Land-sea interactions and relationships with integrated coastal zone management

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25/01/19	2.1	IEO/UAVR/Cerema	Minor layout revision

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Acronyms

ENGIZC	National Strategy for Integrated Coastal Zone Management [*Estratégia Nacional de Gestão Integrada das Zonas Costeiras*, in Portuguese]
EU	European Union
ICZM	Integrated Coastal Zone Management

LSI	Land-Sea Interactions
MSFD	Marine Strategy Framework Directive
MSP	Maritime Spatial Planning
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]
WFD	Water Framework Directive

1. Land-Sea interactions

The Maritime Spatial Planning Directive (2014/89/EU) asks Member States to consider land-sea interactions (LSI) when establishing and implementing maritime spatial planning (MSP), with the aim of promoting an integrated and strategic vision for MSP that is coherent with land use planning frameworks. This line of thinking is in consistency with other European processes, namely the Integrated Coastal Zone Management (ICZM) recommendation, the Marine Strategy Framework Directive (MSFD), and the Water Framework Directive (WFD).

In the scope of SIMNORAT project, land-sea interaction refers to a complex phenomenon relating to:

- the natural processes across the land-sea interface;
- the interactions between uses and activities at the sea and at the land, but also to their impacts on the quality or ecological dynamics of coastal and marine environments;
- the governance arrangements in these interface and socio-ecological systems.

According to EC (2017), when undertaking MSP, social and ecological dynamics should be understood and then the most suited institutional mechanisms to address these interactions within their governance context should be found. A range of options may be available, involving different spatial scales of intervention. Figure 1 sets out a general framework to address land-sea interactions within MSP (EC, 2017).

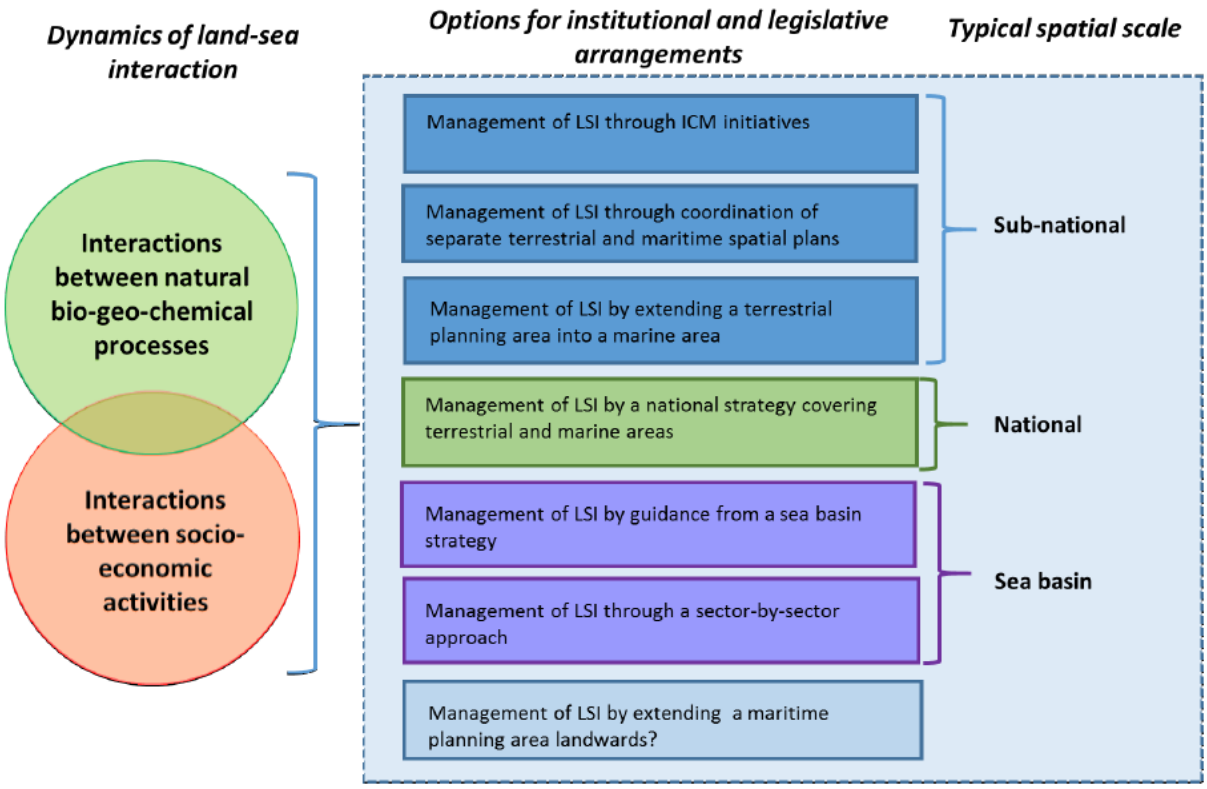

Figure 1. General framework for land-sea interaction within MSP (Source: EC, 2017)

1.1. Land-sea interaction across marine and coastal governance arrangements at European level

In the 1990s, the need for an integrated and strategic approach to the management of the coastal zone gained evidence (e.g., with the EU ICZM Demonstration Programme) and resulted in the publication of the European Commission's Strategy for Europe (COM(2000) 547 final) and a Recommendation (2002/413/EC) concerning ICZM implementation (Ballinger *et al.,* 2010). Here, the expression "integrated" was used to refer the integration of objectives, instruments, policy areas, sectors, administration levels, but also integration of terrestrial and marine components of the target territory, in both time and space (COM(2000) 547 final). A set of key principles were adopted to facilitate the development of more sustainable management of the coasts, namely:

- a broad "holistic" perspective;
- a long term perspective;
- adaptive management (responding to new information and conditions) during a gradual process;
- local specificity;
- working with natural processes;
- participatory planning;
- support & involvement of all relevant administrative bodies;
- use of a combination of instruments;

Although ICZM encouraged the management of these interface systems, and despite of integrating the initial draft proposal for the EU directive on MSP, land-sea interaction is still a challenge (ESPON, 2013). The need for integration of planning regimes across land and sea systems is evident and has high-level political support (Kidd and Shaw, 2014). For instance, the Territorial Agenda of the EU 2020 states that MSP "(…) should be integrated into the existing planning systems to enable harmonious and sustainable development of a land-sea continuum" (CEC, 2011). This is particularly relevant in a time where interactions between land and sea (not only in the coast) are intensifying. In addition, the nature of such interactions and the extent of maritime use creates new levels of complexity, particularly in the coastal and marine governance arrangements (ESPON, 2013).

There are a number of other directives and governance arrangements for the exploitation, management and protection of maritime and coastal resources (See C 1.3.1.3). According to Granit *et al.* (2017), most of these aim to promote coordination across sectors to achieve management objectives related to land, forests, water resources, coastal areas (ICZM), or marine areas (MSP), for instance. These thematic, issues-specific approaches, with objectives that often overlap, create challenges regarding cooperation and integration (Granit *et al.*, 2017; ESPON, 2013). Regarding water-related issues, the WFD and the MSFD share a common goal of achieving good environmental status by 2020. As illustrated in Figure 2, these two directives may overlap in coastal waters, requiring articulation among institutions and coherence among methods and processes.

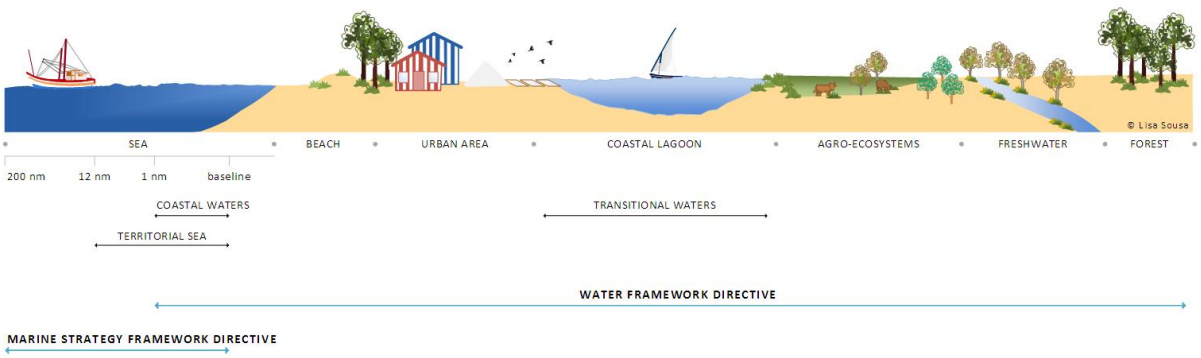

Figure 2. Spatial incidence of MSFD and WFD.

1.2. Dynamics of land-sea interactions

Many maritime uses need support installations on land. Some uses existing mostly on land (e.g., tourism, recreation, ports) expand their activities to the sea as well. These interactions need to be understood, in order to assess their individual and cumulative impacts and potential conflicts and synergies.

1.2.1. Spatial dependency of land/sea uses

Several maritime uses and activities are closely related with land and need support installations on land (e.g., fishing and shipping); which motivated, historically, the population concentration on costal zones. In recent decades, other maritime uses and activities that are connected to land have arisen, such as generation of renewable energy at sea, aquaculture and mariculture, sand extraction for beach nourishment (DMIE/DMEA, 2015; EC, 2017). Table 1 presents an indicative overview of maritime and coastal activities and their spatial dependency on land and sea (DMIE/DMEA, 2015).

Table 1. Indicative overview of sectors/usages with their spatial land-sea interactions/connections (Source: DMIE/DMEA, 2015)

SECTOR	USE/ACTIVITY AT SEA	USE/ACTIVITY ON LAND
Electricity production	(Wind) energy farms	Assembly in ports Building of special ships
	Cables	Landing / connection to the grid
	Cooling water inlet / outlet	Power stations
	Room for experimentation	
Commercial mineral extraction	Sand extraction sites	Desalination / trans-shipment port
	Shell extraction	Trans-shipment port
Coastal defence	Sand extraction sites	Beach and foreshore replenishment
Oil and gas extraction	Exploration	

	Production platforms	Service industry (including helicopters, supplies) Maritime sector (construction, research, etc.)
	Pipelines and cables	Landing / connection of pipelines and cables
	Dismantling	Processing capacity
		Search & Rescue (SAR) capacity
CO_2 storage	Vacant gas fields	CO_2 capture units
	Platforms	
	Pipelines	Landing points
Shipping	Shipping routing measures Anchorages	Ports Trans-shipment Passenger terminals for ferries and cruises Inland shipping
	Dumping sites for dredging	Dredging ports
	Floating trans-shipment	Ports
		Shipbuilding Shipping assistance / coastguard Search & Rescue (SAR) capacity
Military use	Exercise zones	Military airbases Exercise zones and shooting ranges Military ports
Fisheries	Fishing zones	Fishing ports Fish processing industry
Aquaculture and mariculture	Hatcheries	Fishing port Processing industry
Telecommunications	Cables	Landing points / exchanges
Recreation	Free routes Dive sites Fishing locations	Marinas Beach, pier
	Swimming and surfing locations	Beach
		Maritime sector (building, maintenance)
	Unobstructed view of the horizon	Beaches / dykes
		SAR / rescue operations (KNRM)

1.2.2. Impacts of land/sea uses on the environment

Management of maritime uses/activities and marine resources cannot be dissociated from what happens where the sea meets the land, and vice versa (Flannery *et al.,* 2016). Land-sea interactions need to be understood, in order to assess their individual and cumulative impacts and potential conflicts and synergies (EC, 2017). For instance, maritime uses and activities may have negative impacts on coastal zone (Figure 3), as well as land-based uses and activities - in the coast or in the watershed - may have negative impacts on the marine environment (Figure 4). An example is the agricultural run-off resulting in eutrophication of coastal waters, or land-based pollution associated with industrial activity (EC, 2017). Both situations must be carefully considered in MSP and land use planning, in order to achieve a full spatial integration across land-sea interface (TPEA, 2014).

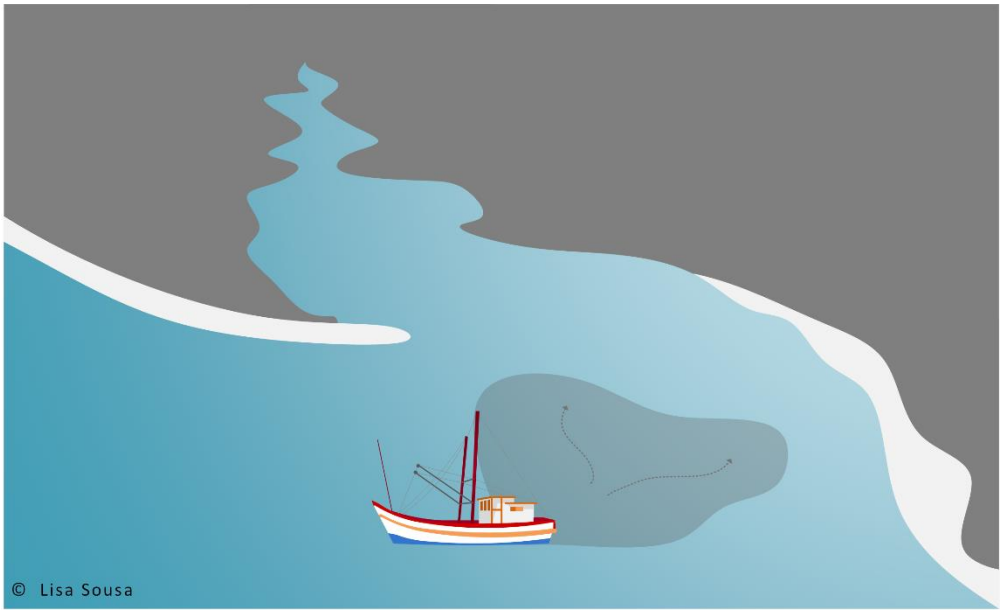

Figure 3. Example of a maritime activity with potential impact on coastal environment.

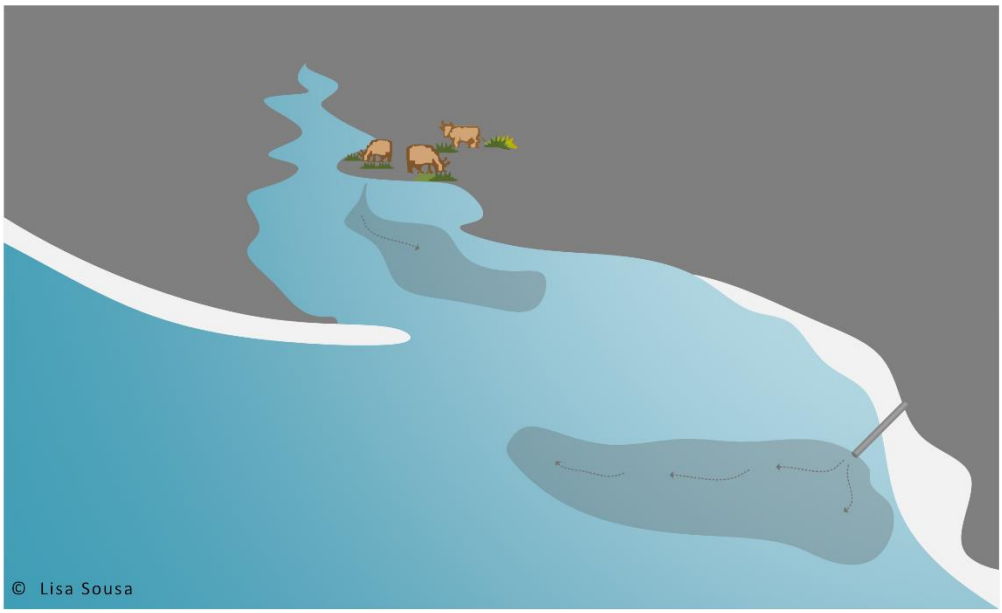

Figure 4. Examples of land-based uses and activities with potential impact on marine environment.

2. Gap analysis

A questionnaire was sent among the SIMNORAT project partners in order to analyse how LSI issues are addressed in each country. The answers result from 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. 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.

2.1 Definition and framing of the LSI

In Portugal, a clear definition of the "land-sea interaction" was not found. However, the coastal zone is commonly referred in official documents as an interface biophysical system between land and sea, where its dynamism, interaction and complexity is acknowledged. The studies (MAOTDR, 2007) developed for the National Strategy for Integrated Coastal Zone Management (ENGIZC) reflected on the various dimensions of land and sea:

- Natural system, which is related with the physical, biological, biophysical and geochemical functionality of coastal systems;
- Socioeconomic system, which is related with the use and exploitation of coastal systems;
- Legal system, which is related with the national and international legislation.

The transposition of the Water Framework Directive (WFD) into national law, in 2005, reinforced the need to clarify and homogenize concepts and boundaries related to water resources. The ENGIZC contributed to this clarification by providing a clear definition of (Alves *et al.*, 2013): Littoral, Coastal

Zone, Coastal Border, and Coastline (see Figure 5). At the planning level, Portugal has the Coastal Zone Programs and/or Management Plans (POC/ POOC), which focus on the coastal boarder.

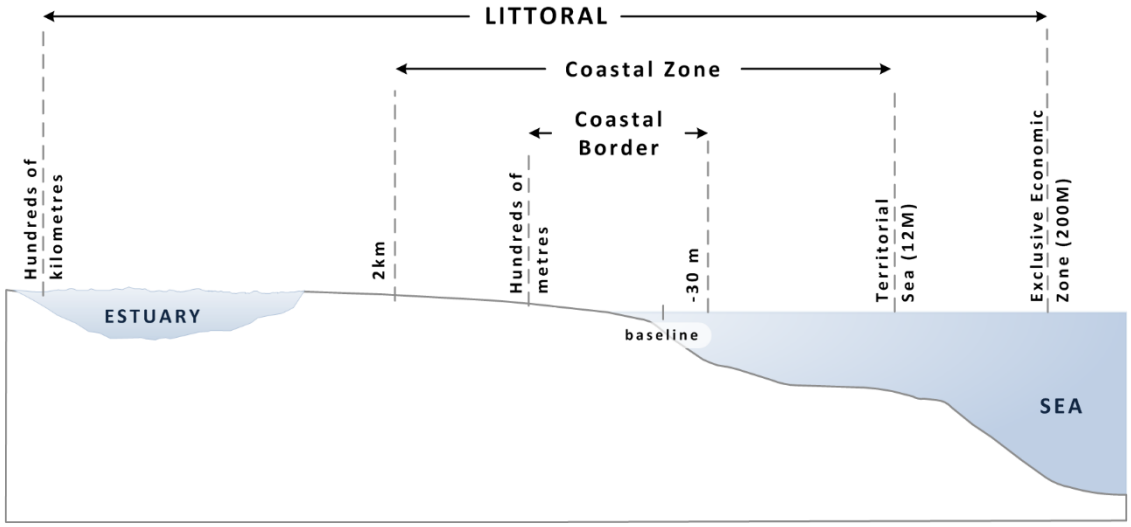

Figure 5. Coastal zone concepts and boundaries in Portugal (Source: Alves *et al.*, 2013).

Besides, one of the principles established in Law No. 17/2014 on 'marine spatial planning and management', requires MSP to be coherent with coastal management, giving particular attention to the protection and recovery of coastal ecosystems. Here, the LSI is mentioned but a definition is not provided. Nevertheless, it mentions the structural or functional interdependence of land-sea elements.

In France, there was no extensive official definition of land-sea interactions in MSP process. However, the methodological guide[1] produced to implement it and based on DCPEM requirements, highlights the necessity to take it into account at various steps of the process. This is detailed in answers below.

In Spain, there is not exact definition for the concept of LSI in the national framework but the legal framing is as follows, established by Law 22/1988, of July 28 of Coasts, modified by the Law 2/2013, of May 29, of protection and sustainable use of the coast.

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

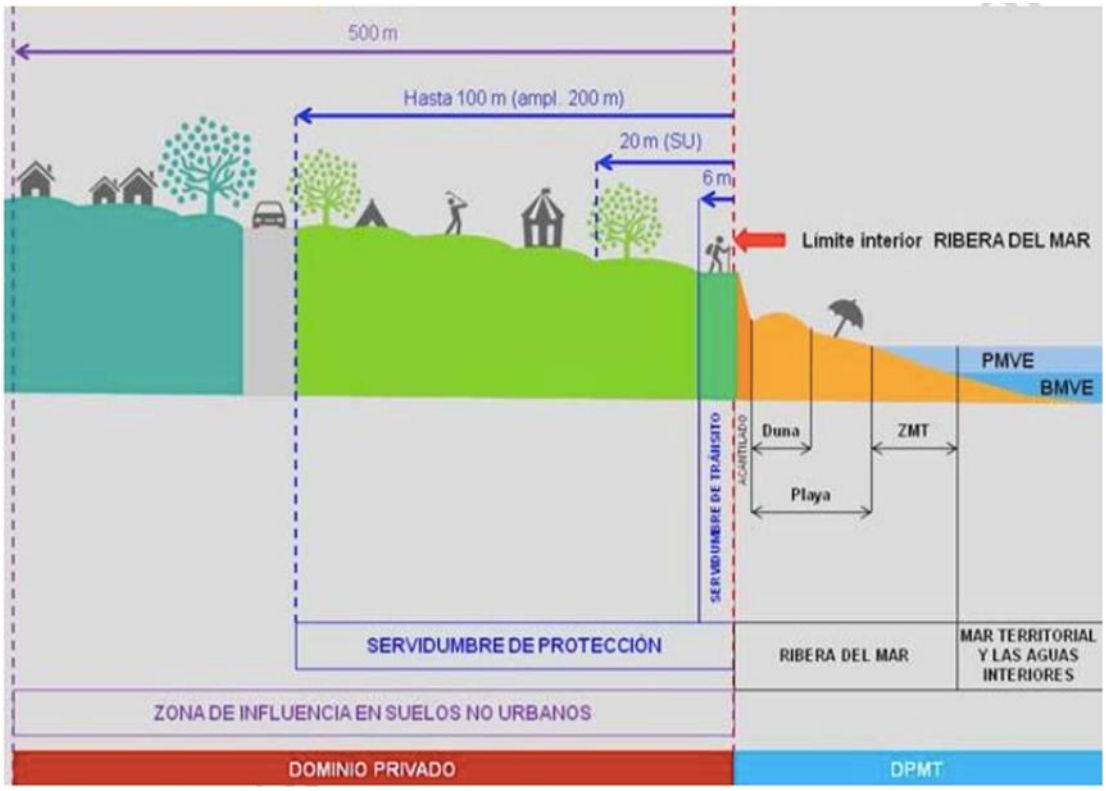

Figure 6. Coastal zone concepts and boundaries in Spain (Source: https://www.miteco.gob.es/fr/costas/preguntas-frecuentes/index2010-10-29_22.56.32.8360.html)

2.2 LSI in the MSP implementation

Question 1: Are land-sea interactions being considered in the MSP analysis or planning phases? If yes, how?

In Portugal, in the analysis phase, LSI are considered through the gathering and analysis of:

- **Existing land-based and maritime uses and activities.** This included the identification of (i) land-based uses and activities that are closely related with the sea (e.g., leisure/recreation, coastal defense, pipelines and cables, harbours), as well as (ii) maritime uses and activities that need support installations on land (e.g., aquaculture, shipping, renewable energy) or are closely related with land (e.g., sand extraction for beach nourishment).
- **Existing land and maritime planning instruments and other relevant documents.** This included the analysis of principles, regulations/guidelines, development strategies, as well as future trends and main pressures.

In the planning phase, LSI was considered:

- in the definition of a coastal protection buffer to safeguard coastal uses, such as small coastal fisheries and recreation;

- in the identification of new areas to meet the needs identified in the analysis phase, whether relating with national policies (e.g., sediment management policy, integrated coastal zone management, climate change adaptation), or relating to activities needs and sectorial development strategies.

In France, LSI are taken into account in the 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[2]. 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 their specific ecological issues. More specifically and regarding the environment, an instruction of the government clarify the articulation and coordination between WFD and MSFD (which is the environment pillar of the French MSP Framework Directive 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[3].

In Spain, the Royal Decree of 363/2017, of April 8, that establishes a framework for Maritime Spatial Planning indicates in several of its articles that LSI should be taken into account in the MSP process. It does not explicit say when or how to approach this and due to the early stage of the process, it has not been faced yet, although it is an issue that keeps coming up in the discussions regarding the MSP process at national level.

Question 2: Is the LSI considered directly in the MSP approach or is it planned through an articulation with other planning tools or ICM approaches? Specify this articulation.

In Portugal and France, LSI is considered directly in the MSP approach (see answer to question 1) and through the articulation between marine and terrestrial strategic, legal and management instruments. Throughout the elaboration of the Portuguese MSP (Situation Plan or PSOEM) all the planning instruments with incidence on (or somehow related with) maritime space were identified in order to ensure its articulation and compatibility[4]. The French law 2016-1087 (august 6th, 2016) specifies the

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

[3] The instruction is available at http://circulaire.legifrance.gouv.fr/pdf/2014/02/cir_37961.pdf [Last visited January 10, 2019]

[4] Some examples of **i) strategic documents**: National Ocean Strategy; National Strategy for Integrated Coastal Zone Management; National Strategy for Nature Conservation and Biodiversity; **ii) legal instruments**: Law for the Maritime Spatial Planning Framework; Law for the Public Policy of Soil, Spatial Planning and Urbanism; **iii) management tools**: Coastal Zone Programs and/or Management

documents that shall comply with the objectives and terms of the DSF, whether these documents applied or have some significant effects at sea.

As mentioned, the Spanish Royal Decree of 363/2017, of April 8, established in several of its articles that LSI should be taken into account in the MSP process. It does not explicit when or how to approach this. Moreover, due to the early stage of the process, it has not been faced yet. This Decree establishes that MSP plans should take into account land-sea interactions but it will not apply to the coastal waters that are under other planning procedures. However, the area chosen for the MSP implementation, that are the Marine Districts for the application of the MSFD, include coastal waters (excluding transitional waters) at least, in the analysis phase. In any case, it is stated in the MSP legislation that the MSP plans should be compatible and articulated with other planning exercises already in place.

2.3. Main gaps and shortcomings considering LSI in the MSP

A specific land-sea interactions framework within the MSP implementation process and its operational implementation at the various phases of the process is a critical gap for all three countries to ensure an optimal integration of LSI in MSP approaches. This framework would include environmental, socio-economical and governance aspects. A common framework to EU countries would also enhance transboundary cooperation, taking into account the subsidiarity principles and the specificity of each context.

Plans; Special Plans for Protected Areas; and **iv) action plans**: Action Plan for Littoral XXI; Mar-Portugal Action Plan.

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