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# Marine spatial planning: achieving and evaluating integration

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Coastal states and nations are conducting marine spatial planning (MSP) at an ever-increasing pace. Some MSP efforts are aimed at planning areas at a subnational level, whereas others extend as far as 200 nautical miles from shore, within national exclusive economic zones. For planning of all types, but especially for planning in the marine realm, integration has become a sought-after norm now that traditional sectoral, single-issue management has not succeeded. Fisheries collapse, threats to marine biodiversity, and global climate change all support the case for greater integration in marine resource management and policy. The designation of boundaries can be related to the level of cross-sector and cross-jurisdictional integration achieved by MSP. The importance of scale and scope for MSP initiatives is examined, relating these aspects of plans and/or programmes to the levels of integration achieved, and a framework is suggested for evaluation. MSP initiatives in Portugal, the UK, and the USA serve as potential case studies for use of the framework.

**Keywords:** boundary demarcation, integration, oceans policy, sectoral management.

## Introduction

Human ability to exploit the marine environment has intensified. Today, through advanced technologies, we can extract resources from the oceans in ways, at depths, and at distances from shore that we were unable to in the past. For example, electronic devices aid commercial fishers in locating concentrations of fish (Roberts, 2007), and newly developed materials render it feasible and economical to construct high-capacity wind turbines in deep water far out to sea (Portman *et al.*, 2009). As more players become involved, conflicts and competition between users and between stakeholders increase. These changes have evolved against a backdrop of threats to the very resources humans strive to exploit. Threats to the ocean environment loom larger and more problematic from year to year. They include the effects of climate change, invasive species, water-quality degradation, loss of habitat, and decreasing biodiversity (Pew Oceans Commission, 2003; Halpern *et al.*, 2008).

Realizing these conditions, policy-makers have started to take a more proactive and comprehensive approach to managing uses of sea, through marine spatial planning (MSP). MSP influences marine resource use in significant ways. On the one hand, it provides opportunities for comprehensive goal-setting that will undoubtedly include resource protection. On the other hand, the process is one of distribution and allocation ultimately designed to divide resources in order to formalize and institutionalize exploitation.

Many MSP initiatives have started within the past decade. Most exclusively address the uses in countries' territorial waters out to 12 nautical miles (hereafter, miles) from shore. However, some countries have started their MSP in their exclusive economic zones (EEZs), extending out to 200 miles. Some advocate the use of MSP in the high seas beyond EEZs as a way to promote marine conservation and to help countries meet their commitments to the United Nations (UN) Convention on the Law of the Sea (Ardron *et al.*, 2008). Some countries, such as Germany, have separate MSP initiatives for their territorial waters and for their EEZs (Portman *et al.*, 2009). The MSP process can highlight problems of jurisdictional discrepancy between national and subnational authorities or, conversely, can provide opportunities to achieve improved coordination and cooperation between different levels of government (Ehler and Basta, 1993).

Most MSP efforts are described as integrative (Ehler and Douvere, 2009; Interagency Ocean Policy Task Force, 2009). The importance of integration cannot be underestimated. Given the failures of past ocean management efforts that were largely sectoral (Pew Oceans Commission, 2003; Tanaka, 2004), the success of MSP may hinge on its ability to achieve integration.

Concern for the marine environment frequently falls secondary to concern for the terrestrial environment, as we see in the number and quality of protected areas (Barr and Lindholm, 2000), knowledge/analysis of the marine environment (Irish and Norse, 1996; Halpern *et al.*, 2008), and governance options (Courtney and Wiggin, 2002; Portman, 2007). Although such a comparison is beyond the scope of this paper, integration achieved in the marine environment may lag far behind that achieved on land (see section below on Integration as a norm).

The purpose of this paper is to inform about MSP as a mechanism for improved management of ocean resources, then to highlight the role of integration and discuss mechanisms for its achievement. I also propose a framework for evaluating the level of integration achieved by MSP based on these mechanisms, describing three MSP initiatives that could serve as case studies for application of the framework.

## Marine spatial planning and its implementation

MSP is a process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to "achieve ecological, economic, and social objectives, usually

specified through a political process" (Ehler and Douvere, 2009). Experts on marine policy have compared MSP with traditional planning and zoning that has taken place for decades on shore. Turnipseed *et al.* (2009) refer to MSP as "analogous to land use planning in terrestrial settings". However, there are major differences between marine and terrestrial environments that render such comparisons tenuous.

Resources at sea are more dynamic, fluid, and transient than those on land. Agardy (2000) lists differences between marine and terrestrial systems as: nebulous vs. clear boundaries, large vs. small spatial scales, fine vs. coarse temporal scales, three- vs. two-dimensional living space, unstructured vs. structured foodwebs, and non-linear vs. linear system dynamics. Marine resources are less understood and, by and large, constitute open access and common property goods. The ocean is three-dimensional in that the depth of ocean resources determines the characteristics and interactions among organisms and elements of the environment. Human constructs will be different when applied to the oceans. Property rights are well established on land, but not for the sea. Terrestrial zoning usually regulates private property so that its application to the sea is justifiably different (Courtney and Wiggin, 2002). Despite these differences, the need to regulate the use of ocean resources engenders the transfer of terrestrial modes of governance to the marine environment (Portman, 2007).

As on land, conflicting uses are the basis for laws, policies, and programmes pertaining to the sea. To qualify as a conflict over resources, there must be the perception of incompatible goals, scarce resources, and interference between involved parties (Weinstein *et al.*, 2007; Reed *et al.*, 2009). These are all common situations at sea. Contested uses frequently intensify close to shore in the crowded use areas of the coastal zone. Miles (1991) contends that nearshore conflicts involve competition for space, adverse effects of one use (e.g. oil extraction) on another (e.g. fisheries), detrimental effects on ecosystems, and negative impacts to onshore systems, such as competition for harbour space. Similarly, the UN Environment Programme's coastal tourism handbook (UNEP, 2009) points out that conflicts in the coastal zone are usually over (i) access to the coastline for uses that require locations in the land–sea interface (e.g. marinas), (ii) uses that cannot exist together spatially or temporally, such as recreation and tuna-farming, (iii) private ownership that can restrict public use of coastal resources, and (iv) conservation of important natural environments which inhibit immediate economic interests, e.g. no-take zones in marine protected areas (MPAs) or shipping-lane diversion as a result of whale migrations.

Planning gives policy-makers the ability to address the desires and needs of resource users proactively before conflicts arise or intensify. Once ocean policies articulate management needs, they are operationalized through MSP (Figure 1). Well-integrated MSP provides opportunities for conflict reduction. To conduct integrated MSP, decision-makers and experts on marine policy employ approaches such as ecosystem-based management (EBM) or integrated coastal-zone management (ICZM), which in turn emphasize comprehensiveness and the crossing of boundaries, both figuratively and literally. It needs to be emphasized here that EBM addresses the full range of human uses across sectors; its effectiveness and reliability require utilizing credible science, accounting for all user groups, and adapting to the changing needs of the environment and society (Levin *et al.*, 2009). ICZM, is "a continuous and dynamic process by which decisions are made for the sustainable use, development and protection of coastal and marine areas and resources" (Cicin-Sain and Knecht, 1998).

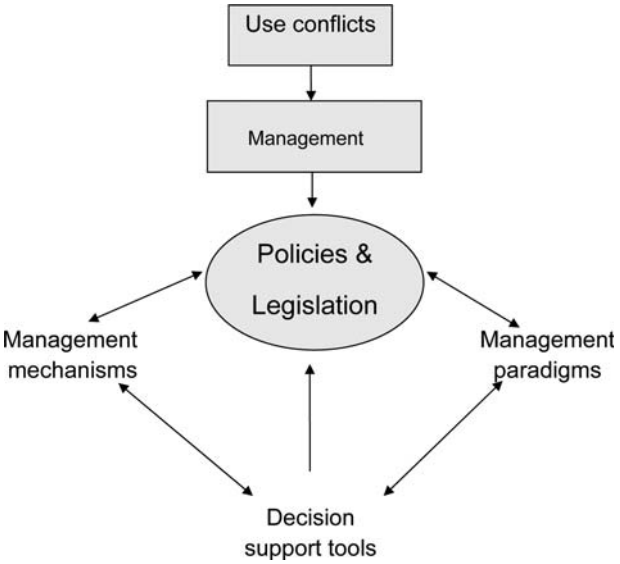


**Figure 1.** Proactive planning as a response to conflicts and management needs.

For MSP to reduce conflicts effectively while avoiding the generation of new ones, it needs to be truly integrative; but what does that mean? Although one is hard pressed to find any resource management approach that does not incorporate a degree of integration, it is difficult to characterize concisely the many facets of integration. This has repercussions as to how we understand and evaluate MSP.

## Integration as a norm

Integration is a basic principle for a variety of management regimes. For resource management or environmental policy, integration connotes the crossing of boundaries; these can be professional (i.e. field/discipline), physical, institutional, or administrative boundaries (Ernsteins, 2010). The coordinated treatment of different landscape units represents the crossing of physical boundaries. Professional boundaries are crossed in integrated assessment. Although highly context dependent, an integrated assessment assembles, and makes coherent, information from a broader set of domains than would research from a single discipline (Parson, 1995). Similarly, institutional boundaries are crossed by multilevel interactions between organizational entities (Tanaka, 2004).

Based on models of integration in the realm of environmental policy, Figure 2 depicts the dimensions of integration schematically. The most common dimensions are physical, referring to the spatial layout of uses, and governance, referring to management authorities, jurisdictions, policies, and legislation. An additional dimension, a hybrid (relating to governance and to physical/temporal attributes), is the integration of science and policy. For that dimension, traditional fields of inquiry are crossed along with the realms of natural and social sciences.

Many international plans, programmes, and legislation, especially in the EU, promote integration in sectors such as water, transportation, and energy. Before the adoption of its Water Framework Directive (Directive 2000/60/EC), EU water

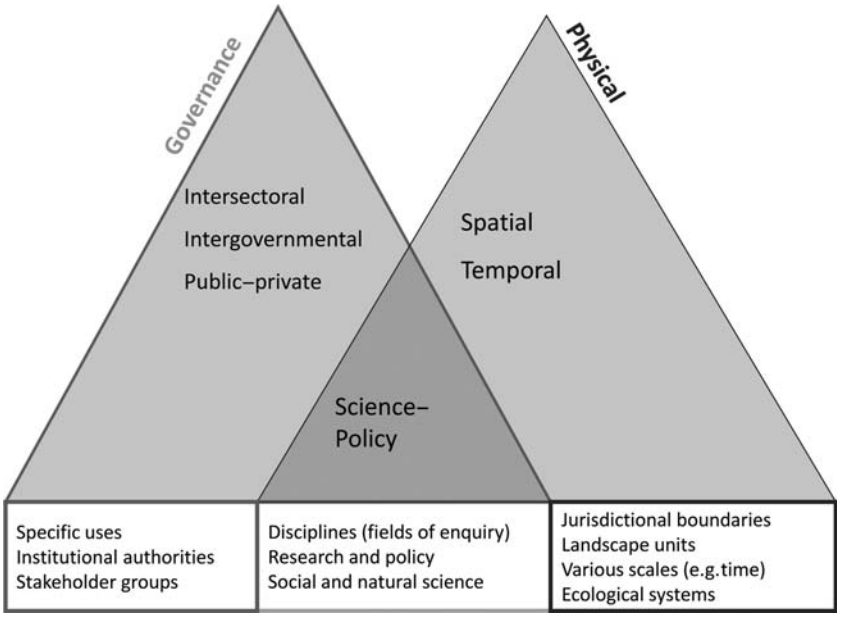


**Figure 2.** Common dimensions of integration. The bottom boxes indicate what could be integrated within each dimension.

policy was fragmented in its objectives and operations. The framework mandates integration by expanding the scope of water protection to all waters, including surface and groundwater. The White Paper on European Transportation policy set goals for integration of various types: integration of different modes of transport; integration of external costs of modes and systems; and integration of different levels of transport from international to regional, national, and local (European Commission, 2001). European countries such as Denmark and Germany have integrated national (state) energy markets and adopted integrated energy planning that seeks a least-cost combination of supply and end-use efficiency measures (D'Sa, 2005).

## Integration in the marine environment

Three decades ago, Underdal (1980) called for greater integration in marine resource management. The ideal he described would bring constituent elements to work in parallel or hierarchically, while subject to a single, unifying concept or set of goals. Despite many subsequent calls for integration, laws and policies aimed at regulating the exploitation of marine and coastal resources continue to be organized around uses in a sectoral manner (Stokstad, 2009; Lubchenco and Sutley, 2010). Moreover, multiple agency involvement and jurisdictional redundancy continue to hinder management (Pew Oceans Commission, 2003). For example, US subnational states control their waters out to 3 miles, but many uses within them require federal authorization. Beyond the 3-mile limit, some 20 federal agencies have responsibilities for more than 140 laws that apply to federal ocean waters and the Great Lakes (Stokstad, 2009). Although the 1982 UN Convention on the Law of the Sea (UNCLOS) defines the extent of coastal nation-state jurisdiction in offshore waters, many countries have not ratified the convention, giving rise to much jurisdictional ambiguity.

The 2005 impact assessment of the EU's Marine Strategy Directive of 2002 identifies the lack of an overall, integrated policy for marine protection. Existing measures to control and reduce pressures and impacts on the marine environment have developed by sector, resulting in a patchwork of policies, legislation, programmes, and action plans at national, regional, European, and international levels, with little coordination between them. Hence, the 2005 assessment recommends future integration on two levels: across sectors and between levels of government (European Commission, 2005). The findings of that assessment have laid the foundation for several countries' MSP initiatives (see Potential applications of the framework section).

A planning approach used for MSP, such as EBM or ICZM, may influence boundaries, but it is most likely that a directive or enabling legislation will define planning limits based on jurisdictions (Sas *et al.*, 2010). Marine ecosystems do not have sharp boundaries; they blend into each other, and their components interact at multiple scales (Levin *et al.*, 2009). The rigidity of boundaries can be offset partially using indicators and buffer zones to monitor trends in the state of the larger ecosystems in which the area for MSP lies. Ehler and Douvere (2009) distinguish between the boundaries for management in the MSP process and the boundaries of analysis. The latter will likely be larger and/or broader than for the former, so as to include areas of influence, life cycle expanses, and interactions between ecosystems. This provides another opportunity for integration: the crossing between planning area boundaries (frequently jurisdictional) and landscape unit boundaries. However, those boundaries are often limited by data-collecting ability, funding, or scientific knowledge.

Whereas the landward limits of coastal zones often depend on characteristics of the environment (Clark, 1996), policy-makers have usually determined marine boundaries of the coastal zone based on jurisdictional lines or agency mandates (Tanaka, 2004). This may reflect better data and greater familiarity with the terrestrial environment. For landside coastal-zone boundaries, there are several common paradigms, e.g. physical landscape, ecological processes and species distribution, or spatial aspects of land uses and infrastructure (Sas *et al.*, 2010). Allowing the boundary to correspond to the physical environment may result in setting a wide managerial unit that accounts for the entire river–coast continuum from the uplands of discharging rivers and their catchments to the sea (European Environment Agency, 2006).

There is consensus that anticipating the interrelated effects of impacts to the physical environment at varying scales is a worthwhile endeavour (Ostrom, 1999; Cash *et al.*, 2006; Levin *et al.*, 2009). For example, the authors of the Millennium Ecosystem Assessment (2005) emphasized the importance of scale and recommended assessment boundaries that were neither too big to see local concerns nor too local to see the big picture. For marine planning, the crossing of typically bounded systems is especially important for the consideration of interdependencies between physical systems in ways that improve management (e.g. appropriate regulation, development assistance, and inclusive public participation). Conservation requires comprehensive, proactive planning and the support and cooperation of many stakeholders, so integration should bring about greater resource protection (Weinstein *et al.*, 2007; Biermann *et al.*, 2009). MSP can make a significant contribution to marine conservation if it is truly integrative. A concrete example is the ability to design and develop networks of MPAs as opposed to single, isolated reserves with little or no connectivity between them (Rees *et al.*, 2010).

In acknowledging the importance of getting the scale (i.e. the physical extent) right for MSP, integration requires planners to address scope too. Scope refers to uses or elements of environmental subsystems such as water, living resources, or habitat types, to name just a few, and it is distinct from the physical extent (scale). For an MSP process, planners need to ensure that planning includes particular uses and resources. Regulatory programmes operationalize both scale and scope along jurisdictional lines, using detailed rules and mandates for exploitation of the environment found within or in some way related to these boundaries. Exploitation may mean extraction, but it can also be an activity with non-use value, such as habitat conservation or whale-watching.

What follows below is a theoretical discussion of spatial scale and scope as applied to the marine environment, and a description of a suggested framework for analysis of integration that can be achieved by MSP. In the brief examples of MSP at the end of this paper, I point out how variations in scale and scope achieve integration.

## Marine scale and scope

Spatial dimensions that determine the physical extent of a targeted geographic area will influence the type of management employed, and vice versa. When planning incorporates EBM approaches, boundaries are likely to extend across different biophysical units and jurisdictions, to encompass areas at varying scales (Convention on Biological Diversity, 2000). Questions of scope often determine the boundaries for sectoral management, such as for ocean transport that may be limited to specific lanes. However, integrated plans need to have a broad scope. For example, for integrated ecosystem-based fisheries management, boundaries need to encompass different stages in the life cycles of fish. Other plans for which boundaries are based on scope are those designed to protect areas with particularly sensitive elements. In the coastal zone, these can include areas such as a watershed that surrounds an estuary system, or areas particularly prone to coastal hazards such as flooding (May *et al.*, 1996).

Other types of boundary that may be based on scope are those set to solve a resource problem, such as pollution, which has major influences on many uses. Balaguer *et al.* (2008) contend that the type of problem addressed usually determines the spatial scale and scope of a management initiative. For MSP, the demarcation needs at least to include both the cause and the effect of problems in the analysis and management unit. As mentioned earlier, there is also a difference between the area of analysis and the area of management set for an MSP process. The former will often be of a significantly larger scale than the latter, which is usually subject to greater restriction by administrative and jurisdictional mandates.

In contrast to boundaries that follow ecological processes or address the uses of a resource, arbitrary administrative lines may unduly confine planning efforts. Whether or not such boundaries constrain management, they are frequently in place for the convenience of governance, or they may be historical policy relics that have continued because it is politically difficult to change them (Sas *et al.*, 2010). In any case, jurisdictional administrative lines are human constructs that need to be understood better, especially in terms of how they impede or support integrated MSP. Some examples follow below.

## Jurisdictional approaches to marine scale and scope

UNCLOS uses a zonal management approach that divides between marine spaces next to the coast and those beyond state sovereignty. It determined that coastal state territorial waters extend to a distance of 12 miles from the shore, territorial boundaries adopted by most countries. UNCLOS also regulates countries' claims to EEZ, usually from 12 to 200 miles from shore. (EEZ limits are boundaries for the use of resources and their management; countries do not have comprehensive ownership rights within their EEZ, they have "use" rights.) By determining limits based on distance from shore, the ecological interaction between marine species, their life cycle needs, and the ecological conditions of the physical area surrounding them are ignored (Tanaka, 2004).

In some cases, management in nearshore submerged areas is $<$12 miles, as is true for most US subnational states (NOAA, 2011). Offshore jurisdiction can also be set by bathymetric depth, such as in China, which has set 15 m depth as the reference for a boundary (Clark, 1996), or in Israel, which uses 30 m seabed depth as the seaward limit of its coastal strip designation (Sas *et al.*, 2010). Owing to bathymetry, boundaries set by depth will vary from place to place along a coast, but even those boundaries are arbitrary in regards to environmental characteristics and the goals of integration.

Many countries, subnational states, and local authorities impose conditions on development within the coastal zone, and in those cases, boundary demarcation becomes critical to both developers and conservationists. Restrictions pertain to both land and marine components. There are many examples for areas that cross land and seascape units, such as the Exuma Cays Land and Sea Park in the Bahamas (Portman, 2009b), and city harbour plans in the USA that protect water-dependent uses along working waterfronts and ports (Portman, 2006). Some of these nearshore restrictions are now being incorporated into and expanded on through MSP efforts (Kannen *et al.*, 2008; Massachusetts Legislature, 2008).

Differences in MSP boundary demarcation highlights the need to examine how the delimitation of boundaries supports or impedes integration. This need is based on questions and concerns that experts in natural resource management (e.g. Molle, 2009), among them marine policy experts and conservationists (e.g. Kannen *et al.*, 2008), call for, including studies of governance mechanisms for integration. Of particular interest are marine-policy

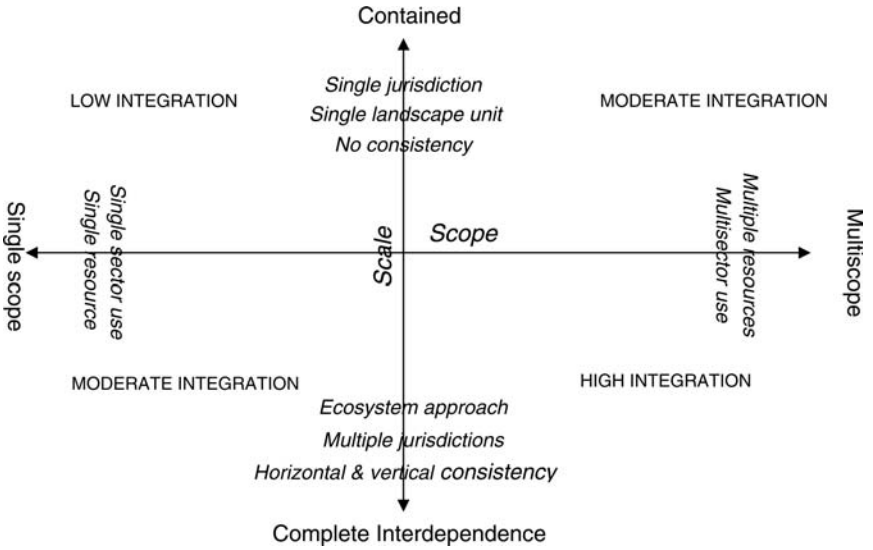


**Figure 3.** Quadrants analysis: a framework for gauging the level of integration achieved by MSP processes and plans. The criteria for evaluation appear in italics.

approaches such as MSP processes that balance development with conservation at varying spatial scales and with differences in scope.

## Two measures of integration: scale and scope

The question arises, therefore, how we can gauge or evaluate how much integration is being achieved? As we have defined two dimensions important to boundary demarcation for MSP—scale and scope—we can use characteristics of these two dimensions to judge the level of integration visualized along X and Y continuums in a graph. Doing so facilitates analysis of various MSP efforts and helps determine the level of integration from high to low.

The integration evaluation framework works by identifying a number of criteria categorized as related to either scale or scope, determining the extremes of these criteria, then locating where the particular MSP process or outcomes lie on the continuum of the *x*- (scope) and *y*-axes (scale). This will lead to an analysis of the ability of a plan (or programme) to integrate according to the quadrant in which the plan is situated. Figure 3 overlays the continuums of scale and scope and illustrates the framework. It shows a few sample criteria on each of the continuums, but many more could be added.

Starting with the *x*-axis for evaluating scale, the two extremes are either a contained approach restricted by a hard-and-fast boundary of some type, or an approach that considers the interdependence of many elements of the environment. The three criteria listed as examples are an ecosystem approach for which all elements of the ecosystem are considered, including a multitude of jurisdictional lines and consistency which can be horizontal, vertical, or both. Vertical consistency refers to harmony between hierarchical levels (national, regional, local, etc), whereas horizontal refers to coordination between similar authorities either at the same governance level or at the same level of spatial unit. For example, overarching policies embodied in a plan give a federal state a basis for reviewing regional and local plans to ensure vertical consistency. Horizontal consistency can be secured by requiring governments to pursue land-use regulations and public investment (distributions) in a manner consistent with policies of adjacent governments or authorities (Bridge and Salman, 2000). An MSP effort will most likely not be completely contained within a single spatial unit or able to take into account all the interdependencies resulting from broad jurisdictional determination, perhaps because of a lack of data. Similarly, complete vertical and horizontal consistency will be unlikely. Therefore, a plan or programme will fall somewhere between the extremes of each.

A similar evaluation can be conducted for the scope dimension visualized on the *y*-axis. The two extremes are single scope or multiscope. In Figure 3, the sample criteria presented relate to use and resource sectors. For example, a single-sector plan would be a fisheries spatial plan that concentrates solely on the fishing sector; the only resource of concern would be fish. This type of marine spatial plan is not integrated in its scope. Similarly, a multiscope MSP process or plan would consider all use sectors and all resources, including minerals, fish, seabed space, the water column, living resources, and stationary resources.

Once MSP processes and outcomes are evaluated using this framework, some conclusions materialize about how much integration can be achieved depending on the resulting quadrant. The specific criteria used for the analysis needs to be flexible and can be many or few, but should at least address both basic dimensions: scale and scope. Application of this framework can help operationalize integration, but it will benefit from implementation on real-world cases. Although a full analysis is beyond the scope of this paper, the three MSP efforts described below and briefly compared in Table 1 could serve to test the utility of the framework.

## Potential applications of the framework for evaluating integration

Most MSP efforts in European countries are driven and supported by international and EU-level initiatives that reflect the discussion and controversy regarding new uses of the sea and the need to meet commitments to protect the marine environment (Douvere and Ehler, 2009). Following earlier communications about the marine environment (such as the Thematic Strategy on the Protection and Conservation of the Marine Environment and an Impact Assessment on the proposed Marine Strategy Directive in 2005), the European Commission published its guidelines for

**Table 1.** Comparison of three national integrated MSP initiatives

| Initiative or status | Portugal | UK | US |
|---|---|---|---|
| Enabling legislation | Action Plan of the National Sea Strategy | Marine and Coastal Access Act | Executive Order for Stewardship of our Ocean, our Coasts, and the Great Lakes |
| Legislation promulgated | December 2006 | November 2009 | July 2010 |
| Jurisdictional area | EEZ and territorial sea | EEZ (partial) and territorial sea | EEZ. Territorial sea and integration with coastal state MSP |
| Scale | National plan (POEM) | Regional plans | Regional plans |
| MSP phase[a] | Plan proposed; public presentation and input ongoing | Mandated | Mandated |
| Overarching responsible agency/institution | Portuguese Government | Marine Management Organization (MMO) | Ocean Policy Task Force |
| Implementing authority | Interministerial Committee for Marine Subjects and National Water Institute | MMO | Regional Advisory Committees |

[a]As of the writing of this article.

integrated marine policy in June 2008 (European Commission, 2008a). The Roadmap for Maritime Spatial Planning: Achieving Common Principles in the European Union (EU) followed in November 2008 (European Commission, 2008b). EU member countries immediately began implementing the roadmap, but over varying schedules.

In the USA, one of the main drivers of recent efforts in MSP has been the interest in developing facilities for renewable-energy generation offshore and the need for place-based planning approaches that can provide some measure of certainty for prospective developers. Place-based management of marine environments such as that achieved by ecosystem-based MSP is management that emphasizes spatially explicit activities together with dynamic physical processes (Young *et al.*, 2007). In addition, marine policy experts have called for a comprehensive marine policy, ocean zoning and integrated marine management at the US national level for some time (Underdal, 1980; Stokstad, 2009; Lubchenco and Sutley, 2010). Of late, these two forces have come together to further MSP in the USA.

## Portugal: a frontrunner in Europe

It is within the context of the Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU (European Commission, 2008b) mentioned above that Portugal initiated a national MSP according to a new National Sea Strategy, the outcome of Ministers' Resolution No. 163/2006 (Estrutura de Missáo para os Assuntos do Mar, or EMAM). EMAM articulated the national government's intention to establish an integrated marine policy to be materialized through two instruments: the National Strategy for Integrated Management of Coastal Zones (ENGIZC) and a plan of the maritime area. The ENGIZC was approved in 2009. The Portuguese marine spatial plan, called the Plano de Ordenamento do Espaço Marítimo (POEM) is at the time of writing, awaiting approval.

Portugal's marine area is large, so its MSP takes on a special significance. Portugal's EEZ encompasses 1 727 408 $km^2$ compared with the country's continental area of 327 667 $km^2$ (Ferreira and Simões, 2010). The area covered by the EEZ is the third in size in Europe after France and the UK, and the largest if one considers only maritime area in the EU. In May 2009, Portugal submitted a claim to extend its jurisdiction over an additional 2.15 million $km^2$ of the adjacent continental shelf. Although the claim has not been settled (partially because of disputes with Spain), its approval would result in a total of more than 3 877 000 $km^2$ (Portuguese Government, 2009).

The National Sea Strategy recognizes the need to exploit maritime space while at the same time valuing marine habitats and biodiversity. Important drivers of the POEM are nature and cultural amenities protection, development of marine renewable energy, interest in reforming fisheries management, and port development. Its major goals are economic development, nature preservation, and the advancement of Portugal as an important maritime country (VLex Portugal, 2006). POEM development is led by a multidisciplinary team consisting of representatives from various government ministries and agencies, the Portuguese Water Institute, and four external consultants, including university representatives (Calado *et al.*, 2010).

The Portuguese plan encompasses the EEZ and territorial waters (to 12 miles from shore) together, and coastal waters directly seawards of the maximum high-water mark of equinox tides. The plan balances development and environmental protection, brings about coherence between land and marine planning strategies, and will employ legally binding zoning. POEM involves a baseline study and analysis, followed by scenario development, which has led to a preliminary plan proposal expected to be approved by late 2011 (Vasconcelos, 2009; Borges, 2010).

According to Calado *et al.* (2010), the two most significant challenges for Portuguese MSP effort have been access to good quality data and the lack of implementation tools that support an effective public discussion and input. The POEM team developed a website as a platform to encourage stakeholder input and efficient communication between the MSP team and the public, but Calado *et al.* (2010) describe the mandatory public discussion as "tokenistic". The whole process of public comment is taking place on a short timetable of 1 year, despite the complexity of the plan (see Portman 2009a; Borges, 2010). Moreover, gathering information from marine sectors, agencies, and research entities has been difficult because of problems in coordinating various data formats and countering vested interests and barriers to sharing (Calado *et al.*, 2010). These challenges suggest a moderate level of integration of an MSP process, although it may be too early to evaluate the process fully.

European efforts at MSP, such as POEM, have an advantage of scale and scope in that there are several EU-level initiatives that serve as guiding directives and ensure the crossing of multiple levels of government and the consideration of a number of uses. For marine conservation, these include the Convention on Biological Diversity, OSPAR, and Natura 2000, which will be adopted by POEM. (OSPAR is the mechanism by which 15 Governments of the western coasts and catchments of Europe,

together with the European Community, cooperate to protect the marine environment of the Northeast Atlantic. Natura 2000 is a network of protected areas designated through legislation by the EU in May 1992, called the Habitats Directive, and complements the EU Birds Directive of 1979.) These regional European efforts in some ways hinder and in some ways help the MSP initiatives. As they are top–down determinations, they anchor proactive conservation zones that constitute a type of *fait accompli* that those involved in an MSP process have to accept and work around. This may cause controversy, and may reduce the motivation of some users to take part. On the other hand, these determinations ensure that some goals, e.g. conservation and marine protection, are afforded a high priority, and they infuse a measure of precaution that may not be achievable otherwise.

## The UK: innovative solutions

In 2006, the UK government commissioned a study to research options for MSP in its offshore waters. The study's principle findings led to the passage of the Marine and Coastal Access Act of 2009. (The Marine and Coastal Access Act, which received Royal Assent on 12 November 2009, is mandated to ensure clean, healthy, safe, productive and biologically diverse oceans and seas, by putting in place better systems for delivering sustainable development of marine and coastal environment.) The Act has set up a framework for management of the seas based on MSP and created a "super" marine management agency. This approach is distinctly different from most other countries, where governments created either intersectoral committees or appointed a lead agency from those already in existence to oversee the MSP process. The UK's Marine Management Organization (MMO) has the responsibility for preparing marine plans for the English inshore and offshore regions (Defra, 2010). An innovative feature of the new Act to be realized through MSP is the identification of Marine Conservation Zones (MCZs). These will be designated in addition to the already existing sites of special scientific interest, offshore national nature reserves, and sites designated for conservation at the EU level (Rees *et al.*, 2010), such as those mentioned in the Portuguese case.

There are two main parts in the system set up by the new Act: the marine policy statement and marine plans. Once these exist, decisions with respect to proposed developments must comply with them. The marine policy statement will guide and direct decisions at the UK level. It will set objectives for sustainable development, ensure consistent and evidence-based decision-making and provide certainty about government policy intentions. The Department for Environment, Food and Rural Affairs (Defra) conducted consultations on the draft marine policy statement during 2010, and plans to finalize it by the end of 2011 (Defra, 2010). The subsequent regional marine plans will be a source of information for stakeholders to use when considering where and how they might carry out activities. The plans will interpret and present the national policies based on the marine policy statement and will apply area-specific policy where appropriate.

Marine stakeholders will benefit from a reduced regulatory burden and a coordinated one-stop-shop licensing system. The two elements of the UK's approach to marine policy, the marine policy statement and marine plans, will improve multilevel governance. Marine plans need to be consistent with the marine policy statement, ensuring linkage between national policy and regional or local application. Stakeholder participation is a major element of the planning process for development of both the marine policy statement and the plans. However, it remains to be seen whether the multitude of non-marine-related entities will have adequate opportunities to provide input to the process. For example, it will be a challenge to ensure that entities impacting marine conservation through land-based sources of marine pollution be included in the process.

Rees *et al.* (2010) point out that past attempts to bring about broad-scale conservation through a network of marine reserves in UK waters failed because of weak legal provisions and the lack of political will in the face of stakeholder conflict. However, the provision for designating MCZs in the new Act may still not achieve the desired marine conservation goals if the current emphasis on fishing and recreation and their associated market or commodity values are not balanced adequately in the planning process with values derived from ecological systems. Applying the proposed framework, stakeholder values associated with certain uses of the marine area will be captured along the scope axis, depending on whether stakeholder involvement is broad-based or limited (i.e. single-sector).

## The USA: crossing the federal–state divide

MSP efforts in the USA are most advanced at the subnational level. As mentioned above, these have been driven largely by interests in developing marine renewable energy facilities (Portman *et al.*, 2009). It is advantageous for such facilities to be located relatively close to shore, near centres of consumption, so most proposals are in state territorial waters. As the federal government has started regional MSP efforts, states are concerned about how government policy-makers and bureaucrats at subnational and federal government levels will ensure a harmonious approach to spatial planning across state waters and into the US EEZ (Eastern Research Group, 2010).

In September 2009, President Obama's White House Interagency Ocean Policy Task Force issued its Interim Report (Interagency Ocean Policy Task Force, 2009), followed in December 2009 by the Interim Framework for Effective Coastal and Marine Spatial Planning (the "Framework"). A few months later, on 20 April 2010, the "Deepwater Horizon" oil spill, the worst spill in US history, occurred off the country's southern shores. In an effort to establish proactive protections for the nation's ocean treasures, President Obama signed the Executive Order for Stewardship of the Ocean, Coasts, and the Great Lakes on 19 July 2010. This Order created the National Ocean Council to coordinate the work of the multiple federal agencies already involved in marine conservation and planning, and established advisory committees for the development of regional coastal and marine spatial plans (CMS Plans). The Executive Order adopted the recommendations of the Framework, defined coastal and marine spatial planning (CMSP), and mandated that regional CMS Plans need to be approved by the newly created National Ocean Council (White House Office of the Press Secretary, 2010).

Similar to the UK's marine policy statement, the Executive Order referencing the Framework articulates federal coastal and MSP goals and guiding principles which must be adhered to in developing and implementing CMS Plans. Among these goals is the conservation of important ecological areas, such as those of high productivity, biodiversity, and migration corridors. The Framework acknowledges that successful MSP will require coordination between federal, state, tribal, local authorities, and regional governance structures, and will need to include meaningful stakeholder involvement (Interagency Ocean Policy Task Force, 2009).

The federal initiative for MSP is specific in scale, but vague in scope. The Framework determines that the planning area for MSP will be regional and will include the territorial sea, the EEZ, the continental shelf, inland bays, and estuaries, and will extend landwards to the mean high-waterline. Although the new policy determines that effective management necessitates connecting land-based planning efforts with ocean and coastal planning, the CMS Plans will not automatically include upland areas unless a regional planning body decides to include them.

As the Framework is a policy guidance document, it declares general intentions rather than statutory mandates. For example, it states that land-based watershed planning efforts need to inform and influence CMSP within each region. Similarly, ocean and coastal activities that affect land-based ecosystems "should be considered and accounted for" during MSP efforts using existing state and federal programmes, such as the Coastal Zone Management Act and the Clean Water Act. However, it does not specifically determine the types of regulatory tool to be used.

With regard to other ongoing US state-level MSP initiatives, plans are varied in scale and scope. They range from the most basic, localized, single-issue planning initiatives to more-comprehensive, multi-use, ecosystem-wide efforts. Regional groups generally do not lead MSP efforts; most lack the resources to do so, although a significant foundation for regional MSP has already been established in the Northeast and the Mid-Atlantic (Eastern Research Group, 2010). State-level initiatives in Massachusetts, Rhode Island, and Washington State, for example, have set boundaries according to state territorial waters (3 miles from shore). Some horizontal integration is taking place through coordination with neighbouring states based on decisions to adopt ecosystem management that needs to be broader in scale or at least not limited to the 3-mile boundary.

As MSP planning boundaries have been limited to state waters or smaller areas, integration of scale and scope has so far been at the state and local levels more than at the federal–state level. Regional governance holds promise in convening state policy-makers and coordinating with federal agencies, but may not be the best option for coordinating data/science because of a lack of technical resources (Eastern Research Group, 2010). This may change now, but even with the new US Ocean Policy, the federal MSP initiative lags behind those of many states. Also, international conservation determinants, such as those for areas off the coasts of Europe, are limited. Hence, it remains to be seen whether significant integration can be achieved in US waters through MSP.

## Conclusions

MSP is a critical and timely mechanism for managing uses of the sea, considering possible conflicts before they arise, and for marine conservation. The expectations from an MSP process for protecting and rehabilitating the health of marine ecosystems are very high. A question about what MSP will produce, posed in Ehler and Douvere's (2009) guidebook, is answered in this way:

> "Our seas will be cleaner and healthier than they are now and they will be ecologically diverse and dynamic. Ecosystems will be resilient to environmental change so that they deliver the products and services we need for present and future generations. Representative, rare, vulnerable and valued species and habitats will be protected. Spatial and other management measures will be in place to make sure that there is no net loss of biodiversity as a result of human activities".
>
> (Ehler and Douvere, 2009, p. 12)

This is a tall order that calls for us to look at MSP initiatives with a critical eye, especially in striving for marine protection and improving the environmental quality of our oceans.

Natural system interdependencies, together with the failings of the piecemeal approach applied for the use and regulation of marine resources in the past, underscore the need for MSP to reach across boundaries. One of the most important steps in an MSP process will be that of boundary demarcation. If plans are too constrained in scale or limited in scope, and do not consider how ecosystems function, it will be difficult to achieve integration and, in turn, conservation and environmental protection goals. The interconnectedness of neighbouring ocean space and the cross-boundary impacts of ocean uses between countries, at different levels of government, between sectors and between land and seascape units, encourage ever-broader scale and scope for MSP.

As pointed out above, the interrelated effects of degradation of ecosystem functions and services have led resource scholars and managers alike to call for the revision of traditional boundaries for environmental decision-making. In the marine environment, the crossing of typically bounded geographic units and use sectors will allow for the consideration of interdependencies between systems in ways that focus planning and management attention on sustainable development. Such integration has the potential to improve significantly the allocation and management of marine resources. The next challenge will be to look at, analyse, and evaluate MSP for its ability to achieve integration, to identify its failings, and to solve challenges.

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