Most appropriate geographical scale for MSP at national scale

Northern Atlantic

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Acronyms

DSF	Strategic Sea Basin Documents [*Document Stratégique de Façade*, in French]
EBM	Ecosystem-Based Management
EEZ	Exclusive Economic Zone
ENGIZC	National Strategy for Integrated Coastal Zone Management [*Estratégia Nacional de Gestão Integrada das Zonas Costeiras*, in Portuguese]
ENM	National Ocean Strategy [*Estratégia Nacional para o Mar*, in Portuguese]
LSI	Land-Sea Interactions
MD	Marine Demarcations
MPA	Marine Protected Areas
MS	Member States
MSFD	Marine Strategy Framework Directive
MSP	Maritime Spatial Planning
NAMO	North Atlantic West Channel
PEAP	Special Programs of Protected Areas [*Programas Especiais das Áreas Protegidas*, in Portuguese]
PGBH	River Basin Management Plans [*Planos de Gestão de Bacia Hidrográfica*, in Portuguese]
POAP	Spatial and Management Plans of Protected Areas [*Planos de Ordenamento de Áreas Protegidas*, in Portuguese]
POC	Coastal Zone Programs [*Programas da Orla Costeira*, in Portuguese]
POOC	Coastal Zone Management Plans [*Planos de Ordenamento da Orla Costeira*, in Portuguese]
PSOEM	Situation Plan [*Plano de Situação do Ordenamento do Espaço Marítimo Nacional*, in Portuguese]
SA	South Atlantic
SCoT	Territorial Coherence Plan [*Schéma de Cohérence Territoriale*, in French]
SMVM	Maritime component of SCoT [*Schéma de Mise en Valeur de la Mer*, in French]
SNML	National Maritime and Coastline Strategy [*Stratégie National pour la Mer et le Littoral*, in French]
SRADDET	Regional Plan for the Management, Sustainable Development and Equality of Territories [*Schéma régional d'aménagement, de développement durable et d'égalité des territoires* ,in French]
SRDEII	Regional Economic Development, Innovation and Internationalisation Plan [*Schéma régional de développement économique d'innovation et d'internationalisation*, in French]
UNCLOS	United Nations Convention on the Law of the Sea
WFD	Water Framework Directive

Forward

This report was jointly conducted under both Supporting Implementation of Maritime Spatial Planning in the Western Mediterranean region (SIMWESTMED) and Supporting Implementation of Maritime Spatial Planning in the Northern European Atlantic region (SIMNORAT). As a result, the first draft of each was similar and the difference resulted from partners' content revision.

This report identifies a number of criteria or guiding principles relevant for ensuring that appropriate geographical scale and boundaries are defined, in order to support the MSP Directive implementation process, and take into account transboundary issues in defining boundaries.

1. Context

Among the 62 non-European Marine Spatial Planning (MSP) processes reviewed by the European Commission in its MSP in Practice Initiative database (2017)[1], 21 were at local scale (e.g. bay, county, district), 23 at sub-national scale (e.g. state, province), 11 at national scale (e.g. country-wide, island), 7 at Regional scale (e.g. international transboundary) ranged from 2,000 km^2 (Wider Caribbean) to 35,716,100 km^2 (Antarctic). Moreover, in this database, some countries have a combination of the different scales: national, sub-national and local (for instance in France, Scotland or in China).

Among all these scales, is there only one appropriate scale for MSP? In a pragmatic manner, the MSP directive requires the Member State (MS) to develop and produce "plan or plans in accordance with the institutional and governance levels determined by Member States" (MSP Directive, art. 4.3).

Therefore, when faced with MSP Directive implementation process, MS have to answer the following questions: what is the most appropriate scale for their MSP plans? Do they have to define different plans based on different geographical scales? If so, what would be their articulation? If not, for instance, is it enough to carry out the plan at national or marine basin scale with some focus areas? Moreover, what would be the plan boundaries once the scale is defined?

The determination of a relevant scale is thus a systematic question in the development of a MSP Project. The question of scale also influences the way in which the stakeholders will be involved, the final form of the plan and the actions that will be carried out (Minang *et al.,* 2015).

This document proposes an up-to-date literature review about this concept, and suggest principles to follow in scaling the plan, defining its boundaries and the number of plans to develop within a country, always taking into account transboundary issues.

2. Scales and delineation of the planning region: two different notions

To better understand the question of scales, it is firstly important to understand the different definitions that are given to the "scale" term. The definition of scale in the fields of geography and ecology induces notions of spatiality and temporality (Cumming *et al.,* 2006). Taking into account sociological elements, *"scale adds to these notions, ideas of representation and organization"* (Cumming *et al.,* 2006) referring to existing institutions and governance mechanisms. This definition, including institutional aspects, can be precised with Minang *et al.* (2015), who cite the Millennium Ecosystem Assessment (2003) *"[...] a level of organization is not a scale, but it can have a scale"*. Depending on the ecological and socio-economic and institutional approaches, there are important

[1] The database is available at the following address: http://msp-platform.eu/events/global-msp-inventory-available-now-cross-border-msp-study [accessed February 16th 2018]

stakes in the definition of “scale” which can influence, subsequently, the way in which the determination of the scale of a MSP project will be addressed (cf. Figure 1).

To take into account all these considerations, we define here a scale as a jurisdictional, ecological and socio-economic level of the MSP process and its components (sub-process, activity and phenomenon), in space and time.

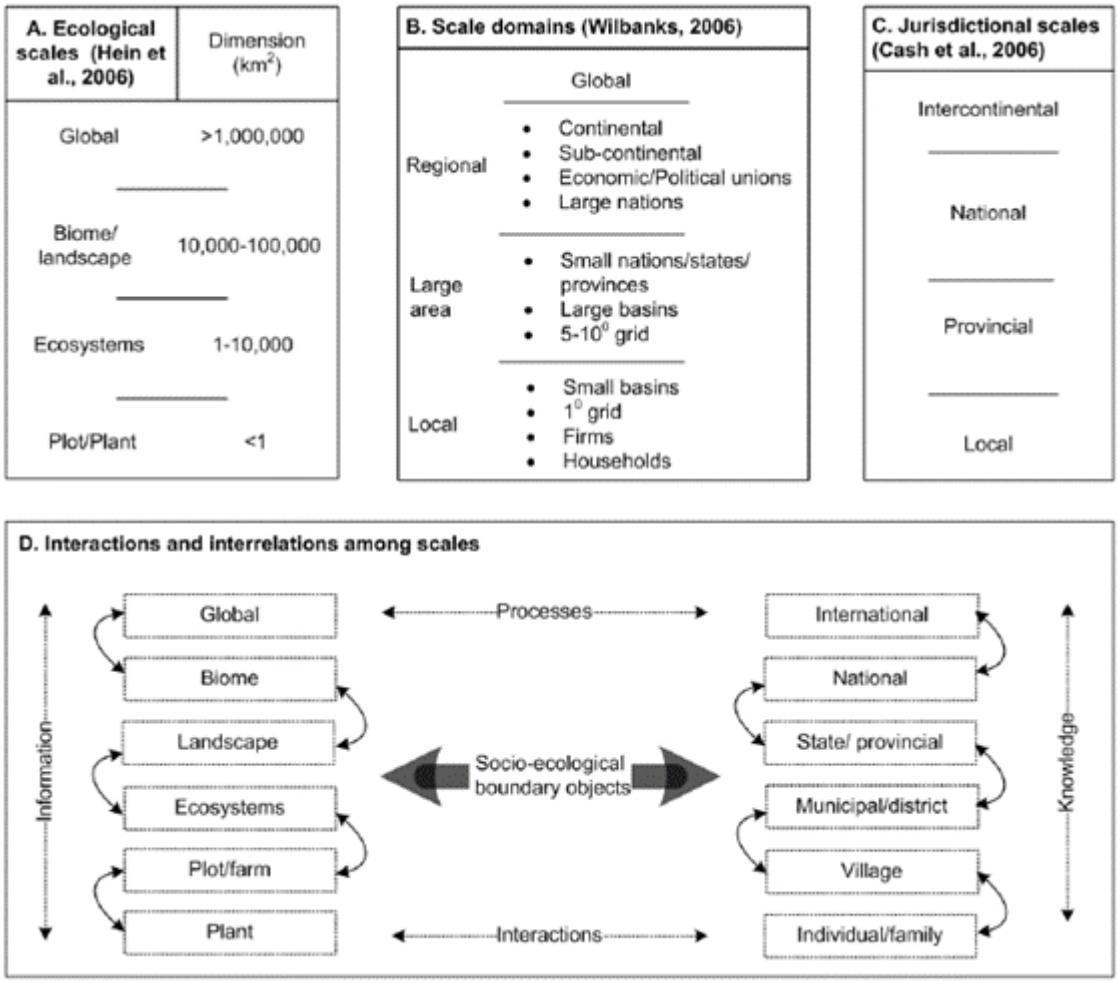

Figure 1. Hierarchical representations of scale and scale interactions (Source: Minang *et al.,* 2015)

2.1. The delineation of physical boundaries

The delineation of units is a necessary step prior to the implementation of a planning process. Mills *et al.* (2010) suggests that the delimitation can be “arbitrary" based on anthropic considerations (property boundaries, policies), based on natural boundaries or a compromise between these three criteria (e.g. Lewis *et al.,* 2003). The explicit consideration of boundaries promotes the appropriation of planning by relevant stakeholders by facilitating the transition between planning and design the actions envisaged (Mills *et al.,* 2010). In 2008, Gilliland and Laffoley (2008) defined three characteristics for the delimitation of the boundaries of maritime areas: along (lateral), landward and offshore the coast.

In a number of cases, the delimitation of the lateral borders raises the issues of cross-border cooperation. However, national land borders and their extensions at sea rarely correspond to the ecosystem boundaries, which the scales of MSP should integrate to avoid scale mismatches (see 2.2) These ecosystem boundaries can be assimilated to ecoregion or bioregion. These are based on biogeography, oceanography and bathymetry define relatively homogeneous biological and physical components, distinct from adjacent regions, and wide enough to cover ecological and evolutionary ecosystems (Mills *et al.,* 2010).

Since MSP can play a very useful role in determining directions for the sustainable and integrated management of human activities at sea, the preservation of the living environment, the fragility of coastal ecosystems, erosion and socio-economic factors, MSP plan need to take into account land-sea interactions (LSI) and thus have landward boundaries defined (Gilliland and Laffoley, 2008). Indeed, MSP should aim to integrate the maritime dimension of certain coastal uses or activities and their impacts and, ultimately, provide an integrated and strategic vision (EC, 2014). The delimitation of the terrestrial limit of a maritime spatial planning is dependent on the issue (environment, professional activity, port, etc.). However, for legal reasons (Gilliland and Laffoley, 2008) a land boundary must be defined for the planning process. This delimitation of terrestrial boundaries also raises the question of the interaction between terrestrial planning policies established in most countries and the MSP boundaries. For the authors, it is relevant to extend the boundaries of the MSP on intertidal zones taking into account the environmental interactions between land and sea and encouraging integration between terrestrial and marine planning activities and institutions "(ibid). For Carneiro *et al.* (2017) *“coordinating planning on land and at sea makes it possible to optimize the implementation of infrastructures and services on the land required for activities at sea, and vice versa”.* In addition, the 2014 Directive establishing a Maritime Spatial Planning framework clarifies the consideration of LSI as a minimum requirement for MSP by MS (EC, 2014).

In practice, the definition of extra-coastal limits of planning is likely to be determined by the limit of national jurisdiction, which characterizes the end of States' legal competencies at sea. However, in the same way as for lateral boundaries, Exclusive Economic Zone (EEZ) boundaries seldom align with ecosystem boundaries (Gilliland and Laffoley, 2008) or marine bioregions. The MSP Directive stresses that *"In order to ensure consistency and legal clarity, the geographical scope for maritime spatial planning should be defined in conformity with existing legislative instruments of the Union and international maritime law, in particular UNCLOS [the United Nations Convention on the Law of the Sea of 1982]”* (EC, 2014), which represents a certain limit in the definition of MSP offshore physical boundaries.

2.2. A plan, two types of boundaries

The definition of the most appropriate geographical scale is important because of the differences that may exist between ecosystem scales and scales of existing governance systems (Cumming *et al.,* 2006). According to Minang *et al.* (2015), in a landscape context, the planning process starts with seeking scales of minimal compromise at which the social system (for example, the institution) can optimally tackle ecological processes. In the case of Marine Planning, Gilliland and Laffoley, (2008)

also recommend a hierarchy of spatial scales that comprises, as a minimum, national and sub-national (e.g. regional) levels (see 4).

The literature review also points out that in the delineation of an area for the development of MSP, a relative consensus seems to exist on the difference between two types of boundaries: the boundaries for the analysis and the boundaries for the management (Ehler and Douvere, 2009; Gilliland and Laffoley., 2008; Mills *et al.,* 2010; Ansong *et al.,* 2017). The argument for this distinction is that the management boundaries often match administrative boundaries (for political purposes), which do not generally correspond to the boundaries of a single ecosystem (Ehler and Douvere, 2009). This is also supported by the consensus in favour of the ecosystem approach, which can provide a solid foundation for the ecosystem-based approach in MSP process (Ansong *et al.,* 2017; Maes, 2008; Flannery and O'Cinneide, 2012; Jay *et al.* 2016; Dunstan *et al.,* 2016).

Indeed, an administrative region often encompasses multiple ecosystems, of different sizes and sometimes only some parts of an ecosystem. As a result, analysing phenomena whether environmental or socio-economic only within the administrative boundaries could lead to misunderstanding of these phenomena in as much as the latter could be broader. This could lead to the failure of the plan, as a consequence of a mismatch between ecological scale and social/management scale (Cumming *et al.,* 2006; cf. Figure 2). That is why the boundaries of analysis should not be limited to the boundaries of management.

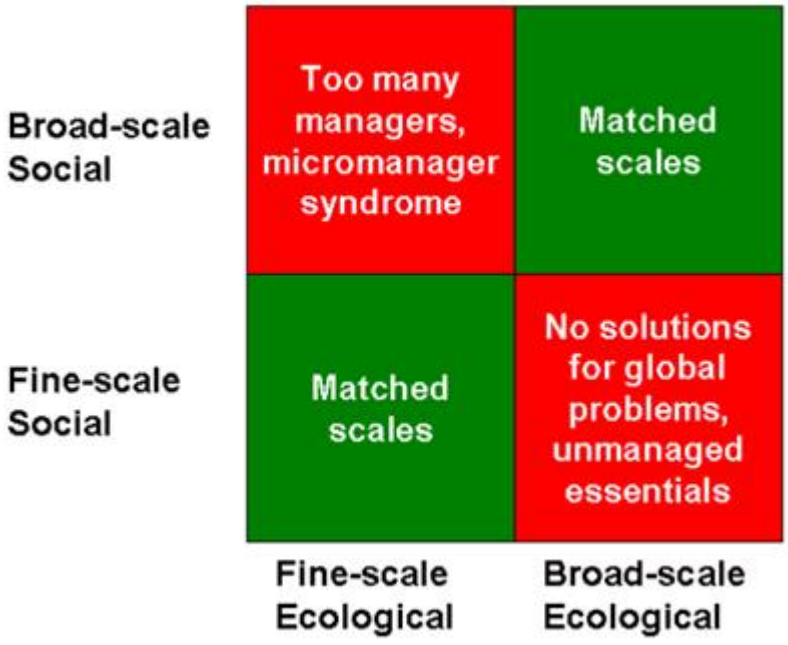

Figure 2. Consequences of mismatched spatial scales (indicated in red) between social and ecological systems (Source: Cumming *et al.,* 2006)

Considering the separation between those different types of boundaries, the reality of MSP implementation is often complex. Mills *et al*. (2010) listed several important scale and boundaries

considerations during a conservation planning process: extent of the bioregion, extent of governance area and cultural systems, extent and availability of data, opportunities and social constraints. Some of the steps and items could be applied to a MSP process. Thus, a principle about the definition of different types of boundaries, namely analysis and management boundaries (Ehler and Douvere, 2009; Gililand and Laffoley, 2008; Mills *et al.,* 2010) - seems to emerge. This level of analysis can then lay the foundation for different management scales depending on: the size, density and characteristics of planned or existing activities, their impacts, environmental vulnerability and existing governance structures (Flannery and O'Cinneide, 2012; Ehler and Douvere, 2009) in order to apply MSP according to the zone and the type of activity. Works on this topic advance the interest of being able to identify and differentiate the planning proposals according to the peculiarities and the characteristics of each local area (Barbanti *et al.,* 2015). Flannery and O'Cinneide (2012) envisaged that *"densely used or particularly vulnerable areas may require more prescriptive spatial plans whereas areas with low density of use may only require general management principles".*

Besides, social opportunities and constraints, institutional capacities and support for conservation actions are likely to determine the feasibility and effectiveness of planned actions (Mills *et al.,* 2010). This is the reason why Minang *et al*. (2015) also consider a "planning facilitation scale" as an important scale to consider when dealing with landscapes planning process, which would be also relevant for MSP. Indeed, planning facilitation calls for consideration of the potential for social support for a MSP project. It also involves attention to the resolution and availability of data. Very few regions have consistent data at an appropriate resolution for landscape planning, and probably for MSP. Most data are limited, highly fragmented and sectoral (ibid). Moreover, the processing and standardization of data can be a significant burden for project developers (Jay *et al.,* 2016). Therefore, since it will influence the issues that will be addressed, the resolution of the data to be assembled and the objectives that will be defined (Smith *et al.* 2012), the scale of a MSP is critical in different stages of the MSP process (Mill *et al.* 2010).

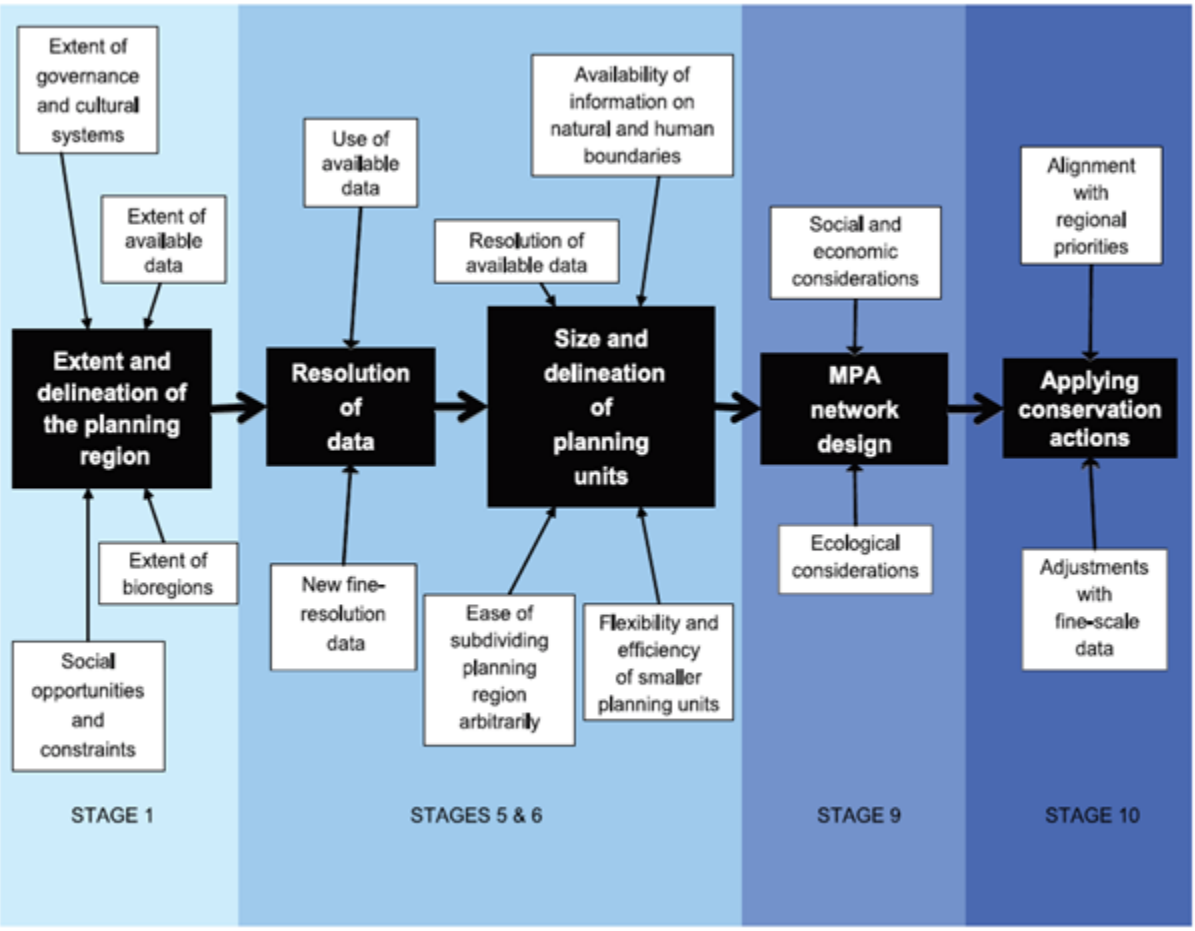

Figure 3. Spatial scale considerations during a conservation planning process (black boxes). White boxes show elements that influence the decisions within the process. Stages are the following: (1) scoping and costing; (5) compiling data on socio-economic variables; (6) compiling data on biodiversity and other natural features of interest; (9) selecting new conservation areas; and (10) applying conservation actions (Source: Mills *et al.,* 2010).

3. The scale in the ecosystem approach

The ecosystem approach also called ecosystem-based management (EBM) is a management approach "based on a particular area defined by the location of a given ecosystem" (Queffelec, 2013). This notion of approach based on ecological science and broadened to integrate human intervention is more and more successful and is considered by some as “a fundamental unit for MSP, working towards ecosystem” (Jay 2010), “and has since long been advocated in biological sciences and fisheries” (Maes, 2008). For Wang (2004), maintaining the integrity of an ecosystem requires management actions to *“cover a wide range of components, including not only the targeted resources, but also habitats, communities, and the related environment that support them. It means that the spatial scale of management has to extend across different biological units and jurisdictions to encompass an entire ecosystem”.* For these advocates, this approach ensures that planning and management units are defined in an environmentally manner and provides a systematic and spatial framework for smaller scale planning and environmental assessment. It also helps scientists to understand biogeographic models and convey information. A boundary based on ecological

considerations *"also makes it easy to identify the connected stakeholders that can propose solutions and measures to any kind of externality that might impacts the ecosystem"* (Ansong *et al.,* 2017).

The European Union has regularly emphasized the strategic role of the ecosystem approach in the management of transboundary resources. The EBM principle has also been adopted on the Maritime Spatial Planning Roadmap (COM [2008] 791 - 25 November 2008) and endorsed as a key principle in the development of MSP in its framework directive : *"An ecosystem-based approach should be applied in a way that is adapted to the specific ecosystems and other specificities of the different marine regions "*(art (14) Directive 2014/89 / EU). A reminder of these European recommendations appears, more recently, in a report from the European Commission on good practices in the ecosystem approach and cross-border cooperation (Carneiro *et al.,* 2017).

At the regional Mediterranean level, ecosystem approach has been acknowledged by the Contracting Parties to the Barcelona Convention as an overarching principle of UN Environment/Mediterranean Action Plan Barcelona Convention system. Moreover, the UN Environment/MAP Barcelona Convention Conceptual Framework for MSP in the Mediterranean attached as Annex II to the Decision IG. 23/07, adopted by the Contracting Parties in their COP 20 (Tirana, Albania, December 2017), recognised the Ecosystem Approach as a guiding principle for Marine Spatial Planning.

Internationally, it is worth to mention the Joint roadmap ("to accelerate Maritime/Marine Spatial Planning processes worldwide") agreed between the Directorate General for Maritime Affairs and Fisheries of the EC (DG MARE) and the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) on March 2017. In this document it is stated that "IOC- UNESCO aim to promote EBM, including through the development and dissemination of the MSP approach [...]". This Joint Roadmap, moreover, defines priority areas and strategic objectives for mutual cooperation. The Priority area 3 "EBM/MSP", recalls "that the MSP Directive requires the use of an ecosystem-based approach, which should ensure that the collective pressure of maritime activities is kept within levels compatible with the achievement of the good environmental status" that the Marine Strategy Framework Directive requires[2].

However, despite international recommendations to develop this approach in the implementation of MSP, plans and administrative boundaries often do not match the boundaries of ecosystem processes (Ansong *et al*. 2017). This is even more pronounced in Europe where marine jurisdictional boundaries are "so close and where many states are involved". The concepts of integrated and ecosystem-based management seem to be often too broad, too abstract, and too complex for to be operationally implemented (Douvere, 2008; Queffelec, 2013). Moreover, for some, even if international instruments exist, EBM may represent legal problems in a cross-border context when

[2] The document is available at the following address: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/Joint_Roadmap_MSP_v5.pdf [accessed February 16th, 2018]

the jurisdictional boundaries do not coincide with ecosystem boundaries and include several instruments and laws in different countries (Wang, 2004). That is why Ansong *et al.* (2017) suggest to start the analysis for a MSP implementation process with a bioregion scale.

4 Multi-level governance and hierarchisation of scales

Without questioning the value of an ecosystem approach to a scale of analysis, many authors emphasize the need to define different levels of complementary and coordinated policies at many scales (Douvere and Ehler, 2008; Gilliland and Laffoley 2008) sometimes based on existing institutions. According to Maes (2008) *"the various forms of coastal and ocean management carried out by coastal states in their jurisdictions"* (some of which are already MSP-approach oriented) already make it possible to locally decline certain actions at different local scales. That is why Minang *et al.* (2015) also consider the interlocking or nested scales criteria as a third scale-related dimension in addition with the spatial analysis and planning facilitation scales. The nested scales refer to the strengths and constraints of each level from international to local one and the horizontal interactions within a scale (Minang *et al.,* 2015), as a horizontal network (Cummings, 2016). In fact, the development and implementation of MSP is not limited to determining the right scale of action, it is also a question of coordinating the different levels of intervention (Queffelec, 2013).

While the scales at which each level is defined may differ from one country to another (Gilliland and Laffoley, 2008), some scales seem more likely to carry particular challenges according to the specialized literature.

4.1 The intakes of local scale plans

The literature that has been consulted about this topic was mostly focused on management of marine protected areas in small islands. Thus, it has to be adapted to the context of the zone where a MSP is considered.

The local scale is often presented as the most likely to bring concrete actions on spaces. According Govan *et al.* (2009), local initiatives can be successfully implemented because they address local issues in a culturally sensitive manner. In the case of conservation planning, for example, it is precisely the social support that offers a particular interest. Social opportunities and constraints, institutional capacities and support for conservation actions are presented by Mills *et al.* (2010) as indicators of the feasibility of conservation actions. For the authors, *"small planning units are more efficient than larger planning units, requiring less total"*: smaller planning units are also likely to achieve targets with smaller overall costs. In addition, they can bring more flexibility to develop more appropriate protected area settings. In this case, global and macro-regional seas mechanisms are "generally too large, too expensive, and too politically divisive to be operationally effective in ocean management" (Wang, 2004).

In a context where ocean ecosystems are *"subjected to external forcing across a multitude of temporal and spatial scales that shift the provision of ecosystem services",* local governments are also perceived as the most capable of determining the benefits and drawbacks that could bring each

action to a space (Sanchirico, 2010). However, the local scale presents limits in the response to global issues. For example, “environmental changes induced by global drivers are beyond the control of locally based governance arrangements” (Serrao-Neumann *et al.,* 2016) and actions based on local initiatives are more generally focused only on sectoral issues of some communities.

4.2 The intakes of national and regional scale plans

Gilliland and Laffoley (2008) mention that *“it is helpful to define “broad scale” as approximately “regional”, as suggested in a number of reviews [Defra, 2004], reflecting important oceanographic and biogeographic processes and the way in which industry and others divide up the sea for planning purposes”.* Regional and international plans are indeed presented as relevant scale for planning integration and coordination (Douvere and Ehler, 2008). This allows planners to take into account spatial context for conservation decisions, complementarity and connectivity between areas, threats to natural features and relationships between different human activities to improve the effectiveness of local strategies (Serrao-Neumann *et al.,* 2016).

However, according to some authors, most assessments at the regional scale confine to prioritization exercises (Mills *et al.,* 2010). Nevertheless, connecting regional assessments to local action is more and more acknowledged as a major issue (Knight *et al.,* 2006). Thus, scale-related decision play an important role in ensuring the achievements at local scale of conservation planning at regional scale (Mills *et al.,* 2010) and probably in MSP.

4.3 The intakes of nesting scales

The challenge of governance at multiple levels is therefore that of the good articulation between local, regional and national scales. Indeed, the mismatch (Mills *et al.,* 2010; Agardy *et al.,* 2011) also called "misfit" (Ouréns *et al.,* 2015) encompasses the failure of regional planning and actions at the local level to inform each other (Mills *et al.,* 2010) in order to ensure the good sustainability of the management of socio-ecological systems (Ouréns *et al.,* 2015). Different variations can therefore be developed depending to the countries with regard to the existing administrative structures. Thus, most of the work done on this topic recommends the implementation of regional, national and local marine spatial plannings (Flannery *et al.,* 2015; Douvere and Ehler, 2009; Maes, 2008; Barbanti *et al.,* 2015).

The European Commission encourages the definition of strategic objectives for the MSP at sub-national or national level (EC, 2008). These strategic objectives must then be further defined by operational objectives. *“Strategic objectives are generally ambitious whereas operational objectives are generally articulated in terms of measurable quantities”* (Flannery and O'Cinneide, 2011). The operational objectives can then be broken down into smaller, more flexible and more efficient planning scales (Douvere and Ehler, 2008, Gilliland and Laffoley, 2008, Barbanti *et al.,* 2015, Mills *et al.,* 2015). Such an approach that allows each *“level to provide context for the level below will provide the most effective and least complicated arrangement”* (Gilliland and Laffoley, 2008). On this model, ecosystem processes are taken into account at global scales and then a hierarchical approach addresses different issues at each scale from global to local (Barbanti *et al.,* 2015). In line with an

approach by different levels of governance, adjustments to plans are needed, as new information appears at scales different from those at which the plan was developed: A common example is the need for regional-level plans to accommodate data inequality at the local level (Mills *et al.,* 2010). The ability to interact with multi-level institutions and respond to ideas of different scales of concern can help ensure implementation of the plan and that the resulting local actions achieve emerging regional goals such as complementarity and connectivity.

4.3.1. Nested scales and stakeholder engagement

Taking into account another key area for MSP step that is stakeholder participation, *"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 [...]. However, the level of stakeholder engagement will be an important factor in the success of MSP"* (Gilliland and Laffoley, 2008). In this regard, Dunstan *et al.* (2016) propose an example of hierarchical levels including:

1) *"A small single sector/use stakeholder engagement with aspirational objectives focused on the needs of that sector and consideration of a limited set of political, economic, social or ecological/ biological objectives."*
2) *"Multiple sectors considered with multiple political, economic, social or ecological/ biological objectives."*
3) *"Consideration of all sectors, current states and future activities. All political, economic, social or ecological/ biological objectives".*

4.4 The importance of the cross-border approach

In view of the principles of the ecosystem approach, the decision criteria for the implementation of the MSP takes on fundamentally cross-border dimensions (Jay *et al*., 2016) and particularly in the European context. The issue of international cooperation is an integral part of the ecosystem approach to MSP and there is some kind of scientific consensus on the need for this cross-border approach (Flannery *et al.,* 2015; *Foley et al*., 2010; Zaucha, 2014). A literature review made by Jay *et al*. (2016) presents various advanced criteria for demonstrating the interest of the transboundary approach in marine planning: *"Firstly, the natural environment is fluid, with much greater material movement across administrative borders, including that of substances and species. [...] Secondly, many marine resources and maritime activities are also cross-border and mobile in nature; their effective planning and management requires a collaborative approach from neighbouring jurisdictions [...] Thirdly, physical boundaries are generally absent in this more remote ,dynamic and graded environment, making it difficult to contain many activities and their impacts within administrative territories. Fourthly, MSP is generally being conducted at large geographical scales, including consideration of regional and land–sea interactions."*

The authors note tensions and difficulties between scientific management and effective resource management on a transboundary approach (Jay *et al.,* 2016; Gilliland and Laffoley, 2008): *"Since national boundaries do not conform to ecosystem boundaries, the boundary question is often seen as a constraint for effective management"* (Maes, 2008). Various arguments are put forward to explain

these tensions: a legal basis for defining a transboundary zone barely exists, and national and sub-national authorities therefore select the jurisdiction of the MSP over their waters (Jay et al., 2016). Indeed, borders shape *"political sovereignty, national and sub-national administrative systems and the potential reach of certain maritime activities"* (ibid). This creates tensions between the national interests contained in the territories and the common interests for which a transnational perspective is seeked (ibid). In addition, considerable differences may exist in governance between jurisdictions (Flannery *et al.,* 2015; Jay *et al.,* 2016), practices in policy, scheduling and goals, etc. Jay *et al*. (2016) also note that: *"there may be procedural obstacles for authorities seeking to work together across borders, including uneven administrative structures and processes, technical difficulties in sharing information, language barriers and other barriers to good communication".* The offshore planning limit is therefore likely to be determined by the national jurisdictional limit (Gilliland and Laffoley, 2008), which seldom aligns with the boundaries of an ecosystem and there is an overall lack of international perspective in MSP initiatives (Douvere, 2010).

Nevertheless, the transnational recommendations to promote these transboundary approaches increase (Flannery *et al.,* 2015) and allow a certain development of cooperation on the uses of the sea. Indeed, international conventions such as OSPAR, HELCOM (Flannery and O'Cinneide, 2011; Douvere, 2008; Smith *et al.*, 2012) or the Barcelona Convention (Gilliland and Laffoley, 2008) and regional maritime agreements (Kidd and Shaw, 2013) have been important drivers in development of these cooperation's. Cross-border imperatives have therefore been recognized in political circles particularly in Europe, where the need for cross-border cooperation is accentuated by geography and pressures on the marine environment (Jay *et al.,* 2016). In European legislation, the Water Framework Directive, Marine Strategy Directive, or Environmental Assessment Directive, to name a few examples, contain obligations for cross-border cooperation (Queffelec, 2013). The MSP Directive also mentions that coastal MS shall cooperate in the marine region involved (EC, 2014). In addition, in 2017, the European Commission published a report recalling the importance of cross-border development and disseminating some good practices to achieve this (EC, 2017). Besides, several projects promoting cross-border cooperation for the implementation of MSP have been leaded on the European maritime basins: TPEA, SIMCELT, Celtic Sea Partnership and currently SIMNORAT for the Atlantic sea basin; MAREMED, COASTANCE, PEGASO (non-exhaustive list) and currently SIMWESTMED for the West Mediterranean sea (non-exhaustive list).

The spatial scale at which cross-border cooperation can be organized is not predefined. The MSP directive (EC, 2014) establishes that: *"cross-border co-operation is implemented through: (a) existing regional institutional structures, such as regional seas conventions; and or (b) networks or structures of the competent authorities of the Member States; and or (c) any other method that meets the requirements of paragraph 1, for example in the context of the sea basin strategies".*

5. Guiding principles

The decision-making process regarding the geographical scale of maritime spatial planning is largely dependent on the context, the objectives set, the level of use of space, the conflicts (Gilliland and Laffoley, 2008) and the vulnerability of the concerned spaces (Flannery and O'Cinneide, 2015). Numerous practices already exist and are determined by phenomena related to historical contexts, jurisdictional limits or particular opportunities.

Another important topic in this review is that there is not a single consistent scale. There are multiple scales adapted to the different stages of the process of implementation of the MSP (analysis, stakeholders' participation, actions, etc.). Indeed a different scale may sometimes be relevant for a particular step in the process of a MSP project. It is the proper articulation of the scales throughout the process that will be the subject of a supported reflection.

The literature review highlights a distinction between two main scales:

- The analysis scale will comprise ecosystem boundaries and processes, as well as transboundary items. It will be the broader and the one in which the definition of the strategic objectives will be based.
- The management scale would be an integral part of the planning boundaries, related to the definition of focus areas where operational objectives will be developed.

Besides, this study makes possible to identify and sometimes extrapolate from the literature review some criteria and principles to determine appropriate geographical scales to implement MSP:

Overall criteria

- The operational ecosystem approach;
- Land-sea interactions. The consideration of land-sea interactions is consistent with other formal or informal processes, such as integrated coastal zone management;
- The Cross-border issues.

Guiding principles

- Be sure to define each type of boundaries: offshore, landward and lateral and air, water surface, water column and deep-sea soil and underground boundaries;
- Always take into account that the sea has a clear, three-dimensional spatial scale that is difficult to represent on two dimensional-maps;
- To ensure an operational ecosystem approach, start with a bioregional scale (e.g. marine bioregion) in order to understand the ecosystem, take into account coastal and near shore waters and LSI, then make some focus on specific areas if necessary. It is also important because MSP's environmental objectives will only be met when MSP also addresses environmental effects beyond the planned area;

- It is necessary to distinguish two types of scales: analysis scale and management scale. Indeed, analysing phenomena whether environmental or socio-economic within the administrative boundaries could lead to misunderstanding of these phenomena and thus mismatch with the planning boundaries in as much as the latter could be broader;
- Where planning and ecosystem boundaries do not match, analyse what it implies and set up appropriate measures to achieve coherence;
- Differentiating an analysis scale from a management scale could then lay the foundation for different management scales depending to the peculiarities and the characteristics of each local area. Areas with specific marine environment elements, multiple uses of, multiple pressures on may require detailed spatial plans , finer than plans at an EEZ or sub-regional sea level;
- Each scale from bioregional to local ones matters: ensure a nesting and a good coordination of the scales from a global (e.g. international, national or sub national) level to a local level (and conversely). Each scale has its specific objectives. For instance, MSP at national scale gives strategic development while MSP at sub-national scale consider policy coordination and objectives (appropriated to the context). Therefore, the coordination takes into account the most appropriate scale to meet each objective: from strategic development to operational measures;
- Ensure that the broader scale gives information about larger phenomena and set complementary actions to the finer scale plans: n+1 scale should provide information to n scale (and conversely);
- Cross-border projects and a network of plans at a same scale (for instance at sub-national scale) should be favoured in view of the high mobility of resources and marine activities and the mismatch that could occur between ecosystems and legal frontiers;
- Take into account the facilitating factors of the implementation and management of the project. These maybe social opportunities or the availability of data, for example;
- Consider relevant scales at each stage of MSP processes development. Indeed, a different scale may sometimes be relevant for a particular step in the process of a MSP project. A particular reflection, for example, may be focused on the scale to which the mobilization of the stakeholders must be carried out.

6. Gap and SWOT analysis

A questionnaire was sent among SIMNORAT project partners in order to assess how the two scales and the three overall criteria are tackled in their on-going MSP Directive implementation process, with focus at national, regional and local scales and their articulation. The answers result in the sum of what was found in literature review within each country and their knowledge of the process. Therefore, they do not reflect the overall undergoing projects or processes led by the planning authorities and they cannot be seen as exhaustive.

The results are summarized below.

6.1. Description of scales and articulations of plans related to the MSP process for each country

This section focus on the maritime spatial plans of each country, as well as on other plans and strategies considered relevant (non exhaustive list) in the articulation with the plans and MSP process oriented, within OPSAR region IV. Either because they establish the long-term vision for the sea, or because they concern parts of the marine environment (e.g. coastal zone, marine protected areas). This analysis contributes to better understanding of the links between marine and terrestrial planning, but also the different scales in which these issues are addressed.

France

The National Maritime and Coastline Strategy (SNML) - Decree 2017-222 of February 23rd, 2017[3] - is the national strategic reference document for the protection of marine environment and integrated, concerted management of activities related to the sea and the coast, with the exception of those whose sole purpose is defence or national security. It is declined at a sea basin scale within four sea basin strategy document (*Document Stratégique de Façade* - DSF) in mainland France. These documents specify and complement the four long-term objectives of the SNML: the ecological transition for the sea and coastline; the development of the sustainable blue economy; the good environmental status of the marine environment and the preservation of an attractive coastline; France's influence. The DSFs also enable France to comply with both MSPFD and MSFD.

The SNML mentions that its objectives *"should apply at different scales (national, coastal or overseas basin, region, park, inter-communes) while respecting a principle of subsidiarity between the different nested levels"* and strongly *"[involving] the stakeholders, both in defining It must be articulated with the approach of the other countries bordering the same sea"*[4].

[3] Available at https://www.ecologique-solidaire.gouv.fr/sites/default/files/17094_National-Strategy-for-the-Sea-and-Coastal_EN_fev2017.pdf [last visited December, 18th, 2018]

[4] Available at https://www.ecologique-solidaire.gouv.fr/sites/default/files/17094_National-Strategy-for-the-Sea-and-Coastal_EN_fev2017.pdf [last visited December, 18th, 2018]

It also states that “strategic planning must be further developed at the regional level in relation to coastal zones and the sustainable economic development of the coastline, in particular with the major upcoming coastal development operations”[2]. Several Regions have already proactively approach this maritime subject, namely through an increased legislative responsibilities upon the Regions for economic development and strategic planning. For instance, the SRDEII (Regional Economic Development, Innovation and Internationalisation Plan) and SRADDET (Regional Plan for the Management, Sustainable Development and Equality of Territories), currently under development will include this theme.

Consistency between DSF and more local plans is provided for by the regulation in the form of a taking into account or compliance of the former by the latter. The adapted coordination will also result from a dialogue between the appropriate stakeholders and authorities at both level. The intercommunality scale of the coastal Territorial Coherence Plan (SCoT) and its maritime component (*Schéma de Mise en Valeur de la Mer* - SMVM), is seen as one of the relevant local scales to be articulated with the larger ones.

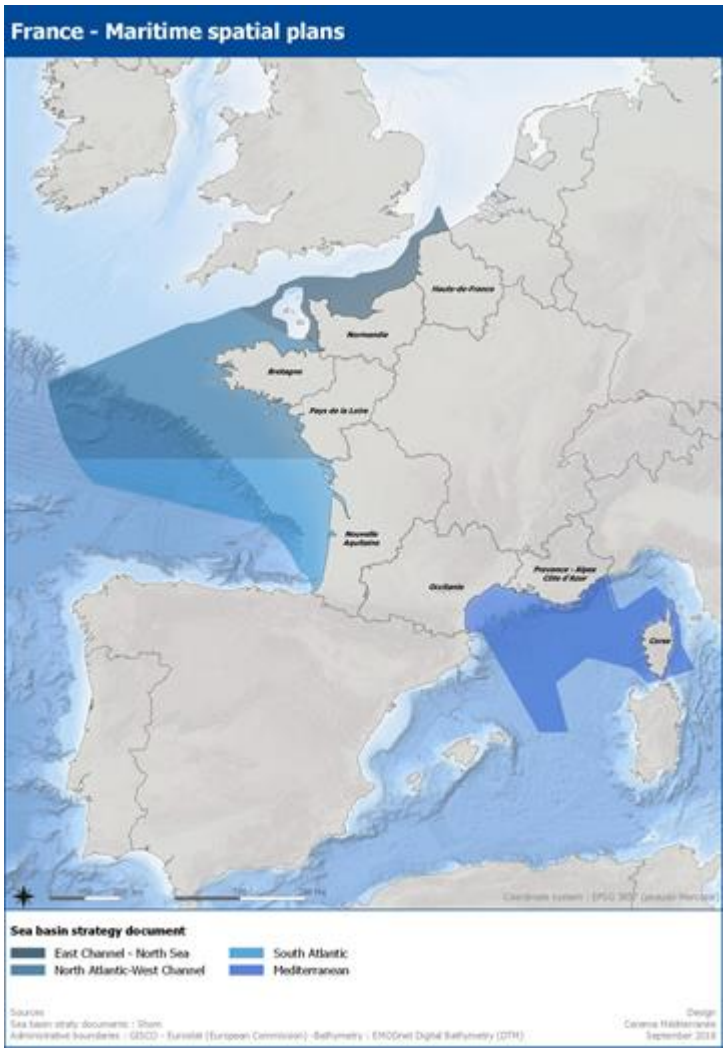

Figure 4. French maritime spatial plans.

Portugal

There are two MSP instruments, created by the Law No. 17/2014 on marine spatial planning and management': the Situation Plan, which is the main MSP instrument, and the Allocation Plan, which is developed in case there are uses or activities that have not been previously considered in the Situation Plan. In case an Allocation Plan is implemented, it automatically updates the Situation Plan. These plans are in line with the national strategies relevant for MSP.

The Portuguese MSP process is being developed at national level, integrating the following functional zones: Territorial sea and inland maritime waters; EEZ; and Continental shelf, including beyond 200 nautical miles.

There is a single Situation Plan for the national maritime area (between the baseline and the continental shelf beyond 200nm), which was organised into four subdivisions (Figure 5): subdivision of the Portuguese mainland, subdivision of the Azores, subdivision of the Madeira, and subdivision of the extended continental shelf.

The Situation Plan is largely related to the implementation of the MSFD. Since both Directives (MSFD and MSPD) intend to ensure the good environmental status of the marine environment, these subdivisions followed the structure of MSFD and were used as administrative units for the Situation Plan. Thus, facilitating the coordination of the whole process between the central and regional governments.

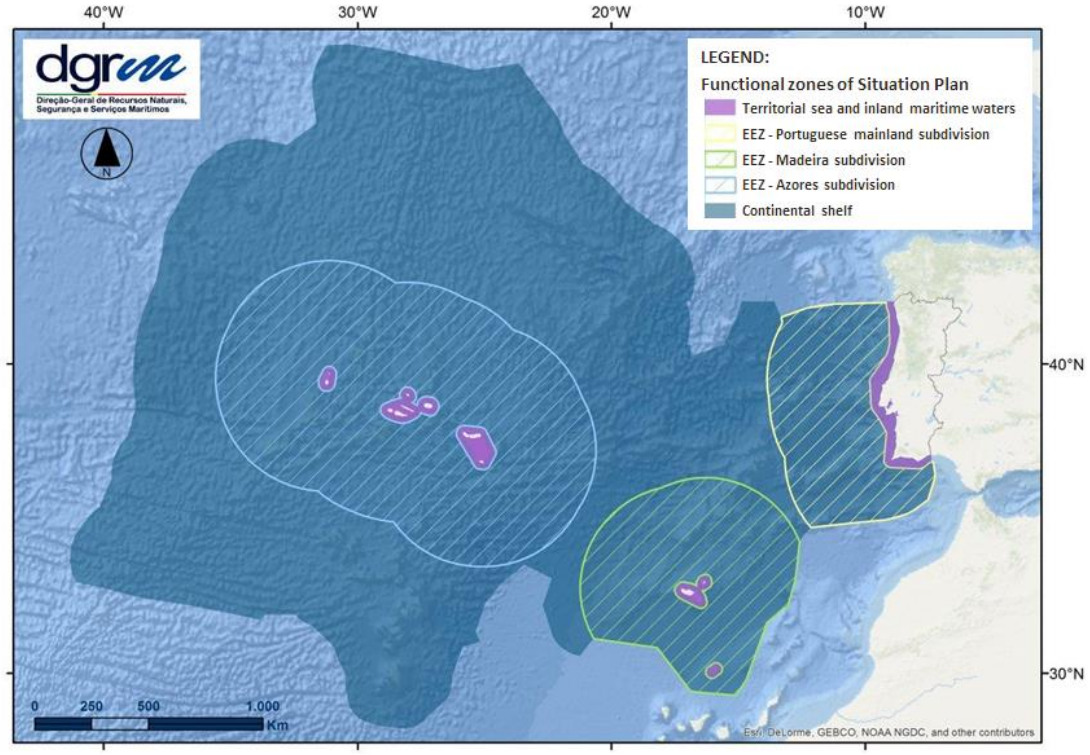

Figure 5. Functional zones of the Situation Plan (Source: DGRM, 2018)

The strategic document guiding the Situation Plan is the National Ocean Strategy (ENM, *Estratégia Nacional para o Mar*), which presents the vision (for the period 2013-2020) regarding the maritime development, based on the preservation and sustainable use of marine resources and services.

Regarding the terrestrial planning, there are number of regulations and guidelines concerning the coastal zones that are integrated in the Situation Plan, namely those established on the coastal zone management plans (POC/POOC), special programs of protected areas (PEAP/POAP) and river basin management plans (PGBH).

Spain

In this early stage of the process, the scale considered is the same as for the MSFD. The Spanish jurisdictional waters (EEZ) have been divided in 5 Marine Demarcations (Districts) (3 in the Atlantic: North Atlantic; South Atlantic and Canary Islands; and two in the Mediterranean: Strait of Gibraltar–Alboran Sea; and Levantine-Balearic).

These Marine Demarcations include coastal waters but not transitional waters. For each Spanish marine subdivision, a marine strategy has been developed and its implementation follows an iterative process, which is carried out in six-year cycles.

Research carried out through the second cycle of the strategies will serve as knowledge basis for the MSP development. Moreover, marine strategies objectives state the limits for the activities' development in the districts. This is, any activity to be developed in a district has to be compatible with its strategy's objectives.

At this stage, there is no MSP plan in Spain but the MSP process is on-going since the adoption of the Royal Decree 363/2017 of April 8th establishing a framework for maritime spatial planning, which transposes the MSP directive into the Spanish legal framework.

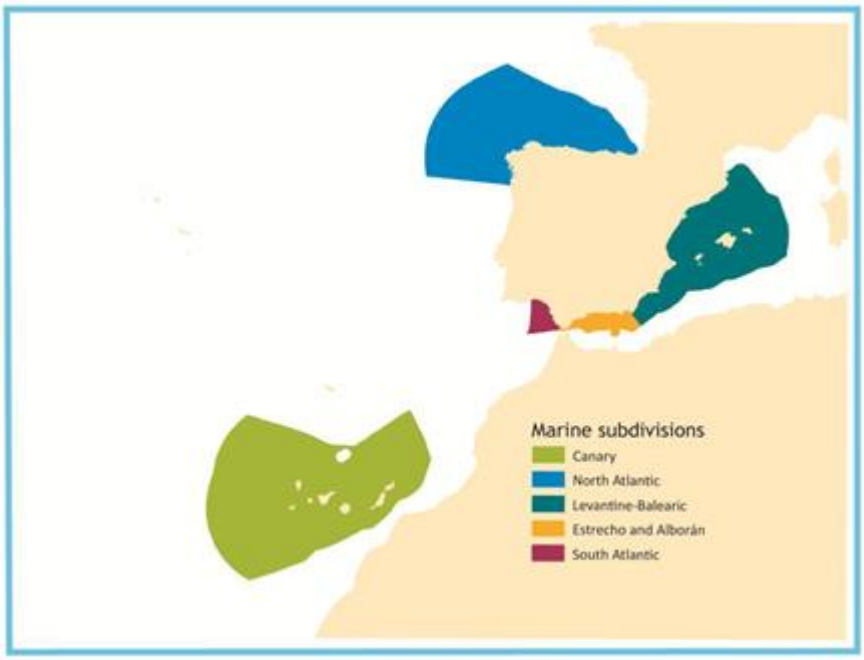

Figure 6. Marine Districts for the MSFD and MSP implementation (Source: Ministerio para la Transición Ecológica. Marines Strategies. VII. Programmes of measures. Executive Summary)

6.2. Analysis for the two main scales (analysis and management)

It is common practice, in spatial planning, to develop an analysis and management phase, where the first one supports the following stages. In most cases, the analysis and management scales overlap, or could be that the analysis scale exceed the management scale. In this section, the analysis and management scales adopted through the planning process of selected plans and strategies are analysed.

France

The SNML initial assessement[5] deals with both socio-economic and environmental issues. The analysis scale is mainly the French EEZ with some focuses beyond its limit (for instance, there is a chapter about French participation to international and European policies and LSI are mentioned). The same goes for the DSF scales. Indeed, whenever considered relevant, the coastal ecosystems, activities and legal aspects were taken into account.

Regarding one of the more local spatial planning tools, the SMVM is composed of an initial assessement whose delimitation enable to precise the perimeter of the objective documents that make up this SMVM[6]. The list of included municipalities are determined by order of the prefect.

[5] Available at : www.geolittoral.developpement durable.gouv.fr/IMG/pdf/etat_des_lieux_mer_et_littoral.pdf [last visited December 19th, 2018]

[6] See http://webissimo.developpement-durable.gouv.fr/IMG/pdf/Etude_paysagere_du_Golfe_du_Morbihan_-_Schema_de_Mise_en_Valeur_de_la_Mer_-_2002_cle7e77d1.pdf for an example of delimitation of a SMVM boundaries [last visited January 10th, 2019]

Besides, for instance, the fiches of each of the 7 zones of South Atlantic (SA) vocation maps of the DSF include some elements regarding which tools shall comply with or take into account the DSF[7].

Portugal

All the analysed strategies, terrestrial and maritime tools developed an analysis phase.

In the case of the National Ocean Strategy (ENM), the studies that supported the strategy were developed for the national maritime area. However, the strategy's action plans were developed at the regional government level: Mainland, Madeira and Azores.

Regarding the Situation Plan (PSOEM), the analysis phase corresponds to the initial assessment, which was organized by subdivision and built on the work developed under the Marine Strategies (MSFD). Whenever considered relevant, the coastal ecosystems, activities and legal aspects were taken into account. The management phase is also organized by subdivision. In the case of the Allocation Plans, the selection of the analysis scale will depend on the use or activity that is being analysed to be further developed. If impacts on another areas are expected, these must be analysed as well. In turn, the management scale will be the same as the project scale.

Concerning the Coastal Zone Programs and/or Management Plans (POC/POOC), the analysis scale ranges from the bathymetric of 30m and 2km landwards, which goes beyond the intervention area. POC/POOC have two management scales: the Program Intervention (1:25000) scale and the Beach Intervention Plan scale (1:2000).

Spain

As already mentioned, in the case of Spanish Marine Strategies, the Spanish marine environment has been divided into 5 Marine Demarcations (MD) taking into account the hydrological, oceanographic and biogeographic characteristics of each zone: North Atlantic MD, South Atlantic MD, Strait of Gibraltar-Alborán Sea MD, Levantine-Balearic MD and Canary Islands MD. For each of these Demarcations, both the analysis phases (Initial Assessment, Determination of Good Environmental Status, Establishment of Environmental Targets) and the management phases (with measures programs of marine strategies) are conducted. As such, the Spanish operation differs from the French and Portuguese processes in which an analysis phase is conducted at the national level.

In the case of the Spanish MSP plans being considered since the adoption of the Royal Decree 363/2017 of April 8th, the scale of analysis should be based on the same delimitations as the Marine Demarcations defined in the context of the Spanish Marine Strategies. At this stage, the management scale is still to be decided.

[7] The fiches are available at http://www.affaires-maritimes.pays-de-la-loire.developpement-durable.gouv.fr/saisine-de-l-autorite-environnementale-ae-a856.html [last visited December 19th, 2018]

6.3. How the 3 overall principles were taken into account in each scale of each plan?

6.3.1. Ecosystem-based management approach

France

Taking into account an ecosystem approach is recalled in the SNML[8].

On a regional scale, (subdivisions by sea basin), the scale of analysis in the implementation of the MSFD encompasses the French part of marine subregions defined in the framework of the OSPAR Convention.

Concerning the regional management tool, the perimeter of the DSF is the French EEZ. It should be noted, however, that the DSF includes the MSFD elements which reinforced and operationalised the ecosystem approach. For instance, a matrix of analysis and impacts between socio-economic and environment objectives has been produced. Moreover, the fiches of each of the 13 zones of the North Atlantic West Channel (NAMO) and 7 zones of the SA vocation maps includes some prescriptions and recommendations related to the zone and about the non impact on certain ecosystem and the conditions to carry out activities (see link in footnote 4 for more elements of operational ecosystem-based approach).

The decree 86-1252 of December 5th 1986 relating to the development of SMVMs states that it covers maritime and terrestrial spaces, defines compatibility conditions of the development of maritime and coastal activities, and measures of protection of the marine environment. This document is subject to the strategic environment assessment. For instance, SMVM Bassin d'Arcachon[9] and Golfe du Morbihan[10] use an ecosystem-based approach in the delimitation of the SMVM boundaries.

Portugal

The boundaries of both National Ocean Strategy and Situation Plan correspond to the administrative/ legal boundaries and not to the limits of the ecosystems.

Regarding Coastal Zone Programs and/or Management Plans (POC/POOC), both the analysis and management phases consider the limits of the ecosystems in their scale of analysis. The analysis phase goes beyond the intervention area on landwards, where the natural, socioeconomic and legal systems

[8] The SNML is available at https://www.ecologique-solidaire.gouv.fr/sites/default/files/17094_National-Strategy-for-the-Sea-and-Coastal_EN_fev2017.pdf [last visited December 18th, 2018]

[9] More information are available at http://www.nouvelle-aquitaine.developpement-durable.gouv.fr/IMG/pdf/schema_de_mise_en_valeur_de_la_mer_presentation.pdf [last visited January 10th, 2019]

[10] More information are available at http://webissimo.developpement-durable.gouv.fr/IMG/pdf/Etude_paysagere_du_Golfe_du_Morbihan_-_Schema_de_Mise_en_Valeur_de_la_Mer_-_2002_cle7e77d1.pdf [last visited January 10th, 2019]

area studied. The boundaries of the intervention area, within the management phase, can range from 500m to 1km in order to ensure that fundamental biophysical systems are integrated.

Spain

In Spain, the law 41/2010, of protection of the Marine Environment, which transposed the MSFD, states that adaptive management of human activities will be applied following the ecosystem approach and in accordance with the objectives of each Marine District strategy. In fact, it respects the administrative limits and the limit of the Spanish EEZ. In Spain, the Royal Decree 363/2017 of April 8th, established that the objectives of the MSP plan will take into account economic, social and environmental aspects to support sustainable development and growth in the maritime sectors, applying an ecosystem approach. At this stage, it is not possible to analyse how this principle will be taken into account in the analysis phase of MSP plans, but it is already possible to identify that MSP implementation is aligned with administrative boundaries (Marine Districts, as the Marine Strategies) and not the ecosystem scale.

For the moment there is no information regarding the application of this principle at regional and local scales in Spain.

6.3.2. Land-sea interaction

France

In the SNML initial assessment land issues are analysed (tourism employment, blue economy, coastal agriculture, coastal natural habitats...). In addition, the subject of the land-sea interface is recalled several times emphasizing the need to implement governance mechanisms aiming to make the link between land and sea. No specific operational document regarding the implementation of LSI was found during the literature review analysis.

Regarding the DSF, LSI are taken into account in initial statement phase for both activities and environmental components, where appropriated, as proposed in the development guide to implement Sea and maritime basin - Strategy document[11]. For instance, terrestrial components of aquaculture or the terrestrial pressure impacts on marine environment. In the planning phase, LSI zones are identified in order to highlight its specific ecological issues. More specifically and regarding the environment, an instruction of the government clarify the articulation and coordination between Water Framework Directive (WFD) and MSFD (which is the environment pillar of the French MSPFD implementation) in various aspects: governance, pressures to be taken into account and their sources (terrestrial or at sea), implementation processes and elaboration phases (initial statements, objective settings, monitoring programme, etc. No specific operational document regarding the implementation of LSI was found during the literature review analysis.

[11] The guide is available at http://www.geolittoral.developpement-durable.gouv.fr/documents-english-version-r549.html [last visited November 26, 2018]

The French law 2016-1087 (august 6th, 2016) specifies the documents that shall comply with the objectives and terms of the DSF, whether these documents applied or have some significant effects at sea, which includes local spatial planning document. These documents can de facto have a major terrestrial component with interaction with sea. For instance, coastal local authorities can decide to carry out maritime components of SCOT (Territorial Coherence Schemes: French territorial planning tools), whose limit is therefore that of the communities on land but does not exceed the competences of the elected representatives at sea. These document shall comply with the objectives and terms of the DSF and thus the LSI interactions mentioned. No specific operational document regarding the implementation of LSI was found during the literature review analysis.

In the case of *Parcs Naturels Marins* (French MPA category), the Park territory covers the maritime public domain. The Park can take into account activities or terrestrial areas, as long as they are linked to an issue in the marine environment. This is particularly the case for islands and islets that are often ecologically linked with the sea.

Portugal

At strategic level, the National Ocean Strategy's vision targets the maritime areas and the coastal zone, in articulation with the Integrated Coastal Zone Management Strategy (ENGIZC).

The Situation Plan, which is an operational Plan that allows to develop the ENM, is consistent with formal processes of LSI, namely the ENGIZC, POC/POOC, PEAP/POAP, WFD, MSFD. Since the Situation Plan overlaps with some terrestrial management instruments, their regulations, guidelines and principles are integrated in the Plan at the management scale (e.g. POC/POOC, PEAP/POAP). The same happens with the Coastal Zone Programs and/or Management Plans (POC/POOC), which take into account the sea activities and guidelines established in the PSOEM.

Spain

In Spain, Marine Strategies are applied to marine waters, the seabed, the subsoil and the natural resources under Spanish sovereignty or jurisdiction, they spatial area cover coastal but not transitional waters. However, strategies will not be applicable to coastal waters regarding those aspects covered by the river basin management plans, deriving from the application of Directive 2000/60/EC (Water Framework Directive). However, if the concept was not explicitly considered, land-sea impacts and pressures were considered in the analysis phase and some of the indicators established for monitoring measure pressures produced by LSI.

Regarding the determination and application of maritime spatial planning, the Royal Decree established that: *"In the elaboration of the Maritime Spatial Planning Plans, the interactions between land and sea will be taken into account. In order to do this, it will be possible to resort to other instruments to define this interaction. The result will be reflected in the Maritime Spatial Planning Plans."*

6.3.3. Cross-Border Issues

France

The development of a cross-border cooperation is approached in France in the analysis and the management scales of the SNML. Indeed, it states that a particular attention will be paid to the development of enhanced European cooperation, particularly in the context of cross-border approaches.

At the regional level, the DSF limit stops at the French EEZ and cross-border cooperation is on going.

Portugal

The National Ocean Strategy sets the strategy for the national maritime area, but the regional specificities are addressed separately and further studies specific for Mainland and Madeira were developed. Nevertheless, the action plans are coherent among government regions.

Regarding the Situation Plan, both analysis and management phases are coherent among subdivisions, as they follow the same structure, in the case of the initial assessment (in line with the MSFD), and the general methodology for the Plan's development was established in articulation with all responsible entities. The Situation Plan also takes into account the maritime occupation of the neighbouring countries regarding existing infrastructures (e.g. submarine cables), servitudes and conditioning areas (e.g. marine protected areas), as well as the extension and distribution of habitats and geologic resources. Additionally, it considers the potential creation in the future of three cross-border Marine Protected Areas (MPA): Coral Patch – Ampére (PT/Morocco), Mud Volcanos in the south margin of Portugal mainland (PT/SP) and Vigo/Vasco da Gama Seamounts (PT/SP).

Concerning the POC/POOC along the coast, the entities responsible for the elaboration of one of the Plans are integrated in the steering committee of the neighbouring Plan. In the cases where the Plan is close to the border with Spain, the Spanish authorities are also invited to integrate the steering committee.

Spain

In Spain, the Law 41/2010, of protection of the Marine Environment, states that the Government will reinforce the cooperation between the Kingdom of Spain and the other Member States of the European Union, as well as with third countries that share the same region or marine sub-region in order to ensure the coherence and coordination of the strategies of the same area, including follow-up programmes.

At the regional level, the Royal Decree stipulates that within the framework of the management process, cooperation will be provided with the Member States of the European Union whose marine waters are contiguous with the Spanish ones, in order to ensure that the Maritime Spatial Planning Plans are coherent and coordinated throughout the affected marine region. For the purposes of this cooperation, issues of a transnational nature will be taken into account in particular.

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