

## Challenges in developing the first Portuguese marine spatial plan

Catarina Frazão Santos<sup>(a)</sup>, Margarida Almodovar<sup>(b)</sup>, Francisco Andrade<sup>(a)</sup> Michael Orbach<sup>(c)</sup>

(a) Centro de Oceanografia, Laboratório Marítimo da Guia, FCUL, Av. Nossa Sra do Cabo, 2750-374 Cascais, Portugal  
[cfsantos@fc.ul.pt](mailto:cfsantos@fc.ul.pt) / [faandrade@fc.ul.pt](mailto:faandrade@fc.ul.pt)

(b) Direcção-Geral de Política do Mar, Praça do Comércio, 1149-010 Lisboa, Portugal  
[margarida.almodovar@dgpm.gov.pt](mailto:margarida.almodovar@dgpm.gov.pt)

(d) Duke University Marine Laboratory, Nicholas School of the Environment and Earth Sciences, 135 Duke Marine Lab Road, Beaufort NC 28516-9721, USA  
[mko@duke.edu](mailto:mko@duke.edu)

### ABSTRACT

The European Commission recognizes the importance of marine spatial planning (MSP) as a key instrument to implement the goals of the European Integrated Maritime Policy and of the Marine Strategy Directive, while reaffirming ecosystem-based management and sustainable development as MSP overarching principles. This study describes the Portuguese MSP process, presents its legal framework and, finally, highlights some major challenges to its long-term adequacy regarding (1) transboundary issues and (2) adaptive management. The first Portuguese attempt at developing a marine spatial plan started in 2008 with the "Plano de Ordenamento do Espaço Marítimo" (POEM). A multidisciplinary team with representatives from various ministries was established and made responsible for developing POEM. Between 2010 and 2011, POEM's public consultation process took place, and in 2012 a final version of POEM documents was completed and published. In order to ensure MSP sustainability there must be a close connection between marine spatial plans and other programs/policies, and decision making must account transboundary effects. This is especially important regarding the sea-land interface (POEM must be properly connected to coastal zone management), and cross-border effects with the Spanish EEZ and with international waters in the Atlantic Ocean. Moreover, a true adaptive management approach is essential in MSP and, thus, POEM must be revised/redesigned whenever necessary due to lessons learned and/or changes in initial conditions. Although the development and implementation of a proper marine spatial plan for Portugal poses a national challenge, it is viewed as a major contribute to attain a truly integrated and sustainable coastal/ocean management.

**KEY WORDS:** *Marine spatial planning, transboundary issues, adaptive management, Portugal.*

### INTRODUCTION

In 2007, the European Union (EU) adopted an Integrated Maritime Policy (European Commission, 2007) that encompasses the regulation of all elements of maritime activity, while providing for a new ecosystem-based approach (EBM) to the management of human activities (Meiner, 2010). EBM is an integrated, place-based approach that focuses on a specific ecosystem and in the range of activities affecting it, recognizing the existing connectivity amongst all of its elements, including humans, and thus aiming for both socioeconomic development and environmental preservation (Crowder and Norse, 2008; Douvere, 2008). In 2008, the EU Marine Strategy Framework Directive (MSFD) reinforced this idea, while requiring member states to apply the EBM concept and to achieve and maintain a good environmental status in their marine environment (European Commission, 2008a).

Marine spatial planning (MSP) has been pointed out by some member states as an operational tool to implement EBM and, subsequently, MSFD goals (European Commission, 2008b, 2010a; Maes, 2008; Meiner, 2010). Commonly defined as "a process (...) of analyzing and allocating the spatial and temporal distribution of human activities in [coastal and] marine areas" (European Commission, 2010b), MSP "consists of data collection, stakeholder consultation and the participatory development of a plan" (European Commission, 2008b) and the

subsequent stages of implementation, monitoring, evaluation and revision of such plan. Given that EBM is to be the underlining principle of MSP (Douvere, 2008; European Commission, 2008b), the planning process "must always take into account the biophysical, socioeconomic and institutional aspects of a given ecosystem – its "total ecology" – making the necessary trade-offs to achieve socioeconomic development without compromising resource use for future generations" (Frazão Santos *et al.*, 2012).

In the Portuguese context, coastal and ocean management are presently undergoing major advances. In 2006 Portugal approved its National Sea Strategy (Council of Ministers Resolution No. 163/2006), in 2008 the Portuguese government began developing a marine spatial plan and, in 2010, the MSFD was transposed into the Portuguese internal law (Decree-Law No. 108/2010).

Given that the present and future strategies for the Portuguese maritime space are currently being defined, understanding how the Portuguese MSP process was conducted so far, together with understanding major opportunities and threats to the success of its implementation, is of the utmost relevance. Moreover, the present study highlights some major challenges to the long-term adequacy of marine and coastal spatial planning in its link to (1) transboundary issues and (2) adaptive management.

## MARINE SPATIAL PLANNING IN PORTUGAL

### The POEM process

According to the Portuguese National Sea Strategy (NSS), marine spatial planning is a governance tool essential to ensure a truly integrated, progressive and adaptive coastal and marine management, based on the principles of precaution, sustainable development and ecosystem-based management (Ruling No. 32277/2008). In accordance to the NSS objectives, and due to the ocean strategic role and importance at a national level (Portugal has one of the world's largest exclusive economic zone (EEZ), and encompasses two MSFD marine sub-regions), in 2008 the Portuguese government established the need to develop a marine spatial plan for all the marine spaces under its jurisdiction or sovereignty (water column, seabed and subsoil, from coastal waters to the entire Portuguese EEZ, and proposed extended continental shelf). This initiative was entitled "Plano de Ordenamento do Espaço Marítimo" (POEM) and studied the existing uses/activities in the maritime space according to seven major objectives (Figure 1). To accomplish the task of developing POEM, a multidisciplinary team - with representatives from various ministries, all belonging to the Interministerial Commission for Sea Affairs (CIAM) - was appointed (Figure 2).

#### POEM's objectives

1. Collection, compilation and mapping of data on **human uses/activities already established** in Portuguese marine spaces, and identification of their **dependence on local communities** near shore
2. Planning present and future human uses/activities on Portuguese maritime spaces in **close connection with coastal zone management**
3. Ensure a **sustainable use of resources**, as well as their protection and restoration, promoting an **efficient, integrated and cross-sectoral** approach to the use of the maritime space
4. Define the **parameters for sustainable development** for each activity, and marine area in which they take place
5. Define **new activities** that may be developed in the **medium/long term**
6. Promote the **social, economic and environmental importance** of the sea
7. Define guidelines to the development of **indicators** for assessing the sustainability of human activities in marine spaces, as well as their corresponding **monitoring programs**

Transboundary issues

Adaptive management

Figure 1. Main objectives of the "Plano de Ordenamento do Espaço Marítimo" (POEM), according to Ruling No. 32277/2008. Objectives 2 and 7 are closely related to "transboundary issues" and "adaptive management" subjects, correspondingly, further analyzed in this paper.

Between 2008 and 2010, the multidisciplinary team pursued an agenda, and its work resulted in the four main documents that compose POEM: (1) a framework document, (2) the Plan's proposal (includes the allocation of space to different uses, management guidelines, an action

program, and monitoring programs), (3) the Plan's strategic environmental assessment report, and (4) the baseline characterization studies.

Afterwards, for about three months - from November 29, 2010 to February 22, 2011 - the referred documents were analyzed in the framework of POEM's public consultation process (Ruling No. 24108/2010). Within this context, different seminars and workshops took place, and discussions were held on several relevant topics, such as marine transportation, national safety, energy, tourism, fisheries, nature conservation, science and technology.

In the beginning of 2012, following a government change, the General Direction for Ocean Policy (DGPM) was created (Regulatory Decree No. 17/2012) and assumed the coordination of the POEM's multidisciplinary team. After incorporating all relevant changes from the public consultation process, as well as from subsequent multidisciplinary team meetings, a final version of the POEM documents was completed. Finally, on the November 8, 2012, a government ruling was released determining that POEM's final documents were to be published in the DGPM website (Ruling No. 14449). Since the multidisciplinary team was extinct by the same ruling, DGPM is further responsible for ensuring the update of the POEM whenever the socioeconomic, cultural and/or environmental conditions, or their prospects for development, undergo important changes.

Figure 3 presents an overview on the legislative framework of the POEM. In the following sub-sections, the role of transboundary issues and adaptive management in POEM will be further discussed due to their relevance for MSP long-term adequacy.

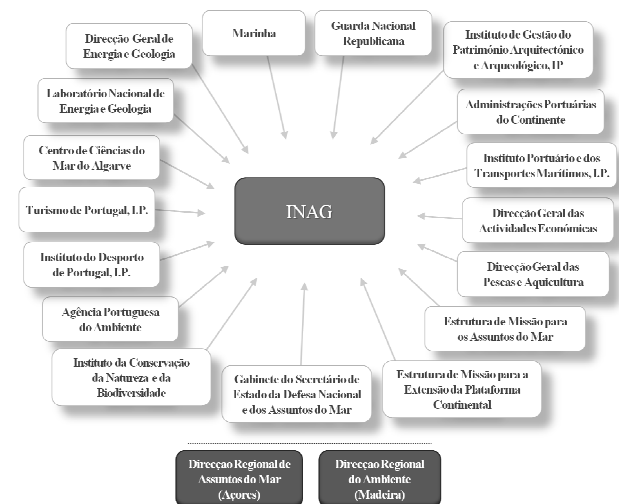


Figure 2. Portuguese public entities that compose the multidisciplinary team responsible for developing the POEM. The Portuguese Water Institute (INAG) is the entity responsible for coordinating the entire process (Ruling No. 32277/2008). Grey boxes stand for entities from the Azores and Madeira Regions that also incorporate the POEM team.

2008. The Portuguese government determines the creation of **POEM** by a multidisciplinary team under the coordination of **INAG**

Ruling No. 32277/2008

2010/2011. **POEM's public consultation** process takes place during c. 3 months (from 29<sup>th</sup> Nov 2010 to 22<sup>nd</sup> Feb. 2011)

Ruling No. 32277/2008

2012. **POEM's final documents** are completed and published on-line on the DGPM website, and the multidisciplinary team is extinguished

Ruling No. 14449/2012

Figure 3. Legislative framework of the "Plano de Ordenamento do Espaço Marítimo" (POEM). INAG: Portuguese Water Institute. DGPM: Portuguese General Direction for Ocean Policy.

## Transboundary issues

Since the ocean does not follow political boundaries, transboundary effects are a major concern in ocean and coastal management, evident in EU guidelines and recommendations (e.g. European Commission, 2008). Within the MSP context there are four main types of boundaries, or "frontiers", to account for: (1) sea-land interface, (2) cross-border effects with neighbouring nations, (3) cross-border effects with international waters or "high seas" and, (4) connection among different fractions of a nation's EEZ. There is a fifth aspect to consider, transversal to all the other four, which is the connection between marine spatial plans and other programs or policies that focus on the same areas. In effect, some type of accordance must exist to provide for a truly integrated management process.

The first frontier is one of the most referred ones in literature. In fact, when considering the sea-land interface several challenges arise from the differences between terrestrial and marine environments (Norse et al., 2005). Nevertheless, synchronization must be achieved within management processes that encompass both spaces. The POEM covers marine waters from the high tide line to the Portuguese EEZ outer limit and for that reason a close connection with coastal zone management is essential. This is, in fact, clearly stated as one of POEM's major objectives in Figure 1. Regarding its connection with other programs and policies, Portuguese MSP will have to be synchronized, for example, with coastal spatial plans (POOCs) and coastal protected areas plans, in order to ensure that main goals and management options are not jeopardized.

In the Portuguese case, cross border effects with adjacent countries (second "frontier") refer directly to marine spaces under Spanish jurisdiction or, less directly, to other countries "facing" the Atlantic Ocean. In this context MSP must (1)

consider potential impacts of human activities/uses that occur in Portuguese spaces on the environmental quality of neighbouring countries waters and (2) take into account effects/impacts of these countries activities into the Portuguese national space - e.g., decisions regarding shipping routes in the Portuguese EEZ may affect the risk of pollution on Spanish waters or, species depletion outside the Portuguese space may limit recruitment to the national stocks. For these reasons, Portuguese MSP should account for neighbouring countries relevant policies and programs concerning the management of ocean and coastal spaces, as well as European guidelines on this subject. For example, the European Marine Strategy Directive recognizes the importance of transboundary issues while stating that "Member States sharing a marine region or subregion (...) shall, in the interest of coherence and coordination, endeavour to ensure that (...) relevant transboundary impacts and transboundary features are taken into account" (European Commission, 2008).

The third frontier, cross-border effects with international waters, follows the same reasoning although, instead of considering effects in (or from) neighboring country's waters, it considers (1) impacts of activities that occur in international waters (e.g. fisheries, shipping) into a country's marine space and, (2) impacts of MSP in international waters. The latter is especially relevant given that "in recent years, (...) scientists and policy experts have begun to consider marine reserves in the open oceans" and "most of the open ocean lies in international waters" (Norse et al., 2005: 311-312). Such fact translates a growing concern on the protection, conservation and recovery of ecosystems located in international waters, which must be considered when developing MSP. In fact, according to Norse et al. (2005), "the biggest challenge to place-based conservation in the open ocean (...) is not so much scientific understanding as the human dimensions, especially political commitment" (Norse et al., 2005:312). From a geographical perspective, in the Portuguese case this essentially pertains to international waters in the Atlantic Ocean. Furthermore, this frontier is especially relevant for Portugal due to the oceanic nature of the Azores and Madeira EEZs.

Last but not least, the fourth boundary relates only to situations where marine waters under a country jurisdiction or sovereignty are not continuous. This is the case of Portugal where the EEZ encompasses three different sub-areas: continental, Madeira and Azores fractions. Although each fraction has its own environmental, socioeconomic and cultural specificities, MSP main objectives, management guidelines, and monitoring programs need to be in accordance among them.

## Adaptive management

According to Ehler and Douvère (2009), adaptive management is essential in a marine spatial planning process. In fact, while defining adaptive management as a "systematic approach for improving management through learning by monitoring and evaluating management outcomes (...) and adapting what one does based on what is learned", they recognize that MSP processes need to implement an adaptive approach in order to be sustainable (Ehler & Douvère, 2009:92).

Accordingly, the last of their ten-step guide for a full MSP process is "adapting the spatial management plan" (Ehler & Douvère, 2009) and, within it, two major outcomes are

expected: (1) proposals for adapting management goals, outcomes and strategies, in the next round of planning and; (2) an identification of applied research needs (Figure 4). Monitoring and evaluation play a major role in this context because they allow us to learn about the effects of management measures and to use such information to adjust management actions. Nevertheless, despite its recognized importance and relevance, adaptive management is rarely truly implemented (Ehler & Douvère, 2009).

Regarding the POEM case, it is recognized that an adaptive approach - which allows for the use of existing information and the subsequent incorporation of new knowledge and changes from the initial conditions - constitutes the best management option (Portuguese Government, 2011). In fact, it is stated in its framework document that the POEM, being a tool for spatial management, can be subject to revision due to changes in the socioeconomic, cultural and environmental factors that underlined and underpinned the original options. Moreover, an adaptive approach is considered a key aspect in POEM because (1) new activities and new technologies that may require an adaptation of management models are expected to emerge, and (2) it is essential to ensure compatibilities between such new human uses/activities and the protection/conservation of species and habitats.

In operational terms, the POEM will rely on monitoring programs and indicators to implement adaptive management. Both monitoring programs and indicators are expected to guide the marine spatial management process by means of (1) identifying and quantifying the effects of the Plan's implementation, (2) assessing the extent to which its objectives are being achieved, (3) detecting errors and (4) proposing corrections (Portuguese Government, 2011).

Following this reasoning, a major challenge and concern is how to ensure the "quality" of such indicators and monitoring programs. In fact, if they are not properly developed the results may be misleading, therefore potentially misinforming the entire management process. Nevertheless, responsible entities seem to be fully aware of this challenge given that one of POEM's main objectives clearly addresses such concerns (Figure 1).

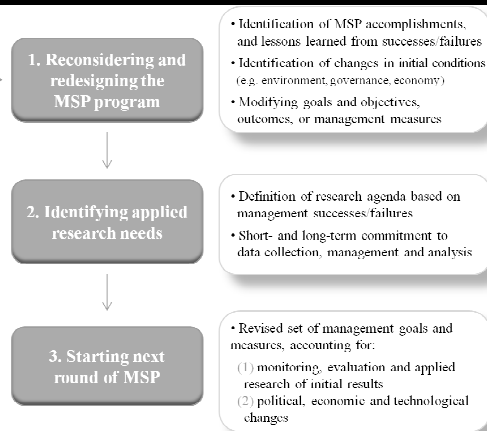


Figure 4. Steps for incorporating adaptive management in marine spatial planning (MSP) according to Ehler and Douvère (2009). Modifications from Step 1 should be implemented as part of Step 3, in a continuous process.

## CONCLUSIONS

Although recognized as an essential tool to implement the EU Marine Strategy Directive goals, as well as the principles of precaution and sustainability, marine spatial planning still faces the challenge of how to translate principles into practice. Nevertheless, an adaptive, ecosystem-based and integrated approach for the management of human activities in coastal and marine spaces seems to be the best course for MSP to follow.

In fact, adaptive management is essential to MSP long-term adequacy by means of allowing responsible entities to revise, reconsider and redesign their planning and management options along time. Within this context, monitoring and evaluation play a major role in providing the information upon which decisions are made.

Another important aspect to MSP is that transboundary effects resulting from human activities/uses in a given marine management area have to be considered within the planning process to ensure an integrated approach. In effect, if marine planners and managers fail to consider the system "frontiers" (whether with land or with adjacent marine spaces) when defining their options, as well as all the policy and management conflicts/compatibilities that may arise from them, they will not be accounting for all the relevant influences, impacts, and interactions at play.

In the Portuguese context, the development and implementation of a proper marine spatial plan poses a national challenge. Nevertheless, it is viewed as a major contribute to the improvement of coastal and ocean conservation and management at a national level. Now that POEM final documents are completed and published a new challenge arises for MSP in Portugal: the implementation process of planning and management options. However, because such process is still in its early stages, only time will tell whether MSP in Portugal will achieve the goals established.

## ACKNOWLEDGEMENTS

The authors would like to acknowledge the Portuguese General Direction for Ocean Policy (DGPM) for all the information provided. The Portuguese Foundation for Science and Technology (FCT) supported this study through a Doctoral Grant to C. Frazão Santos.

## LITERATURE CITED

- Council of Ministers Resolution No. 163/2006. Resolução de Conselho de Ministros n.º 163/2006, de 12 de Dezembro de 2006. Diário da República, 1.ª série, 237: pp.8316-8327 [in Portuguese].
- Crowder, L. & Norse, E. 2008. Essential ecological insights for marine ecosystem-based management and marine spatial planning. *Marine Policy*, 32: 772-778.
- Decree-Law No. 108/2010. Decreto-Lei n.º 108/2010, de 13 de Outubro de 2010. Diário da República, 1.ª Série, 199: pp.4462-4472 [in Portuguese].
- Douvère, F., 2008. The importance of marine spatial planning in advancing ecosystem-based sea use management. *Marine Policy*, 32: 762-771.
- Ehler, C. & Douvère, F., 2009. Marine spatial planning: a step-by-step approach toward ecosystem-based management. Paris: UNESCO, Intergovernmental Oceanographic Commission and Man and the Biosphere Programme, IOC Manual and Guides 53, ICAM Dossier 6, 99p.
- European Commission 2007. An Integrated Maritime Policy for the European Union. Brussels: Communication from the Commission, 575 Final, 16p.

- European Commission 2008a. Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008, establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive). Official J. Eur. Union, L164: 19-40.
- European Commission 2008b. Roadmap for maritime spatial planning: achieving common principles in the EU. Brussels: Communication from the Commission, 791 Final, 11p.
- European Commission 2010a. Commission Decision 2010/477/EU of 1 September 2010 on criteria and methodological standards on good environmental status of marine waters. Brussels: Official J. Eur. Union, L232: pp.14-24.
- European Commission 2010b. Maritime spatial planning in the EU - achievements and future development. Brussels: Communication from the Commission, 771 Final, 10p.
- Frazão Santos, C., Teixeira, Z.G., Janeiro, J., Gonçalves, R.S., Björkland, R. & Orbach, M., 2012. The European Marine Strategy: Contribution and challenges from a Portuguese perspective. *Marine Policy*, 36, 963-968.
- Maes, F., 2008. The international legal framework for marine spatial planning. *Marine Policy*, 32: 797-810.
- Meiner, A., 2010. Integrated maritime policy for the European Union - consolidating coastal and marine information to support maritime spatial planning. *Journal of Coastal Conservation*, 14: 1-11.
- Norse, E.A., Crowder, L.B., Gjerde, K., Hyrenbach, D., Roberts, C.M., Safina, C. & Soulé, M.E., 2005. Place-based ecosystem management in the open ocean. In Norse, E.A. & Crowder, L.B. (eds.): *Marine conservation biology*. Island Press, pp.302-327.
- Portuguese Government 2011. The POEM Framework Document. Plano de Ordenamento do Espaço Marítimo: Volume 1 - Enquadramento. Ministério da Agricultura, Mar, Ambiente e Ordenamento do Território, Portugal. 59p [in Portuguese].
- Regulatory Decree No. 17/2012. Decreto Regulamentar n.º 17/2012, de 31 de Janeiro de 2012. *Diário da República*, 1.ª série, 22: pp.541-543 [in Portuguese].
- Ruling No. 32277/2008. Despacho n.º 32277/2008, de 18 de Dezembro de 2008. *Diário da República*, 2.ª série, 244: pp.50546-50547 [in Portuguese].
- Ruling No. 24108/2010. Aviso n.º 24108/2010, de 22 de Novembro de 2010. *Diário da República*, 2.ª série, 226: p.57141 [in Portuguese].
- Ruling No. 14449/2012. Despacho n.º 14449/2012, de 8 de Novembro de 2012. *Diário da República*, 2.ª série, 216: p.36606 [in Portuguese].