenges posed in marine ecosystems.

5.4.5. Educational Needs

A relatively untouched challenge is that of educational needs. Who are the people that will implement maritime spatial planning? Where can these people be trained? What kind of knowledge do they need? Universities have only taken the first steps to build up this educational base, e.g., summer schools for MSP or ICZM. To date, no full curriculum has been developed to teach MSP at the university level. Lessons can be learned from land use planning. Educational institutions offer a programme of a general study that provides the students with an overview of the related sectoral policies and conveys integrated thinking,

coordination and cooperation with regard to land use planning. A similar set-up is needed for MSP. Students, as well as employees of the responsible public authorities, have to have at least a basic knowledge about maritime transport, shipping, maritime energy (both fossil and renewable), oceanography, biology, the marine environment, fisheries and aquaculture, coastal and marine tourism, the land-sea interface and so forth. Internationally, it is time to join forces and develop training programmes and courses that provide the people that have to implement MSP with the required knowledge and skills.

5.5. Conclusion

MSP is a rather new development at the European level. Although spatial planning at sea was used by some countries at the national level already in the 1960s and 1970s (examples are the United Kingdom, the Netherlands and Norway), the related management activities focussed to a large extend only on sectoral needs (planning for one particular sector like the dredging industry, offshore oil and gas exploitation, fisheries and aquaculture, etc.). This can not be considered MSP as it is defined today. Integrated plans that include all relevant maritime sectors did not exist and still are very rare. Even the most advanced EU Member States like Germany, the Netherlands or Belgium have not managed yet to integrate all maritime sectors. Particularly fisheries, but also recreational uses of the sea or military uses, are very challenging to integrate. This is not only due to the specific structure of the given sectors but also to the restricted accessibility or limited availability of reliable data and information. At the European level, it is the first time that an attempt has been made towards a concerted framework for MSP, to encourage its implementation, and to develop a common understanding of the process and its instruments. A joint learning process that has only started, it is, however, promising. Global challenges like climate change and the maritime dimension that encompass virtually any human activity have led to the conviction that sectoral decision making should be replaced by an integrated, all-embracing approach to the management of marine resources. Diverse user interests in the seas and oceans have to be carefully measured and guided to ensure their compliance with a healthy marine environment that everything else depends on.

This chapter has only touched upon some of the future challenges in regard to implementing MSP. The availability and accessibility of reliable information and data will also be an important issue in the future. If conflicts of uses between maritime sectors are to be avoided, or at least reduced to

a minimum, trust has to be build to turn the current "my interests first and without limits" approach into a real integrated approach. Implementing MSP will provide economic benefits. This is not only relevant for maritime industries, but also for the credibility of the whole MSP process. It is important to prove with facts and figures that the effort as well as the costs involved in implementing MSP will pay off. If we truly want to achieve sustainable use of marine resources and protect the marine environment for coming generations, MSP provides a promising way forward.[21]

[21] More information on the different aspects of MSP is provided in the Special Issue of *Marine Policy*, "The Role of Marine Spatial Planning in Implementing Ecosystem-Based Sea Use Management," Volume 32, September 2008.