

Editorial

The new European Marine Strategy Directive: Difficulties, opportunities, and challenges

1. Introduction

The marine environment presents high levels of complexity, diverse habitats and supports a high level of biodiversity. Besides this, it provides different uses which should be exploited in a sustainable way. However, the marine environment is facing increasing and significant pressures, which include pollution, tourism, commercial fishing, introduction of alien species, eutrophication, aquaculture, sediment discharges, sand extraction, maritime transport, and climate change.

In response to these problems, policy-makers worldwide tend to develop strategies to protect, conserve and restore the marine environment, and the United Nations Convention on Law of the Sea (UNCLOS, 1982) is the international basic legal framework that governs the uses of the oceans and seas. UNCLOS outlines provisions for the protection and preservation of marine ecosystems, together with the 1992 Convention on Biological Diversity (CBD, 2000), as highlighted by Parsons (2005).

At a national level, several initiatives have been developed recently (Parsons, 2005): (i) in December 1998, Australia released an Oceans Policy (Commonwealth of Australia, 1999); (ii) the Canadian Parliament passed the Oceans Act, which came into force in January 1997, this being the Canada's Oceans Strategy released in 2002; and (iii) in the USA, the Pew Oceans Commission, created in 2000, and the US Commission on Ocean Policy, created by the Oceans Act of 2000, both reported in 2004 (Granek et al., 2005).

In Europe, although there are several policies which refer in part to the marine environment such as the Habitats and Birds Directives, the Water Framework Directive (WFD) or the Common Fisheries Policy, together with several international conventions and organisations (OSPAR, HELCOM, ICES, WSSD, Barcelona Convention, IMO, MEDPOL, etc.), none yet have been developed in an integrated way for the protection of all seas of the European Union (EU). Analysis undertaken within Europe has detected an inadequate institutional framework for the man-

agement of the sea. Although there exists a large number of regional strategies or conventions, little articulation or coordination occurs between them; similarly, there is poor implementation and a lack of enforcement. In order to face these problems, a "Proposal for a Directive of the European Parliament and of the Council, establishing a Framework for Community Action in the field of Marine Environmental Policy", known as European Marine Strategy (EMS) Directive, has been presented (24th October 2005) by the Commission of the EU (COM, 2005a,b,c).

The main objective of the EMS is to protect and/or restore the European seas, ensuring that human activities are carried out in a sustainable manner, providing safe, clean, healthy and productive marine waters; in summary, "to promote the sustainable use of the seas and conserve marine ecosystems". Hence, the EMS establishes a framework for the development of marine strategies designed to achieve good environmental status in the marine environment by the year 2021 (Table 1). The concept of environmental status takes into account the structure, function and processes of the marine ecosystems together with natural physiographic, geographic and climatic factors, as well as physical and chemical conditions including those resulting from human activities in the area concerned.

Currently, the WFD provides comprehensive coverage of a small (similarly arbitrarily defined) part of European marine waters (19.8%, as stated by Borja, 2005). Conversely, the EMS presents a small area of overlap with the WFD (1 nautical mile, from the baseline) and is applicable to all European waters, on the seaward side of the baseline; from this, the extent of the territorial waters is measured. Such waters extend to the outermost reach of the area covered by the sovereignty or jurisdiction of Member States (MS) (200 nautical miles), including the water column, the sea bed and its sub-surface geology. Hence, the extension of the marine waters under the EMS will have major implications within marine research and in the implementation of some European Directives, including the WFD, as highlighted by Borja (2005).

Table 1
Timetable and plan of action of the European Marine Strategy (EMS) implementation, including some previous landmarks

Year	Plan of action
2002	Communication from the EU Commission, towards an EMS
December 2002	'Kick off' conference, in Koge (Denmark)
November 2004	Stakeholder conference, in Rotterdam (Netherlands)
March to September 2005	Open consultation
October 2005	Proposal for an EMS Directive
(2006)	Entry into force of the EMS Directive
(2008)	The Commission lay down generic qualitative descriptors, criteria and standards for the recognition of good environmental status
(2009)	Transposition of the Directive, into national laws
+6 months	Designation of the national competent authority, for the implementation of the Directive
(2010)	Initial assessment of the current environmental status of European seas (1)
(2010)	Determination of good environmental status for the European waters (2)
(2011)	Establishment of environmental targets (3)
(2012)	Implementation of a monitoring programme (4)
(2012)	Member States shall report on issues (1), (2), (3), and (4), then every 6 years
2016	Development of a programme of measures to achieve good status (5)
2019	Interim Report, describing progress in the implementation of (5)
2018	Entry into operation of the programme of measures
2021	Achieve good environmental status of the European seas.
(2021)	Publication of a first evaluation report, then every 6 years Revision of the Directive, where appropriate

Note: Years between brackets are approximate, depending upon the final publication of the Directive.

2. The contents of the EMS directive

In order to implement this Directive, European marine waters have been split into different ecoregions (COM, 2005a): (i) the Baltic Sea; (ii) the North East Atlantic Ocean (including several sub-regions, such as the North Sea, the Celtic Sea, the Bay of Biscay and the Iberian coast; and the Macaronesian area); and (iii) the Mediterranean (including several sub-regions, such as Western Mediterranean; the Adriatic Sea; the Ionian Sea; and the Aegean-Levantine Sea). In the future, following the incorporation of Bulgaria and Romania into the EU, the Black Sea will need to be added. Hence, the EMS solves one of the problems of the WFD, in splitting European seas into different ecoregions (see Borja, 2005); this is because the WFD considers the Atlantic Ocean and the Mediterranean Sea as two complete ecoregions, without taking into account the substantial ecological differences within each of the areas.

Within each of these ecoregions, a Marine Strategy should be implemented; these, in turn, should follow the plan of action described in Table 1. One of the most important on-going tasks is to analyse the essential characteristics and present environmental status of these waters, together with the corresponding pressures and impacts (COM, 2005a). These variables include: (i) physical and chemical features (bathymetry; temperature and salinity properties; currents and residence time); (ii) habitat types (identification and mapping of special habitats, together with their physico-chemical characteristics); (iii) biological elements (including: phyto and zooplankton; invertebrate fauna; fish, mammals and seabird populations; together with structural and community parameters, population

dynamics, and the introduction of alien species); and (iv) pressures and impacts, such as nutrient inputs and cycling, chemical pollution (water, sediments and biota), physical loss (smothering), physical damage (siltation, abrasion, sediment extraction), non-physical disturbance (noise, visual), non-toxic contamination (organic enrichment, changes in thermal regime, etc.), and biological disturbance (pathogens, non-native species, fishing). Furthermore, such a study must include the economic and social analysis of the use of the sea, together with the cost of marine environment degradation.

The ecological analysis should follow the ecosystem-based approach (EBA) (Browman et al., 2004; Nicholson and Jennings, 2004; Rudd, 2004), taking into account habitat types, biological components, physico-chemical characteristics and hydromorphology. The EBA is defined as: "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. The application of the EBA will help to reach a balance of the conservation, sustainable use, and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources" (CBD, 2000).

On the basis of this assessment, a set of measurable environmental targets and associated indicators must be established for the European waters, together with necessary monitoring programmes for the surveillance of achievement of the good quality status. However, if such a status cannot be reached in appropriate time, the MS must implement some programmes and corrective measures (including ecological and socio-economical measures), to revert poor status into good status.

Hence, the key elements contained in the EMS include (COM, 2005b): (i) a dual EU/regional approach establishing, at EU level, common co-operation and approaches amongst MS and third countries bordering EU oceans and seas, leaving the planning and execution of measures to a regional level, to take into account the diversity of conditions, problems and needs of marine regions requiring specific solutions; (ii) a knowledge-based approach, in order to achieve informed policy-making; (iii) an EBA, whereby human activities affecting the marine environment will be managed, in an integrated manner, to promote conservation and sustainable use in an equitable way of oceans and seas; and (iv) a co-operative approach, providing for broad engagement interaction with all relevant stakeholders, enhancing co-operation with existing regional seas conventions.

3. Some difficulties, opportunities, and challenges in implementing the EMS directive

When a new procedure is established, a plethora of difficulties, opportunities and challenges will arise in implementing and applying it to the 'real world'. In this particular case, there are institutional barriers to the improved protection of EU marine environment (COM, 2005b). (i) At EU and national level, a number of measures exists which contribute to some extent to the protection of the marine environment; however, most of these measures are sectoral and were not designed specifically for protection of the marine environment; (ii) many EU regional seas are the subject of international conventions and a number of these have made excellent contributions to marine protection; however, these conventions have only limited enforcement powers and this compromises their effectiveness in achieving agreed goals; and (iii) at a global level, there is little communication between the large number of strategies, conventions and agreements in place, with significant limitations in terms of their implementation and enforcement.

The barriers outlined above make the EMS, in essence, trans-boundary; as such, they require intense cooperation between the MS for implementation, because national approaches to the marine environment are doomed to fail. There exists an opportunity now, with the recent (and future) incorporation of new MS to the EU, to develop a harmonised approach to European seas protection. Indeed, the development of this EMS has already contributed significantly to the coordination of marine protection efforts, in particular, in relation to regional seas conventions.

As the EMS has stated, good policy depends upon the availability of high-quality information. Presently, the existing EU monitoring and assessment programmes are neither integrated nor complete (with large regional, even national, differences), resulting in an insufficient knowledge-base for EMS implementation. The knowledge that existing monitoring networks have generated has revealed

significant information gaps in relation to the state of the marine environment, the effectiveness of existing measures, and the various threats and pressures posed by human activities.

Hence, a new approach to marine monitoring and assessment, combined with the use of existing scientific information is required across the different levels of governance, to identify and infill knowledge gaps, reduce duplicated data collection and research, and promote the harmonisation, dissemination and use of marine science and associated data. In this way, the establishment of 'marine observatories' and GIS-based tools can assist (for details, see Vallega, 2005). Within this context, the 7th European Research Framework Programme (2007–2013) should emphasise cooperative marine research, addressing the objectives of the EMS; this, in turn, should avoid dichotomies between basic (or academic) research and further knowledge application to assess the marine status.

Conversely, the availability of scientifically based methodologies, in the implementation of the EMS, should prove efficient and economical; this can be undertaken only by means of increasing both marine research and scientist-implementer collaboration, as proposed elsewhere for the WFD (Borja, 2005). In this way, some authors (see Leonard, 2002) provide examples of how biological research can provide cost-effective solutions to analytical problems, together with an opportunity to predict the way in which some human activities may impact upon the marine environment. For a better economical resource profit, cooperation between the different existing Working Groups in ICES, OSPAR, WFD, etc., should be undertaken; these could benefit each other, in terms of previous experience and historical datasets.

The opportunities for progress in EMS implementation can be similar to those for the WFD coastal waters (see Townend, 2002; Borja, 2005). These can be grouped into three objectives: (i) monitoring, in which the key requirements are centred around the assessment of the present state of the system (requiring the identification of sets of indicators, to be used in such an assessment) and rates of change (including both short- and long-term changes); (ii) system models, which should take into account the inherent non-linearity of the processes and the complexity of their interactions, at the ecosystem level; and (iii) education, at different levels and addressed to the citizens and to specialised high level training.

Hiscock et al. (2003) have outlined the conceptual approach that scientists have adopted to the understanding of human impacts, in using marine resources and marine environment. Nonetheless, there is a need for improved integration. Therefore, the objective of the above initiatives is to develop easily-understood measures of ecological change, which have clear practical application in the achievement of management goals; namely, to define, understand, protect or restore biological integrity.

The EMS can benefit from synergies with other policies, such as: the WFD; the Urban Waste Water Treatment and

Nitrates Directives; the Habitats and Birds Directives; the Recommendation on Integrated Coastal Zone Management; and the Common Fisheries Policy. This synergy can provide the environmental core for the future EU Maritime Policy; it will set out the course of action required to protect marine ecosystems, upon which sustainable wealth, productivity and employment opportunities depend (COM, 2005b). Conversely, international conventions and agreements can assist in this task, such as: the International Convention for the Control and Management of Ships' Ballast Water and Sediments; the International Convention on the Control of Harmful Anti-Fouling Systems on Ships; and the UN Convention on Biological Diversity. Such an approach should be combined with the cooperation with third countries, such as the EU-Russia Energy dialogue, or countries from the southern shores of the Mediterranean.

As stated for the WFD (Borja, 2005), perhaps, for the first time, the whole of Europe can develop and implement a methodology for the assessment of the ecological status of marine waters. Now, the challenge for scientists is to develop monitoring networks and suitable methodologies (including the EBA, as the main pillar), which could be applied to different ecoregions. This approach would assess, in the most accurate, realistic and pragmatic way the coastal ecological status. This would fill in the gaps and limitations of other EU Directives (Borja, 2005).

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