Key elements and steps in the process of developing ecosystem-based marine spatial planning

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1. Introduction

Marine spatial planning (MSP) is seen by many as an idea whose time has come [1]. This paper highlights key elements and steps that should be considered in deciding if and how to develop an MSP system and framework. These are predominantly illustrated by, or based on, experience from the United Kingdom (UK). The paper has also benefited from discussions at UNESCO’s First International Workshop on MSP [1] and experiences described from other countries.

The paper briefly outlines key considerations in deciding to pursue MSP at all and the basic elements or ‘building blocks’ that would need to be put in place to establish a planning framework, such as: aim and principles, spatial scale and hierarchy, temporal elements, and determining geographic boundaries. The paper goes on to provide an overview of the steps in the process of producing a plan and to consider some of these in detail, particularly setting objectives, planning guidance, particularly on integrating objectives and identifying priorities, spatial data, and stakeholder engagement.

2. Deciding that marine spatial planning is worth developing

2.1. Added value within the Ecosystem Approach

If marine resources are to be used sustainably, ways have to be found to reconcile the differing economic, social, and environmental demands that are placed on the marine environment with its capacity to accommodate these demands, particularly in view of increasing and competing use, e.g., see Fig. 2 of Boyes et al. [2], and growing commitments to protect the environment through, for example, the designation of marine protected areas. Some form of rational, systematic, and well-informed management regime is required. A spatial planning framework is a logical and necessary part of such a regime, as it has long been judged to be on land. MSP offers a range of benefits (Table 1) and most countries are driven by some or all of the benefits listed. During discussions at the UNESCO workshop, it became clear that concern about addressing increasing competition for space and resulting conflict with some degree of certainty is a key driver, whether in Poland, China, or elsewhere. However, it is important to establish the added value of MSP compared to other tools [3] including how it can complement these. Other tools for ecosystem-based management, and their relationship to MSP, are described by Douvere in this issue.

In a recent report, a range of advisers assessed practical actions to implement the Ecosystem Approach to the seas and coasts [4].
They assessed a large number of actions and measures, e.g., representative network of MPAs, developing management indicators, best practice in environmental impact assessment (EIA), against the 12 principles of the Ecosystem Approach set out in the Convention on Biological Diversity, such as setting objectives, decentralised management, the need to consider different spatial and temporal scales. In their report, a spatial planning framework, spatial management/regulation, and regional sea plans were the only three out of 34 measures that met all 12 principles of the Ecosystem Approach. As has been argued in other articles in this issue. MSP is an essential and valuable tool to help implement the Ecosystem Approach in the marine environment.

2.2. Costs

Establishing MSP will incur costs as well as producing benefits. However, relatively little information and practical experience exists on which to assess costs [5]. A recent local project in the UK [6] required funds of approximately £130,000 over a 3-year period (personal communication C. Wishart). Recent legislative proposals in the UK included an indicative annual average estimate of £6.05 million over a period of 20 years to implement a statutory marine planning system (where plans are ‘binding’ on decisions such as awarding of licenses) for the whole of the UK [5]; an earlier assessment [7] considered that ‘non-binding’ and ‘binding’ systems would incur similar costs. The costs presented should be considered as illustrative only, and are a subject to a number of caveats which, in the opinion of the authors, have produced an overestimate.

2.3. Gauging support

In the end, the relevant government or authority will have to judge whether MSP is worth pursuing based not only on cost/benefit analysis but other information such as the views of stakeholders. A consultation on proposals for legislation in the UK provided some ‘market research’. Ninety-three percent of the 195 respondents thought that some form of planning was ‘appropriate or essential’ and 71% (83% if individual responses from the same campaigning organisations are included) supported a statutory binding system [8]. It was clear from discussions and the UNESCO workshop that persuading relevant authorities of the added value of MSP, e.g., national and regional government in the Philippines and Indonesia, and politicians, e.g., California and Belgium, is essential to make progress.

3. Transferring experience from land use planning

While much of the debate on developing MSP has taken place among the marine community, those that understand ‘planning’ also have something to offer. Many lessons can be drawn from the implementation and evolution of land use planning. Caution should be exercised in transferring lessons as there are significant differences between land and sea, including ownership and rights, the relevant ‘community’, co-location of multiple uses, the three-dimensional and dynamic nature of the sea, and available data. Care is also required in applying the same terminology; for example, discussion highlighted that ‘zoning’ has different connotations in different contexts and in places such as the USA, it is seen negatively as having been too prescriptive in terrestrial planning.

Nevertheless, it appears to be widely agreed that many of the principles, procedures, and processes of land use planning systems can be applied to developing MSP [9,10]. As such, spatial plans integrate a wide variety of sectoral policies in space, have a temporal element covering a defined time horizon with periodic renewal, and tend to be nested with different levels/scales providing context for more detailed levels below. Many land use planning systems have evolved and improved over time, including the steps in the planning process and procedures for consultation and participation, and this should be expected of MSP. For example, the most recent changes to land use planning in England include a more ‘regional’ dimension, a move away from over-reliance on prescribing the specific use of space in zones, and a shift in emphasis from ‘balance’ to ‘integration’ between different objectives and further evolution is anticipated [11].

4. Establishing the principles and purpose of MSP

4.1. Purpose

It is important to highlight that planning is about more than gathering information and producing maps. In particular, as a process and framework, much of the benefit of MSP will come from taking a forward look, drawing together relevant objectives and using these together with information about pressures, use, and the state of the marine environment to assess the spatial interactions and cumulative impacts among different sectors, activities and uses. The spatial planning process should then analyse a range of alternative measures for managing those interactions, whether positive or conflicting, to reduce impacts, restore ecosystem functioning, and deliver sustainable use. It is therefore axiomatic that MSP encompasses all sectors of economic use as well as environmental and social issues.

It is important that the purpose of an MSP system is stated. The proposed aim for MSP in the UK [12] is ‘to create a strategic marine planning system that will clarify our marine objectives and priorities for the future, and direct decision-makers and users towards more efficient, sustainable use and protection of our marine resources’. The authors agree that the overall purpose of MSP should centre on delivering sustainable development. We recommend that a similar purpose be included in any statutory measures (as indeed, it in effect has been for land use planning in England [13]).

4.2. Sustainable development principles

It follows from the previous section that MSP should encompass the principles that underpin sustainable development
(and in doing so it shares many of the principles set out for integrated coastal zone management [14]). In general terms the underpinning principles should include:

i. achieving sustainable development;
ii. implementing the Ecosystem Approach;
iii. adopting the precautionary principle, preventative principle, and polluter-pays principle;
iv. facilitating the co-ordination and integration of activities;
v. delivering better regulation; and
vi. enabling compliance with international, regional, and national obligations.

4.3. Guiding principles

In the context of sustainable development, the Ecosystem Approach, and lessons already learned from land use planning, the following specific operating principles are recommended:

i. provide a strategic, integrated, and forward-looking framework for all uses of the sea that takes account of economic, social, and environmental objectives and so helps to achieve sustainable development;
ii. apply the Ecosystem Approach to the regulation and management of development and activities in the marine environment by safeguarding ecological processes and ecosystem resilience, thus ensuring the environment retains the capacity to deliver ecosystem services and so support social and economic benefits;
iii. provide a means to articulate policies and activities affecting the marine area and improve integration between those policies and activities to achieve multiple, shared objectives;
iv. enable more efficient decision-making, offering benefits to marine managers and regulators, developers, users, and their advisors;
v. provide a framework to identify, conserve, and where appropriate, recover important components of coastal and marine ecosystems, including species, habitats, physical features, natural processes, and natural heritage;
vi. embrace all existing and future marine uses, developments and activities, together with natural resources, features, and processes;

vii. extend to all marine waters within the relevant jurisdiction, e.g., EEZ or equivalent;
viii. contain a hierarchy of spatial scales that comprises, as a minimum, national and sub-national (e.g., regional) levels;
ix. create a more efficient and rational use of marine space to provide a balanced view between competing uses, highlighting where one human activity might preclude another, helping avoid or minimise conflicts of interest, and, where possible, optimising the co-location of compatible activities;
x. enable a better understanding of the cumulative effects of different types of human activities, both on marine ecosystems and each other;
xii. promote participation of stakeholders by being transparent, open, and inclusive, and ensure involvement of all relevant stakeholders, including marine users and local communities;
xiii. facilitate co-ordination with and between other governance tools and measures, such as land use planning, watershed management, and marine protected areas, and thereby contribute to integrated coastal zone management;
xiv. provide a strategic and efficient (and thereby cost-effective) approach to information gathering, collation, management, and access, thus reducing the burden and duplication of effort between individual sectors and encouraging greater data availability than at present.

5. Spatial elements—scope and scale

5.1. Geographic scope

Given the purpose of MSP, it would seem logical that it should encompass all waters within a particular jurisdiction, e.g., the EEZ of a nation. However, the degree of planning effort and detail required will vary spatially depending on circumstances, such as the level of human use and conflict, and in some cases may not be needed at all. In UK waters, for example, planning is likely to be more involved in the southern North Sea compared to far offshore in the more remote sea area to the west of Scotland.

5.2. Hierarchy and appropriate scale

Just as ecosystems operate at different scales, so too should MSP. While there is no single answer, experience suggests that it is best to take a hierarchical approach, addressing different issues or detail at each level. We favour this, as a nested approach in which each level provides context for the level below will provide the most effective and least complicated arrangement. The scale at which each level is defined will vary from country to country. We agree with recent proposals in the UK for national (strategic planning policy guidance), broad scale or regional (integration of policy and comprehensive planning), and local (where appropriate, i.e., heavily used or high conflict areas such as some estuaries) levels. We think it is helpful to define ‘broad scale’ as approximately ‘regional’ (Fig. 1), as suggested in a number of reviews [15], reflecting important oceanographic and biogeographic processes and the way in which industry and others divide up the sea for planning purposes. Defining the broad scale level would enable as consistent an approach as possible, particularly where the size of an area may affect the relative importance of issues being considered, e.g., the benefit or impact of an economic development or the conservation interest of a marine protected area. The idea of planning at a more ‘local’ level where required has tended to focus at the scale of estuaries, e.g., Severn Estuary, or smaller inshore areas such as Liverpool Bay (Fig. 1).

6. Spatial elements—defining and planning boundaries

Whatever scale is considered, the boundaries of the planning ‘unit’ need to be defined. This includes along the coast (lateral), landward, and the offshore boundaries.

6.1. Lateral boundaries

Preferably plans should follow meaningful ecosystem boundaries such as those based on biogeography, oceanography, and bathymetry, e.g., suggested regional sea boundaries around the UK (Fig. 1). In principle, under the Ecosystem Approach such boundaries should be taken as a starting point. In practice, planning units will also need to reflect socio-political and administrative considerations and a sensible balance will need to be achieved between these factors. For example, planning is
‘devolved’ in the UK to England, Northern Ireland, Scotland, and Wales (Fig. 1), although within England, there is some approximate alignment between draft ‘regional seas’ and land-based ‘regional’ administrative boundaries [16]. Furthermore, ‘ecological’ boundaries on paper may have to be translated into straight lines on charts to assist sea users in checking their relative position on the ground, as found with the revised zoning scheme for the Great Barrier Reef (see Day in this issue) and defining boundaries around European marine sites in the UK.

The relationship between the planning/governance scales and ecosystems is important to understand in order to identify areas of convergence and areas where these do not align. Measures should be put in place to achieve coherent planning in such situations, at national, regional, and local levels. The UK has a mixed experience in achieving a coherent approach on sites that cross borders, such as the Berwickshire and Northumberland European Marine Site (a type of MPA), and Severn Estuary (Fig. 1). However, in general, practitioners on the ground see a need for clear direction and a requirement on planning authorities to work together if a coherent approach is to be delivered.

6.2. Landward

In theory, the landward boundary will vary depending on the nature of the issue being addressed, i.e., in some cases could be as far inland as the relevant water catchment. In practice, a set landward boundary will need to be defined for legal reasons even if this is an ‘artificial’ boundary within the Ecosystem Approach and the principles of integrated coastal zone management. In most countries, there will be some form of well-established terrestrial planning which may help determine the extent of MSP. In the UK, where terrestrial planning generally extends over the intertidal, a number of options have been considered. The authors favour the recent proposal [12] to extend shoreward over the intertidal because in principle, MSP ought to encompass the marine environment and, as marine planning will affect decisions on marine licences, it should encompass the area to those licences apply. An overlap with terrestrial planning would also be more likely to encourage integration between terrestrial and marine planning activities and institutions, and in most cases, it will not be practical to change the seaward extent of the terrestrial planning system.
6.3. Offshore

The offshore planning boundary is likely to be determined by the limit of national jurisdiction which rarely aligns with an ecosystem boundary. There is reticence amongst European countries to develop cross-border marine plans although there are some hopeful prospects for co-ordination, i.e., collaboration under the auspices of regional seas conventions such as OSPAR [17], HELCOM (Baltic), and the Barcelona Convention (Mediterranean); the requirement for co-operation between countries producing action plans within the same ‘eco-regions’ under the proposed Marine Strategy Directive [18], and strong reference to MSP as a key tool in a discussion document on a future maritime policy for Europe [19]. As marine plans are likely to require ‘Strategic Environmental Assessment’ [20] countries are bound to consult adjacent countries that may be affected. In Europe, marine planning will be complicated by the competence of the European Union over fisheries outside of 6–12 nautical miles.

7. Temporal elements

MSP by definition involves some kind of forward look. It includes expressing a vision about what is desired in the future, forecasting future needs and conditions, and deriving scenarios based on objectives and targets, and ensuring that decisions are led by planning as far as possible rather than being simply reactive. What timeframe should plans take? There is no single answer. Many existing initiatives appear to plan for up to 10 years ahead [10] but others take a longer view, e.g., 25-Year Strategic Plan for the Great Barrier Reef World Heritage Area, and a timeframe of 20 years or longer is now being considered more appropriate (Fig. 2) [12,21].

Clearly plans need to be reviewed in response to new data, including improved estimates of the costs involved in implementing any plan, new or increased levels of human activity, and changes in the policies that the plan is intended to deliver. In defining a review period, there needs to be a sensible, practical balance between keeping plans up to date so that they are used, leaving a plan in place for long enough to realise its benefits, and ensuring the resources to undertake review are kept within manageable limits compared to the overall budget for planning. A typical period for cyclical review appears to be 5–7 years [10]. The period for review will vary depending on circumstances, e.g., the recent Great Barrier Reef plan will not be reviewed for 7 years, the current plan for Dutch waters runs to 2015 and 5–6 year reviews have been proposed in the UK (Fig. 2) [12,21]. Review will also depend on scale, e.g., in Mexico land use plans are reviewed at 2, 4–6 and 6 years at local/regional, state and national level, respectively. Therefore, while we think it is helpful to indicate a review period, it is more important to provide clear guidance on how to take account of new information or changing circumstances without having to review or revise the whole plan. It would be prudent to check the duration of a plan against the timeframe of the objectives driving the plan. Some attempt should be made to ‘future-proof’ the plan by horizon-scanning over a longer period of time in preparing and reviewing the plan, not least in respect of climate change. For example, in the UK, the plans produced to guide coast protection measures (Shoreline Management Plans) take a 50 and 100 years view [22].

8. Key steps in the planning process

8.1. Overall process

The above sections address the key basic elements of setting up an MSP system and framework. The following sections consider the mechanics of the planning process needed to produce a plan. The basic steps in the plan production process are illustrated by those followed in the pilot project in the Irish Sea (Fig. 3). Projects and initiatives elsewhere will have their own versions that are likely to be variations on that shown and, equally, the process can be presented in more detail (for example Ref. [3] which provides a detailed process by comparison with that for Strategic Environmental Assessment) or less detail (Fig. 4). For the purposes of the following discussion, we refer to the latter to emphasise the key inputs required to undertake the planning process, i.e., setting objectives, spatial data, and planning guidance including on identifying priorities. Interested parties

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**Fig. 2.** Suggested programme for a Marine Spatial Plan Programme (adapted from Ref. [25]).
tools’ rather than just a map with zones [23] such as:

emphasised that the outputs can include a range of ‘planning
process in detail here partly because they are covered elsewhere
be directed.
spatial data) and this is where initial effort in the planning process should
objectives to provide a context for spatial data (and providers of
evident from a range of countries and from planning practitioners,
often find it difficult to address objectives and turn quickly to the
relatively easier and more tangible issue of spatial data. It is

The plan production process and stakeholder engagement based on work
from the Irish Sea (adapted from Ref. [25]).

Fig. 3. The plan production process and stakeholder engagement based on work
from the Irish Sea (adapted from Ref. [25]).

Fig. 4. Simple schematic of basic steps in the process of marine spatial planning.

planning conditions or ‘action plans’ focussed on particular areas;
● different types of allocation (indicative, prescriptive); and
● zoning.

Day [24] provides a more exhaustive list of management tools
for the Great Barrier Reef Marine Park which includes many relevant to MSP.

8.2. Identifying objectives

In referring to objectives, we draw a distinction between the
goals for the MSP system as a whole (see Sections 4.1 and 4.3) and
what is being referred to here, namely specific economic, environmental, and social objectives, for different sectors and
for different interests. In general, there appear to be more
identified environmental objectives than there are economic ones.

For the pilot project in the Irish Sea, a wealth of material was
available from regional to international levels from which to
derive objectives for planning [25]. In some cases, further work
was required in order to interpret some of the existing environ-
mental objectives in the context of the plan area. For example, in
the following illustration only the high level objective was already in place:

● High level objective: halt deterioration of biodiversity and
promote recovery where practicable.
  ○ Supporting objective: facilitate network of marine protected
    areas.
    – Target: for scenario, assume 20–30% of the area of
      representative habitats in the region designated as
      MPAs.
    – Policy: important and irreplaceable re-
      sources afforded highest level of protection
      and management.

Clear gaps for other issues existed, with a lack of overt
objectives for some economic sectors, insufficient account of
social justice, and a need for more recognition of cultural heritage.
It was therefore necessary to adapt or create objectives, including
targets and associated policies, to undertake the planning exercise
including forecasting and generating scenarios. For example,

● Objective: exploit renewable energy resources in a sustainable
  manner.
  ○ Target: 10% energy from renewables by 2010. Supporting
    targets could be derived for different energy sources, i.e.,
    wind, tidal, wave. Consider spatial implications based on
    1.2 GW coming from tidal source.
    – Policy: no offshore wind farms within 8 km of the coast.

8.3. Planning guidance—integrating objectives and identifying
priorities

While planning, guidance should cover a plethora of issues; we
focus here on the interaction between objectives and setting
priorities. This is a fundamental step in the planning process, and
as such encompasses integrated assessment (Fig. 4) including
generating scenarios and evaluating options (Fig. 3). The emphasis
here should be more on securing integration rather than a balance
between competing objectives and pressures. As multiple use and
co-occurrence of activities at sea is common, there is obvious
potential for optimising use of space and achieving synergies
between different objectives and interests. Nevertheless, conflicts

Table 8.1: Planning guidance (adapted from Ref. [25]).

<table>
<thead>
<tr>
<th>Objective</th>
<th>Planning guidance</th>
<th>Spatial data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set goals</td>
<td>including prioritisation</td>
<td>from spatial data (and providers of data)</td>
</tr>
<tr>
<td>Identify issues</td>
<td>between objectives, conflicts, opportunities</td>
<td></td>
</tr>
<tr>
<td>Analyse information</td>
<td>Generate options</td>
<td></td>
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<tr>
<td>Evaluate options</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare spatial plan</td>
<td>&amp; sub-regional plans</td>
<td></td>
</tr>
<tr>
<td>Examine plan</td>
<td>Determine goals &amp; objectives</td>
<td></td>
</tr>
<tr>
<td>Implement, monitor &amp; review</td>
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Discussion in the workshop identified that planning systems that are well placed to address conflicts effectively exhibit a number of characteristics, i.e., well-set-out legislation, clear objectives, strong principles and guidance, clear ‘driving’ priorities, and strong stakeholder engagement.

A number of case studies have addressed priorities including through identifying ‘decision rules’ [26,27]. The pilot project in the Irish Sea explored two scenarios that illustrate different responses to apparent conflict. The first concerned the tidal energy target included in Section 8.2. Possible areas for deployment of tidal devices were identified and then overlaid with spatial information on key marine resources and other sea use activities using a grid of cells (approximately 3 km²) over the study area (Fig. 5). The ‘policy’ decision taken in this simulated scenario was to avoid conflict between tidal energy and other spatially constrained interests. Therefore, where a choice had to be made, cells were assigned to the non-tidal interest (‘sieving process’) resulting in a smaller number of cells deemed to be preferred areas for potential tidal stream development [21,28]; these were considered sufficient to attain the contribution of tidal energy to the renewable energy target.

In another simulated hypothetical example, it was more difficult to ‘avoid’ conflict when overlaying known and potential areas for wind farms and fisheries interests (Fig. 6) [25]. In this case, the consultants, acting as the ‘planning body’, made the decision (policy priority or ‘rule’) that because the renewable energy target is such a high priority and such developments are limited in the areas they could potentially occupy compared to fishing activity, wind farms would be given a preference or ‘allocation’ in those areas. The project also explored the use of different techniques to identify conflict, e.g., a ‘goals achievement matrix’, and highlighted the value of identifying and resolving conflicts in conjunction with relevant stakeholders.

**Fig. 5.** Identifying (by ‘sieving’) suitable resource areas for tidal stream energy development, shown as ‘cells’, to avoid conflict with other interests: (a) prior to overlay of potential constraints; (b) showing cells which overlap with one ‘constraint’, potential marine protected area sites; (c) removal of overlapping cells; (d) result after mapping and removing overlap in all cells with any constraint, e.g., shipping routes and known wreck sites, as well as MPAs. From a small section of the marine spatial planning pilot study area in the Irish Sea, adapted from Ref. [28] based on Ref. [21].

8.4. Spatial data

The remaining key input to the planning process (Fig. 4) is spatial data. MSP, like policy and decision making more generally, should be based on the best available information. Poor or limited data will limit the scope of planning. However, in many relatively well-studied waters, such as around parts of Europe, there are many sources of relevant data to enable MSP to be initiated. Four key points must be emphasised here. Firstly, there is a distinction between collecting and collating data; in many instances a lot of data has already been collected for an area but it is either unknown, currently inaccessible or not been presented in a usable format (initial estimates in the UK suggest an investment of £10,000 per plan to address these requirements [5]. Secondly, it is essential to recognise that there are sources of data other than government authorities, industry, and research institutions, e.g., sea users and there is growing experience in capturing such ‘knowledge’ [29] (see also Day and St. Martin and Hall-Arber in this issue). Thirdly, the scope of relevant data extends beyond environmental resources and human activities to, for example, legislation, policy, and values. Finally, MSP can provide an impetus to achieve better management and access to data than other purposes which require much of the same spatial data, e.g., Strategic Environmental Assessment [30].

Given the sustainable purpose of MSP, there is no obvious priority to what data is collated or collected first. This will be determined most likely by local priorities, e.g., expansion in the marine renewable sector, and which data are more readily obtained based on cost and practicalities. Different projects classify the range of data required in various ways, see Ref. [12, pp. 28–29] for an example from the UK.

Effort should be devoted to collating existing data, extracting maximum value from it through ‘reuse’ or new interpretations, and adapting the presentation of existing data to suit a new
audience. Examples from the UK that illustrate these, respectively, include Mapping European Seabed Habitats (a transnational project between five countries) [31], UKSeaMap [32] which used available physical and hydrological data to provide a complete ‘picture’ of the seabed around the UK in the absence of extensive ecological data, and a study to present the net effect of a range of spatial legal controls through the common language of a ‘de facto’ zoning scheme [2].

9. Stakeholder engagement

The nature of MSP is such that stakeholder engagement should be considered intrinsic to it [33] (see Section 4). Governance arrangements are likely to be heavily shaped by practical issues such as the geographic scale of each planning unit, sectoral scope, and the resources available [33]. However, the level of stakeholder engagement will be an important factor in the success of MSP, especially given the difficulties of monitoring compliance with the plan at sea. Recent proposals in the UK [12] stress ‘early engagement of the public, industry, local government, regulators, and stakeholder groups in the planning process is fundamental to achieving its objectives’. Further, in many countries, there are obligations to ensure public participation in decision making [20,34]. Equally, while stakeholder engagement should inform and support the planning process, an authority will ultimately be responsible for planning decisions and that needs to be made clear to all involved to manage their expectations.

9.1. When and how?

Stakeholders should be involved in developing the overall MSP framework and process, rather than only when consultation on an actual plan reaches them, as well as the planning/plan production process itself. On the latter, experience from the evolution of the terrestrial planning system in England and elsewhere, favours ‘front-loading’ stakeholder involvement and dialogue to resolve conflicts earlier in the process. Further, stakeholder engagement will need to be sustained. How stakeholders are engaged will be critical, and they should be properly informed to enable them to play their full roles. However, it can be a lengthy and labour
intensive activity and care is needed to keep the costs associated with it in proportion to the activities being undertaken. While stakeholder engagement is important throughout, recent experience in the UK suggests key steps in the process where it is more essential (Fig. 3).

Stakeholder engagement can be done in many ways, from one-on-one meetings to reactive consultations, but these are not considered in detail here (see instead Pomeroy and Douvere in this issue). Which approach is most appropriate will depend on the context. While direct meetings are important, consultations are sometimes more effective, e.g., the recent major consultation in the Great Barrier Reef. In the UK, there is debate about introducing a mechanism analogous to the ‘examination in public’ held for land use plans. As a principle of good governance, planning systems should include some form of appeal mechanism.

9.2. Who?

Identifying the right stakeholders is a challenging task which needs to consider a number of issues. For example, defining the adjacent ‘local’ or ‘regional’ land-based community may be relatively straightforward, although it may be challenging to raise their awareness of marine issues and establish the most effective mechanism for ensuring an efficient but democratic input, such as through ‘coastal groups’ [35], e.g., the North West Coastal Forum in the Irish Sea planning pilot [36] or elected local and regional representatives. However, it will be a greater challenge to identify those coming from further afield, such as tourists (noting that in England around half the population visit the seaside, many to take part in activities on or in the water) or fisherman with access rights, e.g., in the UK sector of the Irish Sea fishermen from Belgium, France, the Netherlands, and Republic of Ireland as well as from the UK have rights to fish. A substantial effort should be made to bring together all sectors of use and ensure they contribute. This is perhaps easier to achieve for more ‘developmental’ sectors used to applying for spatially based licences, e.g., for building infrastructure, aggregate dredging, sediment disposal, than for shipping or fisheries [37]. A more comprehensive discussion and methodology for the identification of stakeholders are provided elsewhere in this issue (see also Pomeroy and Douvere in this issue).

In terms of technical expertise, it is important to extend beyond the ‘usual suspects’ such as marine managers, regulators, advisers, data providers, to include all relevant disciplines, e.g., terrestrial planners, policy makers, legislators, economists, and other social scientists. Experience in the UK and elsewhere has shown the value of involving different disciplines even though this takes some effort initially to understand each others’ perspective and ‘speak the same language’ [33].

10. Conclusions, recommendations, and summary

MSP is a tool that is worth developing to implement the Ecosystem Approach. However, it is important to demonstrate its added value compared to other existing measures and in doing so to consider costs as well as benefits and to establish support among decision-makers and stakeholders.

While there are significant differences between planning on land and at sea, many lessons can be applied from the implementation and evolution of land use planning. Involving terrestrial planners and the decision support methods they employ offer particular benefits.

The purpose of an MSP system should be stated and founded on a clear set of principles. We recommend that the purpose is about delivering sustainable development and have identified an associated set of generic guiding principles. MSP should clearly encompass all sectors of use.

MSP ought to apply throughout the jurisdiction of particular countries but with varying degrees of detail. Just as ecosystems operate at different scales, so too should MSP. While there is no single answer, a ‘nested approach’ in which each level provides context for the level below is considered to provide the most effective approach.

It would be preferable for planning units to follow meaningful ecosystem boundaries. In practice, they will also need to take account of socio-political and administrative factors and what is practical and recognisable on the ground and in the water. Where planning and ecosystem boundaries do not align, it is important to understand the implications and direct effort and measures toward achieving a coherent approach. An overlap with terrestrial planning systems is likely to facilitate a more integrated approach at the coast.

MSP by definition involves some kind of forward look. There is no single answer to how long a timeframe MSP should take. The challenge is to find the right balance between ensuring the stability of the process and the need to address new and changing policy, use and data. A 20–25 year horizon is often followed with review periods driven by the relevant governance framework. Plans should be ‘future-proofed’ where possible, as well as needing to be adaptable, and this will need to take account of climate change and longer timeframes.

The process of producing a plan involves a series of basic steps that are likely to be generic to different situations. The importance of setting clear objectives early in the process should be recognised and that these objectives should provide the context for spatial data. While it is very challenging, objectives should be identified for the full suite of economic, environmental, and social interests.

Assessing the interaction among objectives and deciding how best to deliver them is fundamental to the planning process. In deciding on options, the emphasis should be more on integrating, rather than balancing, between competing objectives. MSP should help to achieve synergies among different objectives and interests as well as making the best use of space. Nevertheless, conflicts will arise and a number of options exist to address these, including by identifying policy priorities or ‘decision rules’ based on clear principles and stakeholder engagement.

MSP requires extensive spatial data although there is likely to be sufficient existing data to start to establish MSP in many parts of the world. All sources of relevant information should be considered, including stakeholder knowledge, and the most made of existing data before deciding to go to the expense of collecting new data.

The nature of MSP is such that stakeholder engagement should be considered an inherent aspect. Stakeholder engagement is critical to different stages of producing a plan, but so too is the way in which it is done. The earlier in the process stakeholders are involved, and dialogue to resolve conflict is initiated, the better. It is important to involve different disciplines in establishing planning, as well as all sectors with a ‘stake’ in an area and relevant communities, but in the case of the latter, it will be a challenge to effectively identify who they are.

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