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How sustainable is sustainable marine spatial planning? Part I—Linking the concepts

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ABSTRACT

Marine spatial planning (MSP) has emerged worldwide as a tool for sustainable ocean governance. This paper reviews how sustainability and ecosystem-based management (EBM) have been included so far within the MSP general framework, by carrying out: (1) a review on the links between sustainability, EBM and MSP in EU maritime policy initiatives; (2) an analysis on the differences between ecosystem-based MSP versus MSP focused on delivering blue growth; and (3) a discussion on how adaptive management may address some of the main challenges found in achieving sustainable ocean management. From the EU Green Paper (2006) to the MSP Directive Proposal (2013), MSP processes based on the principle of EBM have been recognized as a necessary tool to ensure maritime sustainable development. Although ecosystem-based MSP has been recently presented as the best way to ensure both ecosystem conservation and development of human activities, most national and European MSP initiatives seem to follow a MSP approach focused in delivering blue growth. A challenge, therefore, arises: how to adjust policy decisions to properly preserve ecosystems and the services they provide? If truly implemented, an adaptive approach seems to be a way forward in ensuring that spatial planning, management and policy-making in marine spaces can be continuously adjusted, thus allowing for sustainability.

1. Introduction

In 2007, the European Union (EU) adopted an Integrated Maritime Policy [1] that encompasses the regulation of all elements of maritime activity, while providing for a new ecosystem-based management approach (EBM) to human activities in the sea [2]. EBM is an integrated, place-based approach that focuses on a specific ecosystem and on the range of activities affecting it, recognizing the existing connectivity amongst all of its elements, including humans ("people are integral components of social–ecological systems[1] (…) [as they] both affect and respond to ecosystem processes" [3]), and thus aiming for both socioeconomic development and environmental preservation [4,5]. 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" (GES) in their marine environment [6].

Marine spatial planning (MSP) – or *maritime* spatial planning, as it is referred to in Europe – has been pointed out by some

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[1] Although the term *socio-ecological system* is commonly accepted and used, we acknowledge that if humans are truly considered as part of ecosystems it is somewhat redundant to use it. The "ecological system" already encompass humans by definition (as any other occurring species) and, consequently, their social, cultural and economic dimensions; referring to *socio-ecological systems* is the same as referring to "a store that sells *fruits* and *apples*" or "an area to protect *marine mammals* and *whales*", assuming the second definition is not included in the first. This is why throughout the text we preferred the use of the term *ecosystem*.

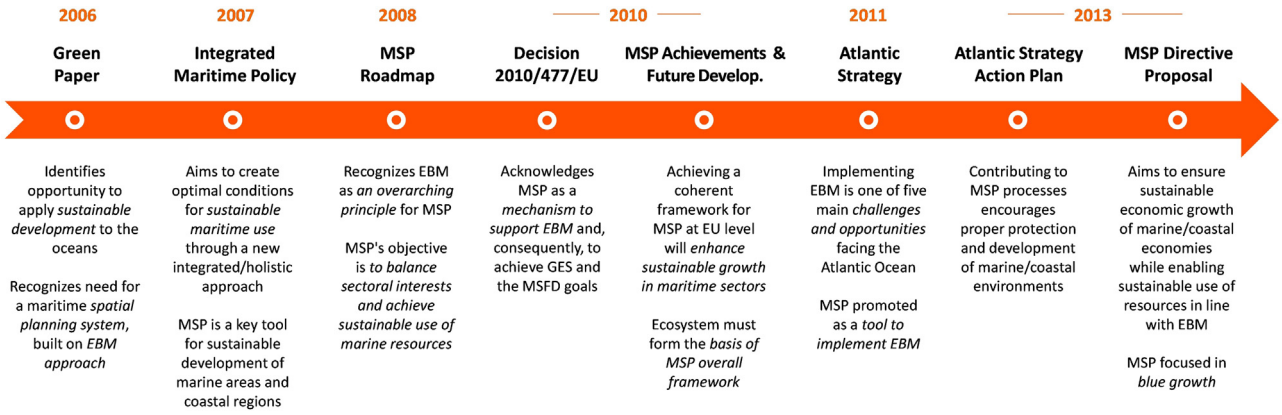

Fig. 1. Timeline of major European policy initiatives addressing marine spatial planning (MSP), with a brief description of each initiative's main ideas regarding MSP, ecosystem-based management (EBM) and sustainability.

member states as an operational tool to implement EBM and, subsequently, MSFD goals [2,7–9]. Commonly defined as a "public process of analyzing and allocating the spatial and temporal distribution of human activities in [coastal and] marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process" [10], MSP consists of "data collection, stakeholder consultation and the participatory development of a plan" [8], as well as the ensuing stages of implementation, monitoring, evaluation and revision of such plan [11]. Given that EBM is to be the underlying principle of MSP [4,8], the planning process must always take into account the biophysical, human and institutional dimensions of a given ecosystem – its "total ecology" [12] – making the necessary trade-offs to achieve "the right mix of protection and use" [13], thus allowing for socioeconomic development without compromising the use of resources by future generations.[2] Ecosystem-based marine spatial planning and management has been presented, therefore, as the best way to ensure sustainability of marine ecosystems and the services they provide [10].

Given its relevance for the long-term adequacy of marine planning and management, the present work analyzes how *sustainability* and *EBM* have been included so far within the MSP general framework. It starts by (1) reviewing the links between sustainability, EBM and MSP in EU policy initiatives; (2) then it analyzes the differences between MSP focused on ecosystem conservation and MSP that prioritizes the development of a maritime economy; and finally (3) it discusses how an adaptive MSP approach could address some of the main challenges found in achieving sustainable ocean management.

2. Linking the concepts: sustainability, EBM and MSP

According to Katsanevakis et al. [14] in a recent review on the subject, EBM is an "emerging paradigm of ocean management" that has been promoted worldwide as the best way to ensure sustainability of marine ecosystems goods and services. Although there is a plethora of different definitions (e.g. [15–18]) and terminologies for EBM (e.g. ecosystem management, ecosystem approach, ecosystem-based marine spatial management), a set of common criteria to describe EBM was identified by Arkema et al. [19]. According to these authors, EBM is characterized, in general, by the concepts of "sustainability", "ecological health" and "inclusion of humans in the ecosystem" and, more particularly, by considering: (1) *specific ecological criteria*, such as "ecosystem complexity" or "ecosystems dynamic nature across temporal/spatial scales"; (2) *specific human dimension criteria* – e.g. "ecosystem goods and services", "economic factors" and "stakeholders engagement"; and (3) *specific management criteria*, such as "adaptive management", "co-management", "precautionary approach", "interdisciplinary knowledge" or "monitoring"[3] [19]. Concomitantly, Stojanovic and Farmer [20] recognize that although sustainability is constantly used to frame the intentions of ocean policies,[4] in practice, there also are a multiplicity of interpretations for it (i.e. it is highly differentiated).

In the last decade, EU maritime policy initiatives have continuously emphasized the importance of progressing towards EBM implementation, as well as of achieving a sustainable use of marine and coastal ecosystems (Fig. 1). In 2006, the *EU Green Paper*, recognizing that sustainable development was "at the heart of the EU agenda", identified the opportunity to apply such a principle to the oceans [21]. Aiming to promote a debate on the future of EU Maritime Policy, the Green Paper sought to achieve the right balance between the socioeconomic and environmental dimensions of sustainable development, and to consider a new and holistic approach to the management of marine/coastal areas. Here, for the first time, the Commission acknowledges the need for "a system of spatial planning for maritime activities" that must build on the EBM approach [21]. In fact, although the EBM concept had been previously mentioned in the Commission's communication *Towards a Strategy to Protect and Conserve the Marine Environment* [22] and in the proposal for a *Marine Strategy Directive* [23] (which later resulted in the MSFD, the "environmental pillar" of EU maritime policies) such documents have no specific reference to MSP.

Later in 2007, however, the *EU Integrated Maritime Policy* (IMP) [1] clearly identified MSP as one of three major "horizontal planning tools" for integrated policy-making (that cut across maritime sectoral policies and support joined-up policy making). Aiming to create optimal conditions for sustainable ocean use (which is acknowledged by the Commission as a "major global challenge"), while enabling the growth of maritime sectors and coastal regions, the IMP highlights the need for a new, integrated and holistic approach that can provide "a coherent policy

[2] As pointed out by Chapin et al. [3] "efforts that fail to address the synergies and tradeoffs between ecological and societal well-being are unlikely to be successful" in the long-term.

[3] "Ecological" and "human dimension" criteria relate to specific components of ecological health and the inclusion of humans in the ecosystem, while "management" criteria include diverse approaches to administration as well as the use of science and technology.

[4] These authors analyzed seven maritime governance regimes – Australia, Canada, New Zealand, EU, South Africa, United Kingdom and United States of America – in order to study how sustainability is conceptualized for the oceans.