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He who hesitates is lost: Why conservation in the Mediterranean Sea is necessary and possible now

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ABSTRACT

Although significant advancements on protecting marine biodiversity and ecosystems of the Mediterranean Sea have been made, much remains to be done to achieve the targets set by the Convention for Biological Diversity (and the Barcelona Convention) and ratified by the 21 Mediterranean governments. Particularly, these targets require the design and implementation of an ecologically representative network of marine protected areas that covers 10% of the Mediterranean surface by 2020. Despite the many efforts to gather spatial information about threats to the Mediterranean and conservation planning initiatives that identify sensitive areas for conservation, we are far from achieving this target. In this paper, we briefly review existing and proposed conservation initiatives at various scales throughout the Mediterranean to recognise those that have political endorsement and those that serve more as lobbying tools. We then propose a model process that can be applied to advance marine spatial planning within the eleven ecologically and biologically significant areas (EBSAs) through a multi-step process designed for moving conservation forward in this particularly complex region. The proposed process combines tenets of professional urban/regional planning and systematic conservation planning. As shown with two specific examples, despite some conventional wisdom, there is enough information on the Mediterranean Sea to move forward with ecosystem-based marine spatial management for conservation purposes using the EBSAs as a starting point - and the time is right to do so.

1. Introduction

Much has been written about the challenges of marine conservation planning and the design of marine protected areas [1], including the process of identifying conservation priorities and implementing them. In this context, the Mediterranean Sea can be compared to many areas of the world, since robust marine conservation planning efforts exist. However, in this area of the world, perhaps more than others, many challenges remain for the implementation of these efforts.

The Mediterranean Sea is one of the world's priority conservation areas, for its relatively large amount of endemic species and high habitat diversity [2,3], and due to increasing levels of human threats that affect all levels of biodiversity [4,5]. Given the current shortfalls in achieving effective marine resource management in

Abbreviations: ACCOBAMS, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area; CBD, Convention on Biological Diversity; CIESM, Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée (International Commission for the Scientific Exploration of the Mediterranean Sea); EBM, ecosystem-based management; EBSA, ecologically or biologically significant area; ECAP, ecosystem approach process; FRAs, fisheries restricted areas; ICZM, integrated coastal zone management; IUCN, International Union for Conservation of Nature; MESMA, monitoring and evaluation of spatially managed areas; MPA, marine protected area; MSP, marine spatial planning; RAC/SPA;, Regional Activity Centre for Specially Protected Areas; SPA/BD, specially protected areas and biological diversity; SPAMI, Specially Protected Areas of Mediterranean Importance; UNEP-MAP, United Nations Environment Programme's Mediterranean Action Plan; WWF, World Wildlife Fund.

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Table 1
A compilation of systematic advocacy planning initiatives[a] that have taken place on a regional level in the Mediterranean in the last decade.

Organisation	Year	Objectives	Details	References
IUCN—WWF	2004	Conservation of Mediterranean deep-sea ecosystems	Protection of unique deep-sea biocenoses in the Mediterranean and adjacent Atlantic waters	Tudela S., et al. 2004. The Mediterranean deep-sea ecosystems. IUCN, Málaga and WWF, Rome, pp. 39–64
Greenpeace	2006	Creation of a network of MPAs	Network of 32 large-scale high seas and coastal areas (territorial and EEZs). 40% of each noted habitat is covered	Greenpeace 2006. Marine reserves for the Mediterranean Sea. Greenpeace International, Amsterdam. 58 pp.
ACCOBAMS	2007	Conservation of cetacean critical habitats	Identification of 18 areas of special importance for cetaceans in the Mediterranean and Black Seas	ACCOBAMS, 2007. MPAs for cetaceans. Resolution 3.22 adopted at the 3rd Meeting of the Contracting Parties to the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area (ACCOBAMS), Dubrovnik, Croatia, 22–25 October 2007
CIESM	2010	Creation of a network of MPAs	Identification of 8 trans-boundary protected areas to enhance biodiversity, peace and cooperation	CIESM. 2011. Marine peace parks in the Mediterranean—a CIESM proposal. Siracusa, 18–20 November 2011. CIESM Workshop Monograph no 41. F. Briand, (Ed), Monaco. 128 pp.
Oceana	2011	Creation of a network of MPAs	MEDNET network of MPAs that comply with the CBD recommendation to protect at least 10% of the world's marine eco-regions	Oceana, 2011. Oceana MEDNET: MPA network proposal for the Mediterranean Sea. Oceana, Madrid, 100 pp.

[a] Advocacy planning is further defined in Section 3.

the Mediterranean, securing acceptance – scientific and political – of priority conservation areas and fast-tracked implementation of strategic marine protected areas (MPAs) is imperative.

In this paper, existing conservation planning efforts for the Mediterranean are reviewed and three critical issues are addressed: (1) the existence of scientifically sound and politically endorsed priority areas for conservation action; (2) the level of knowledge and available data that can be used to begin implementing a functional MPA network; and (3) the type of planning process needed to generate the political support and commitment for science-based and effective implementation of a network of MPAs. This network would allow countries to meet key conservation obligations, such as targets set by the Convention on Biological Diversity (CBD). Models used for urban and environmental planning with principles of conservation planning have been considered for the development of the proposed process.

In the next section, initiatives that have identified priority marine areas for conservation in the Mediterranean are reviewed, focusing on the assessment and identification process for EBSAs (Ecologically or Biologically Significant Areas). In Section 3, a framework for moving EBSAs from a planning to an implementation stage is proposed and justified, while the institutional (legal) background and issues of scale are discussed. In Section 4, a process for designating and managing MPAs within an ecosystem-based management (EBM) context that could work in the Mediterranean is suggested. In the last section, the role of knowledge gaps is discussed and the kind of information that is both relevant and available for moving conservation forward is described, with examples of where the process can be applied.

2. Conservation planning initiatives

Up to now, MPAs in the Mediterranean have been declared by the coastal states on the basis of national initiatives [6] disconnected from a need to construct an ecologically representative network of MPAs [5]. The Protocol on Specially Protected Areas and Biological Diversity (the “SPA/BD Protocol”) of the Barcelona Convention provides for the designation by the Mediterranean countries of Specially Protected Areas of Mediterranean Importance (SPAMIs), which can also be designated in areas beyond national jurisdiction. However, SPAMIs are accrued to the list on a case-by-case basis and they do not function together as a network. Therefore, they are not synergistic, do not properly account for connectivity issues, nor do they achieve representativity of the full range of ecosystems in all biogeographical subdivisions, or replication of ecological features. As such, their designation is largely inconsistent with best conservation planning practices [7,8]. Also, due to the lack of monitoring systems for these protected areas, little is known about whether the declared SPAMIs actually achieve their designated level of protection [9].

Several spatial conservation planning initiatives for the Mediterranean Sea have been proposed in the last decade (Table 1), some recognising and attempting to address the above-mentioned challenges. These include proposals by intergovernmental organisations (ACCOBAMS, CIESM) as well as by NGOs (WWF/IUCN, Greenpeace, Oceana) and scientific consortia (for a more in-depth review of existing initiatives see Micheli et al. [4]). None, however, are embedded in any legally binding framework.

There are also several studies aiming to identify priority areas for conservation and to assess the effectiveness of the approximately 170 marine-coastal protected areas (accounting for 4.56% of the total sea surface area) established in the Mediterranean Sea (Table 2). In addition to serving as inventories, these studies have identified conservation gaps and ‘hotspots’ of biodiversity or threats. For example, Coll et al. [10] quantified the areas of conservation concern for biodiversity by looking at the spatial overlap between high biodiversity and high cumulative human threats, whereas Mouillot et al. [5] examined the spatial match of various diversity traits and the distribution of MPA and fishing efforts (using total catch allocated spatially as a proxy for effort). Portman et al. [9] examined the spatial distribution of Mediterranean MPAs in relation to areas of high human impact and activity in the near-shore marine and terrestrial environment. However, these scientific initiatives fall short of guiding conservation planning efforts and informing governance processes. Although they include ecological considerations, they miss important elements to take into account when planning conservation initiatives, particularly designating SPAMI areas as interconnected nodes within the larger EBSA areas.

For marine areas within the jurisdiction of the European Union (EU), the Habitats Directive [11] and the Birds Directive [12] (collectively the Natura-2000 network) serve as a legally binding basis for the establishment of a set of terrestrial and marine protected areas,. This network, despite its drawbacks [13,14], is an important binding framework for conservation planning in the EU (see http://ec.europa.eu/environment/nature/natura2000/). However, the Natura-2000 initiative covers only the territorial waters of EU member states and thus fails to consider the myriad of ecosystem concerns throughout the Mediterranean Sea [15]. The more recent Marine Strategy Framework Directive (MFSD) [31] requires riparian EU Member States to implement national strategies for the