INTRODUCTION TO LSI: LINKS WITH ICZM AND MSP

MSP as a tool for the implementation of ICZM Protocol in the Mediterranean

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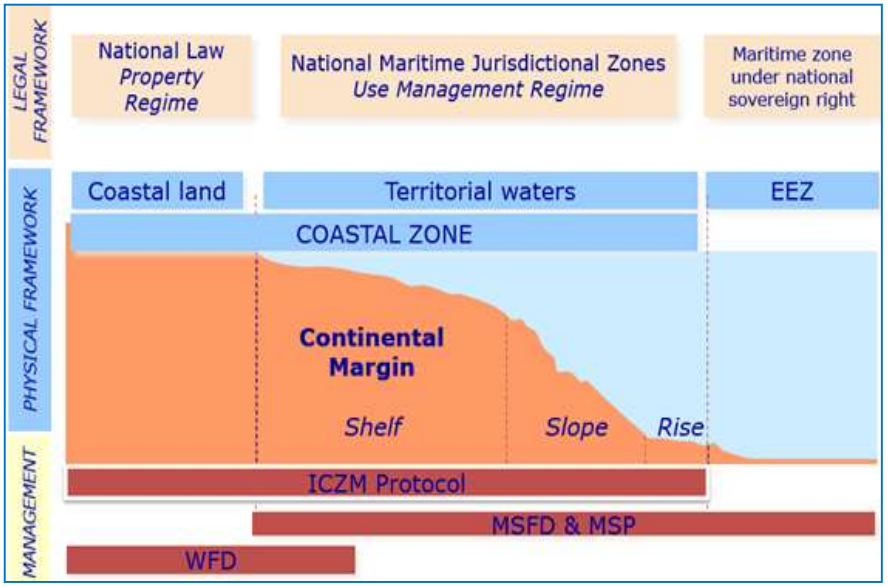
POLICY FRAME

Directive 2014/89/EU: “Marine and coastal activities are often closely interrelated. In order to promote the sustainable use of maritime space, **maritime spatial planning should take into account land-sea interactions**”



Source: adapted from Vallega, A., 1999

Coastal zone: “the geomorphologic area either side of the seashore in which the in**teraction between the marine and land parts occurs** in the form of complex ecological and resource systems made up of biotic and abiotic components coexisting and interacting with human communities and relevant socio-economic activities” **(ICZM Protocol)**

DEFINITIONS OF LSI

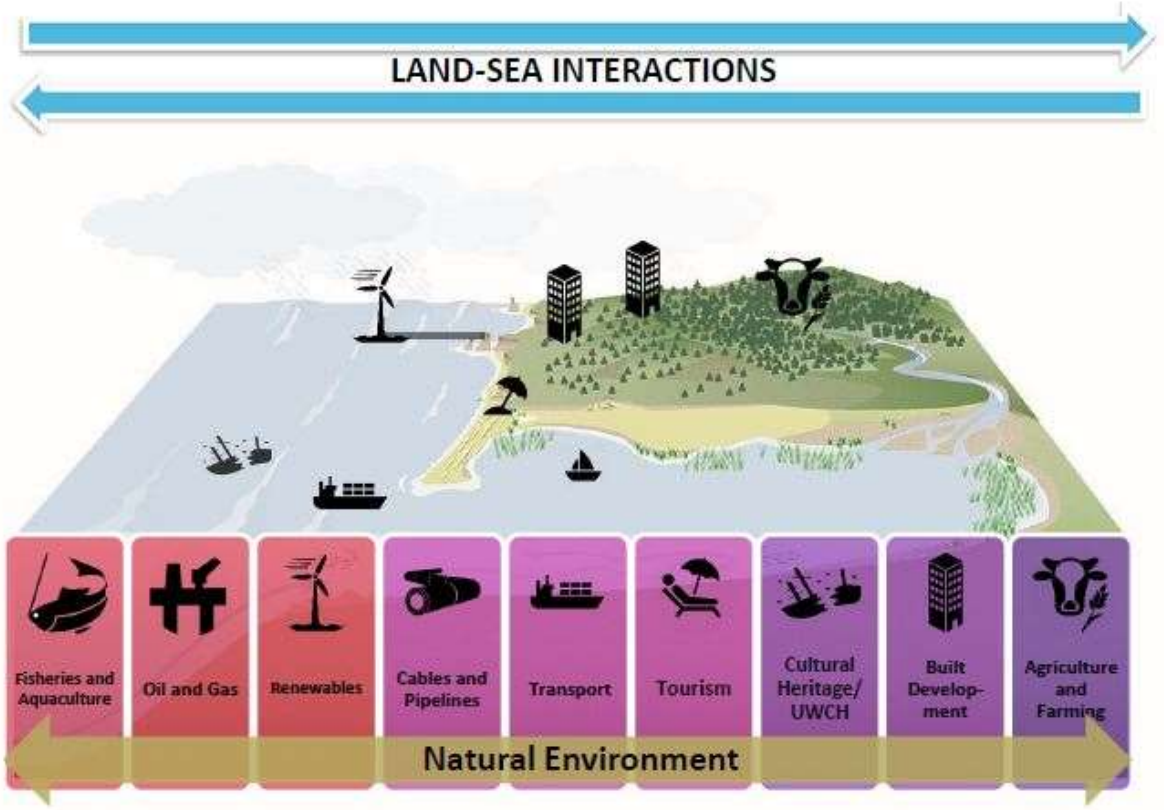
"LSI as a complex phenomenon that involves both **natural processes** across the land-sea interface, as well as the **impact of socio-economic human activities** that take place in the coastal zone" (DG MARE MSP-LSI Conference, 2017)

"**Interactions** in which **land-based** natural phenomena or human activities have an influence or an impact on the marine environment, resources and activities and interactions in which **marine** natural phenomena or human activities have an influence or an impact on the terrestrial environment, resources and activities" (CAMP Italy project, 2017)

CAMP Italy Project

TWO WAYS INTERACTIONS

Double direction of the land-sea interaction should be considered: **land toward sea** and **sea toward land**



Source: Baltic Scope project; www.panbalticscope.eu

LSI TYPOLOGIES

Interactions related to natural processes; the analysis of their implication on coastal management and planning must consider their **dynamic nature**. Human activities can interfere with natural processes, impacting on the coastal and marine environment.

Interactions between **land and sea uses and activities**. Almost all maritime uses need support installations on land, while several uses existing mostly on the land part expand their activities to the sea as well

SEA LAND INTERACTION

Economic activities / natural phenomena at "sea" interacting with "land"

SPECIFIC HUMAN ACTIVITIES

- **Aquaculture in seawater**
- **Fishing**
- **Mining activities from seabed** (including sand and marine aggregates mining)
- **Industry** (systems, including off-shore desalination, CO_2 capture and storage)
- **Energy industry** (offshore (oil and gas) energy, offshore renewable energy (wind, waves, surge)
- **Infrastructures** (ports, civil works of marine / coastal engineering [artificial reefs, breakwaters, etc.]
- **Submarine cables and pipelines**
- **Maritime activities in general, including dredging and storage of materials**
- **Maritime transport** (maritime traffic, commercial, including ferries)
- **Tourism and cruise boat**
- **Recreation and Sports**
- **Biotechnology**
- **Marine Protected Areas (MPA), Biological Protection Zones (BPZ)** (and in general *'area based management tools, including marine protected areas'*)[4]
- **Defence and security**

GENERAL HUMAN ACTIVITIES

- **Waste (*marine litter*)**

NATURAL

- **Extreme events** (storms, heavy tides, tsunami)
- **Sea Level Rise** (global and local)
- **Risks to coastal areas** (coastal erosion, marine flooding and saline intrusion)
- **Algae bloom**
- **Volcanic and tectonic activities**

LAND SEA INTERACTION

Economic activities / natural phenomena at "land" interacting with "sea"

SPECIFIC HUMAN ACTIVITIES

- **Coastal and lagoon Aquaculture**
- **River and lagoon fishing**
- **Natural resource use** (water abstraction, removal of aggregates (quarries))
- **Farming and livestock farming**
- **Industry** (food, manufacturing, on-shore plant, including desalination plant, CO_2 capture and storage)
- **Energy industry** (onshore energy (oil and gas), onshore renewable energy (wind, sun, geothermal)
- **Infrastructures** (river ports, including dredging activities, engineering work, including dam, bridges, remediation activities, railways and roads)
- **Port activity**
- **Transports** (river transport, road and rail transportation)
- **Tourism, Sports and Recreation activities** (i.e. bathing stations, touristic facilities)
- **Biotechnology**
- **Natural Protected Areas** (Nature reserves, National Parks, Regional Parks, etc., on-shore or with off-shore boundaries) [5]
- **Defence and security**

GENERAL HUMAN ACTIVITIES

- **Urban plants** (including pollution of water bodies that collect waste water)
- **Waste**
- **Services network** (i.e. sewage systems)

NATURAL

- **Soil erosion** (leaching, wind action)
- **Natural subsidence**
- **Hydrogeological instability** (including landslides)
- **Transport od river sediments**
- **Flooding**
- **Volcanic and tectonic activities**

Source: CAMP Project Italy, 2017

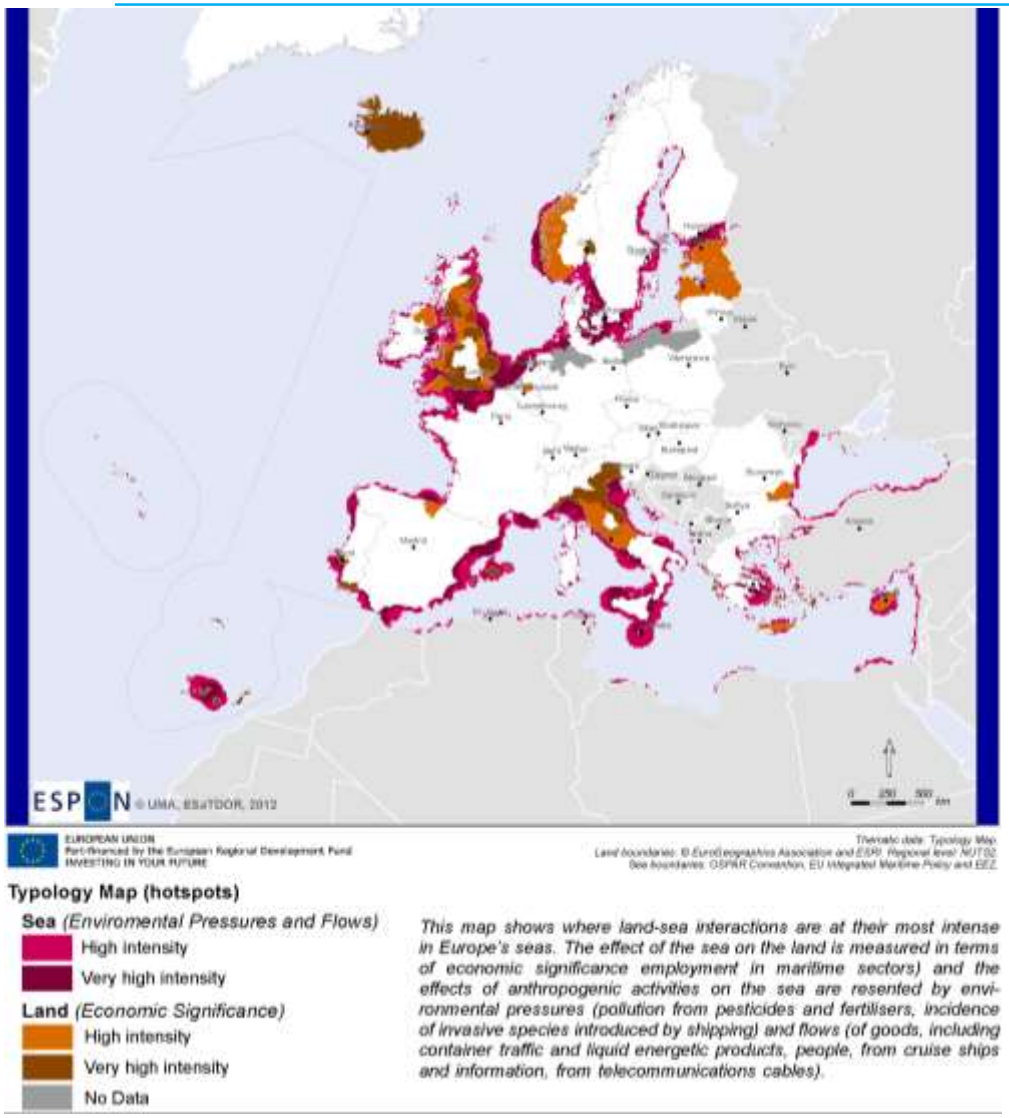
ANALYSIS OF LSI

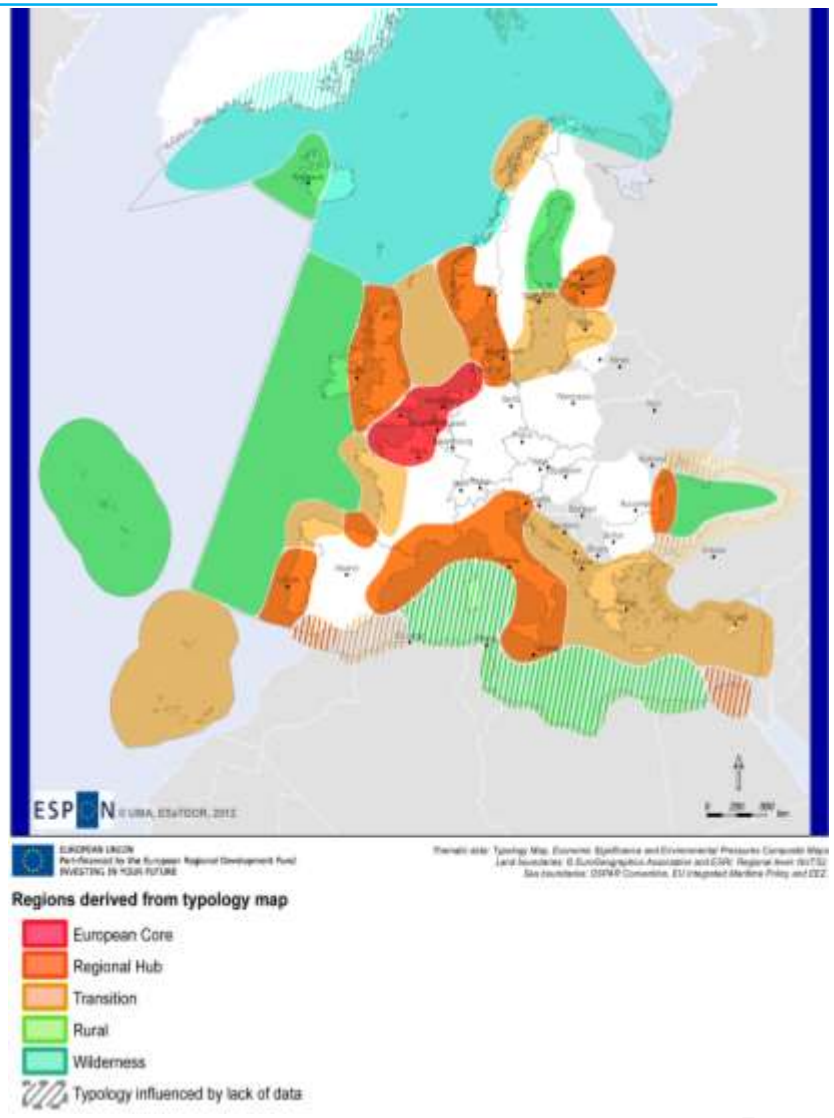
LSI analysis should not limit to environmental implications of interactions but also consider the well-being of inhabitants of the coastal zones, achieving the **combination of environmental, spatial and socio-economic development**.

"ESaTDOR – European Seas and Territorial Development, Opportunities and Risks" study. LSI was assessed considering three main features:

- **Economic significance**, based on employment in maritime sectors, used to describe the intensity of landward influences;
- **Flows**, representing the movement of goods, services, information and people through sea areas;
- **Environmental pressures**, representing the human impacts on the marine environment, through both sea and land-based activities such as, respectively, shipping or agriculture.

LSI IN EUROPE





Source: ESPON and University of Liverpool , 2013

LSI IN THE ADRIATIC

Long and indented coastline

High number of islands

Important land-sea transition systems

No EEZ

Concentration of maritime activities in coastal waters

Limited pure offshore activity

Highly urbanised coasts

Climate change adaptation and disaster risk reduction

Connections between land and marine transportation

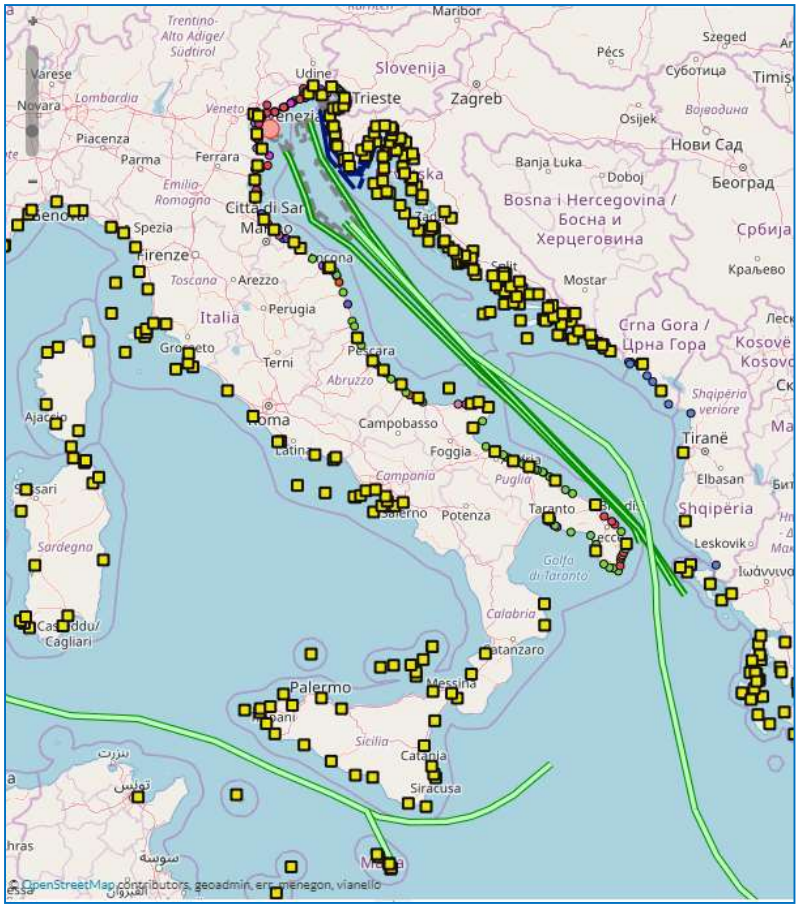
Coastal urbanization and littoralization

Booming of coastal tourism

Land-based impacts to marine environment as eutrophication and plastic pollution

Degradation of land-sea transition systems

Limited connection between coastal-marine and rural development



Source: Tools4MSP Geoplatform

GEOGRAPHICAL SCOPE OF LSI

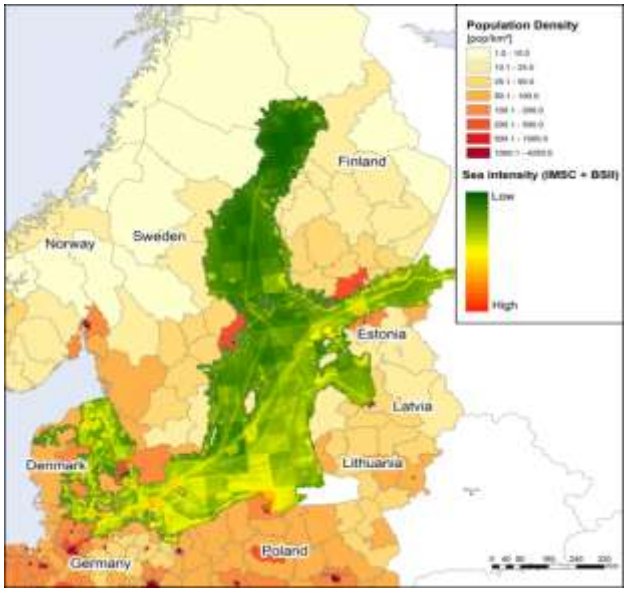
Scale of the analysis: continental, regional, sub-regional, national, sub-national, local. Although driven by the planning scope, the scale for LSI analysis should in principle be larger than the planning area, to consider all external elements

Coast characteristics: hydrography, geomorphology, bathymetry, etc.

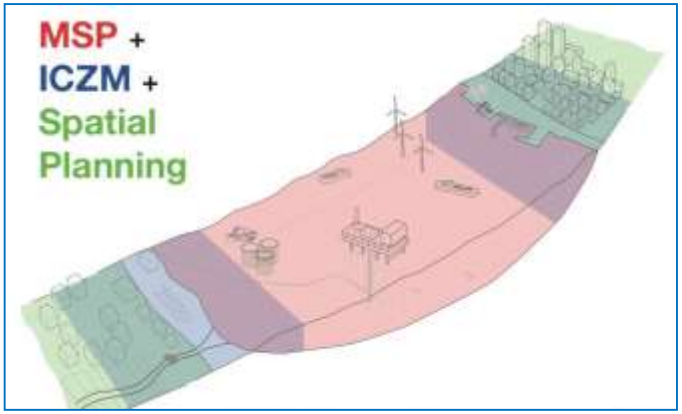
Typology and extension of the LSI processes: widely diffused (e.g. flow of goods, large-scale transport or nutrient loads from large drainage basin) or spatially restricted (e.g. coastal erosion or local consumption of marine resources)

Spatial and temporal distribution of natural processes and human activities. Space and time are two key variables in LSI. They need to be jointly considered starting with the identification of the area for the analysis.

Distribution of **ecological elements**: interfaces, ecological connections, ecological barriers



Regional analysis of cumulative environmental impacts in Baltic Sea (Janßen et al., 2013)



Source: Musco "MSP addressing LSI" Conference, 06.2017, Malta

CHALLENGES OF LSI IN PLANNING

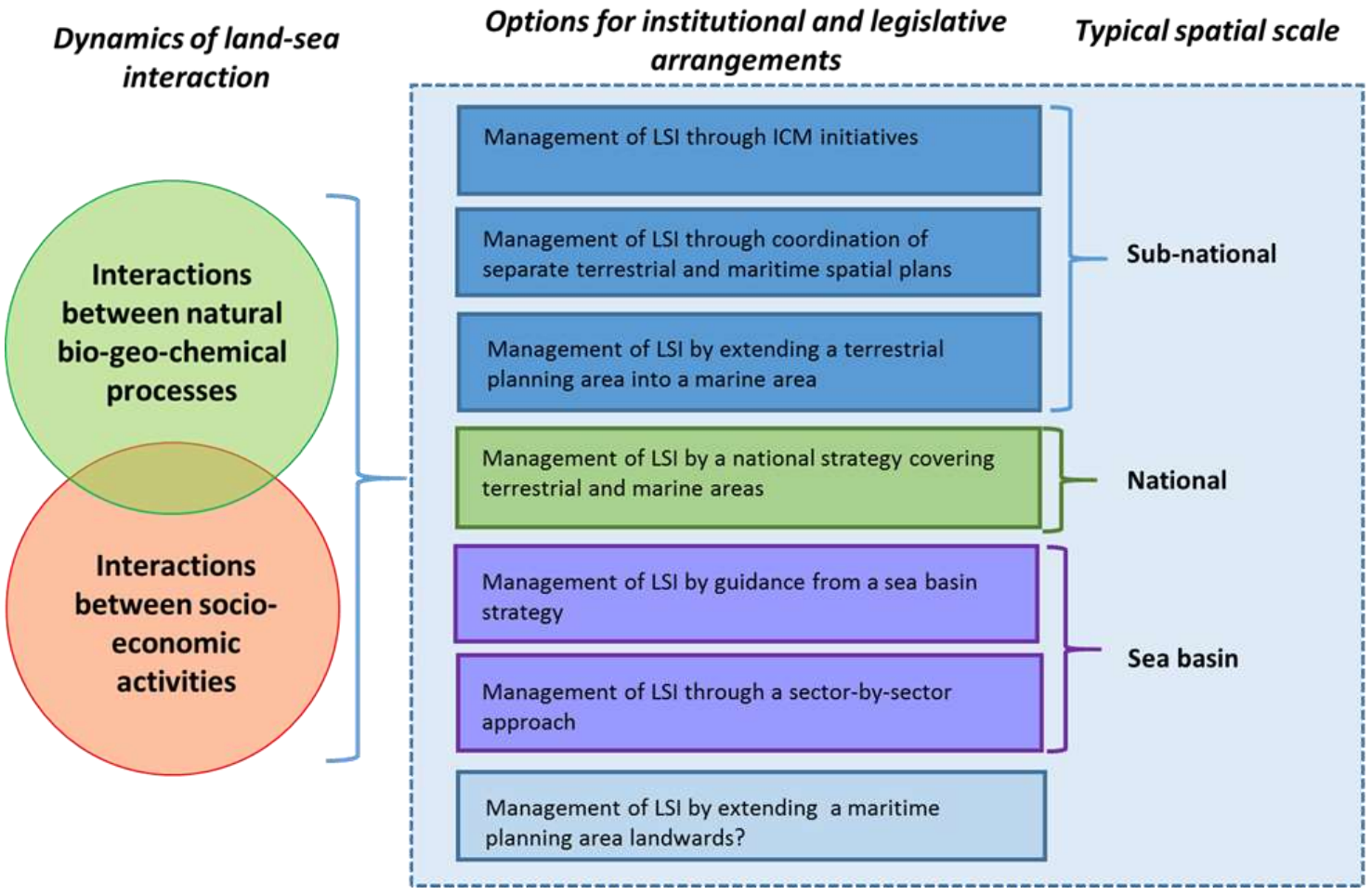
The management of LSI should take into account the interactions of **planning processes and plans** for land and sea areas

It is important to ensure that legal, administrative, consultation and technical processes are coordinated to avoid unnecessary duplications, incoherence, conflicts, waste of resources and/or excessive demand of stakeholders' efforts

The challenge is to plan and manage inshore and offshore activities in harmonized manner considering the **functional integrity of the land-sea continuum**

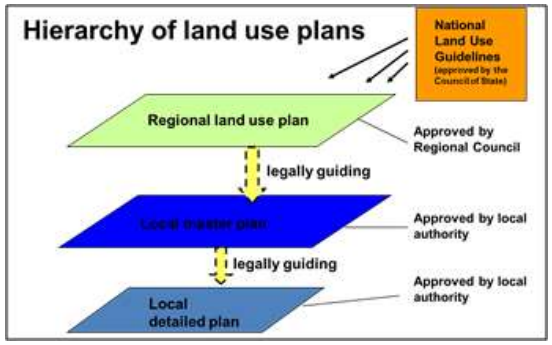
The achievement of this coherence also requires alignment/integration of the different **approaches, methodologies and tools** applied respectively on land and at sea

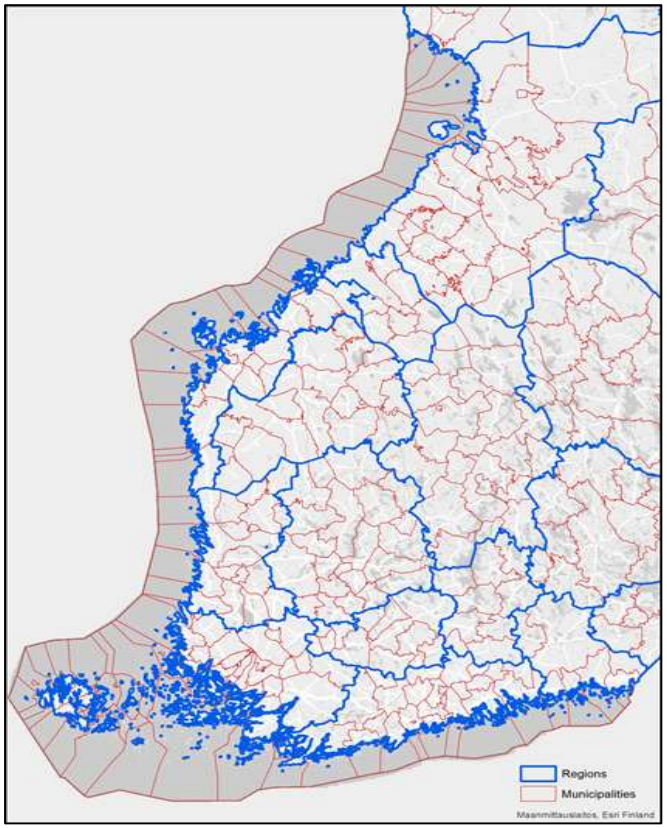
APPROACHES TO LSI IN PLANNING

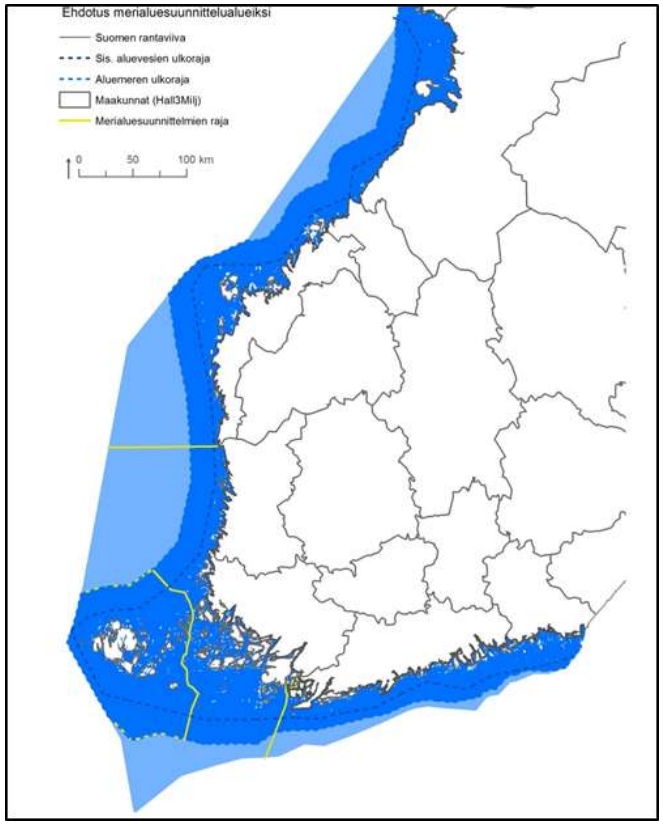


Source: EU MSP Platform, Report of the "MSP addressing LSI" Conference, 08.2017, Malta

EXAMPLE 1: Finland

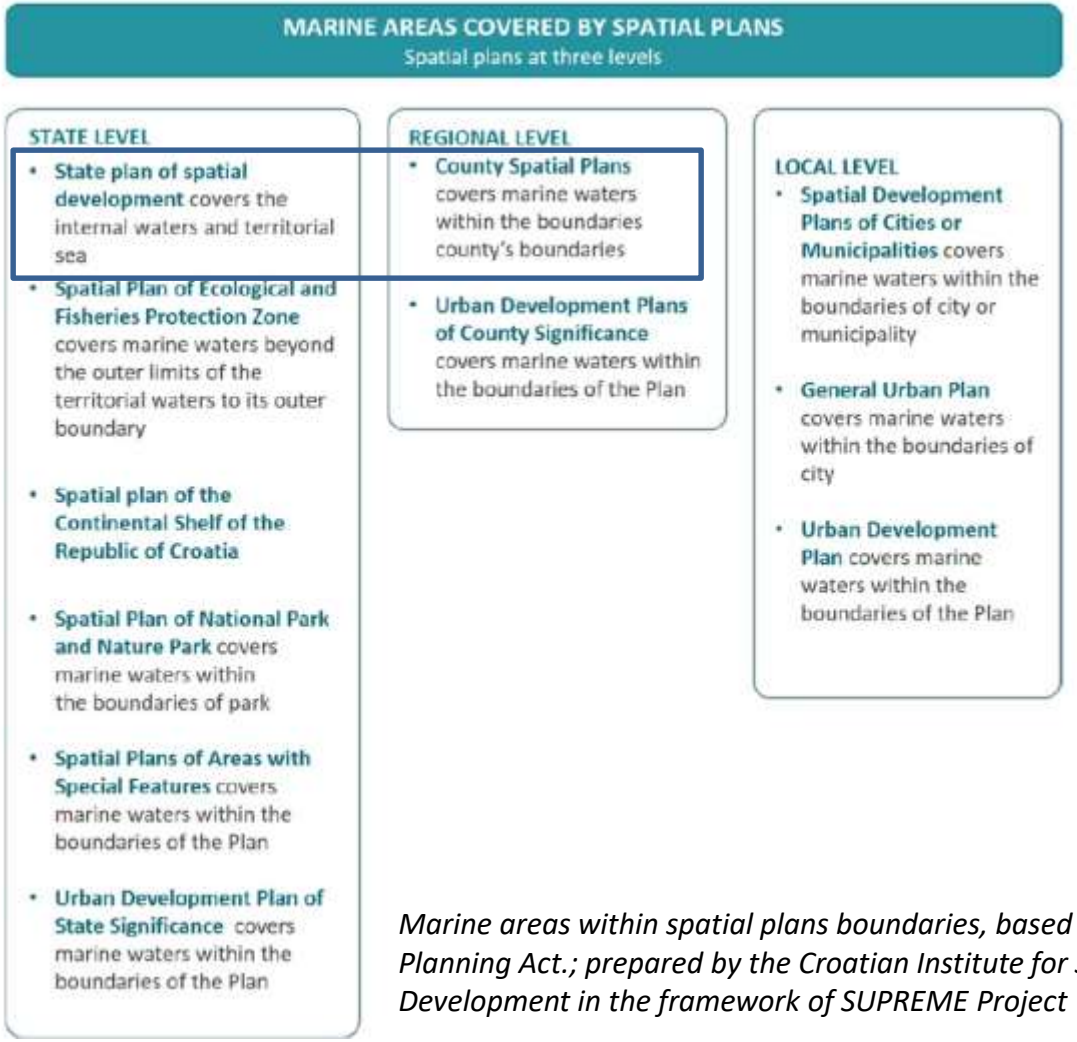






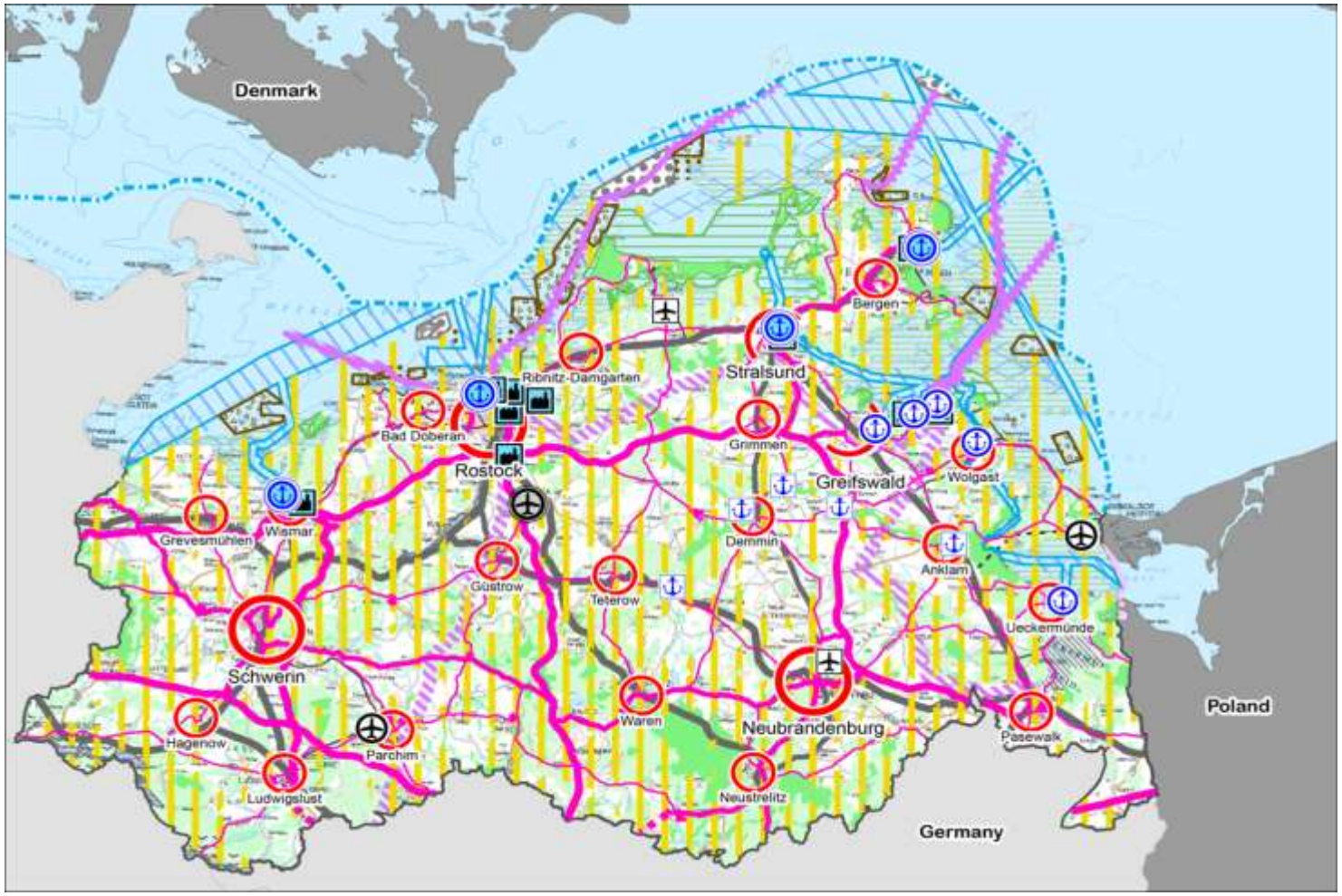
Source: Tihlman, T., "MSP in small sea spaces" workshop, 03.2018, Portorož, Slovenia

EXAMPLE 2: Croatia



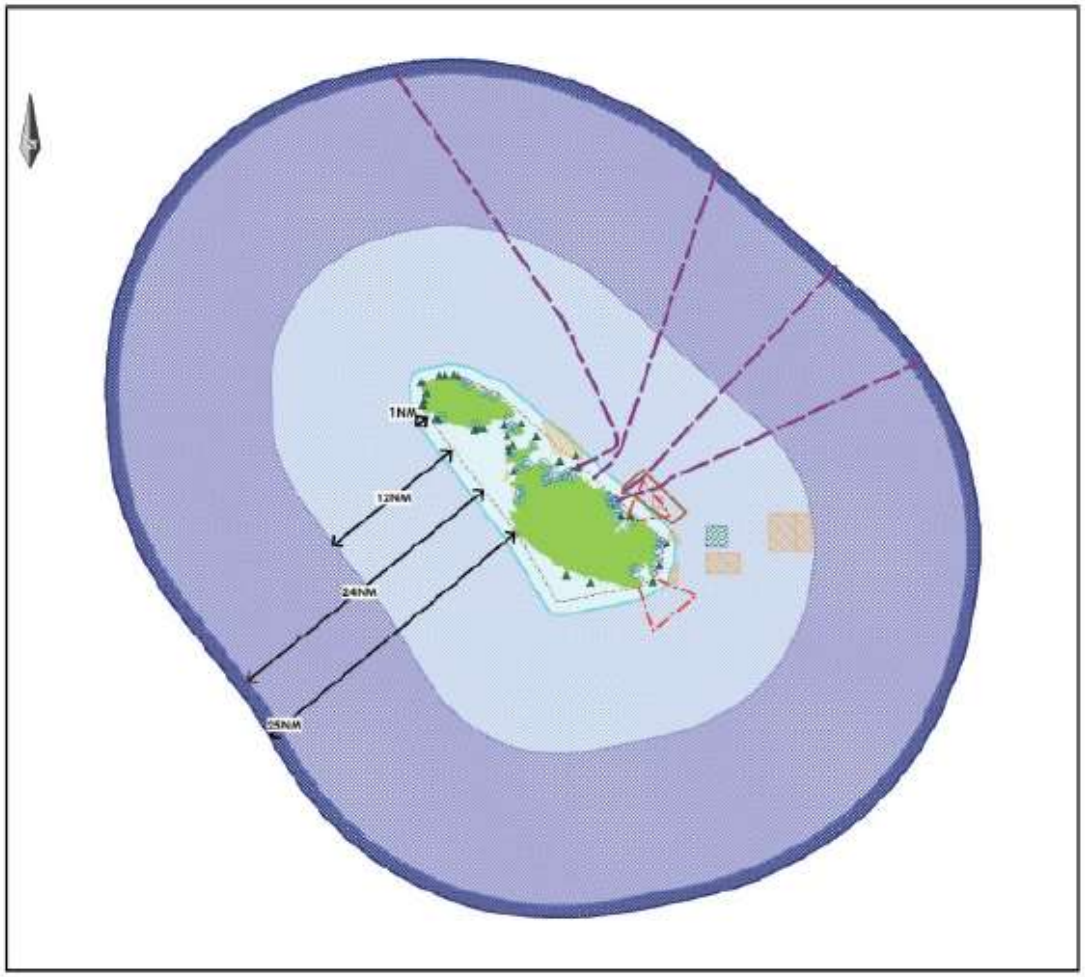
Marine areas within spatial plans boundaries, based on Physical Planning Act.; prepared by the Croatian Institute for Spatial Development in the framework of SUPREME Project

EXAMPLE 3: Mecklenburg-Vorpommern



Source: Janßen, H., "MSP in small sea spaces" workshop, 03.2018, Portorož, Slovenia

EXAMPLE 4: Malta



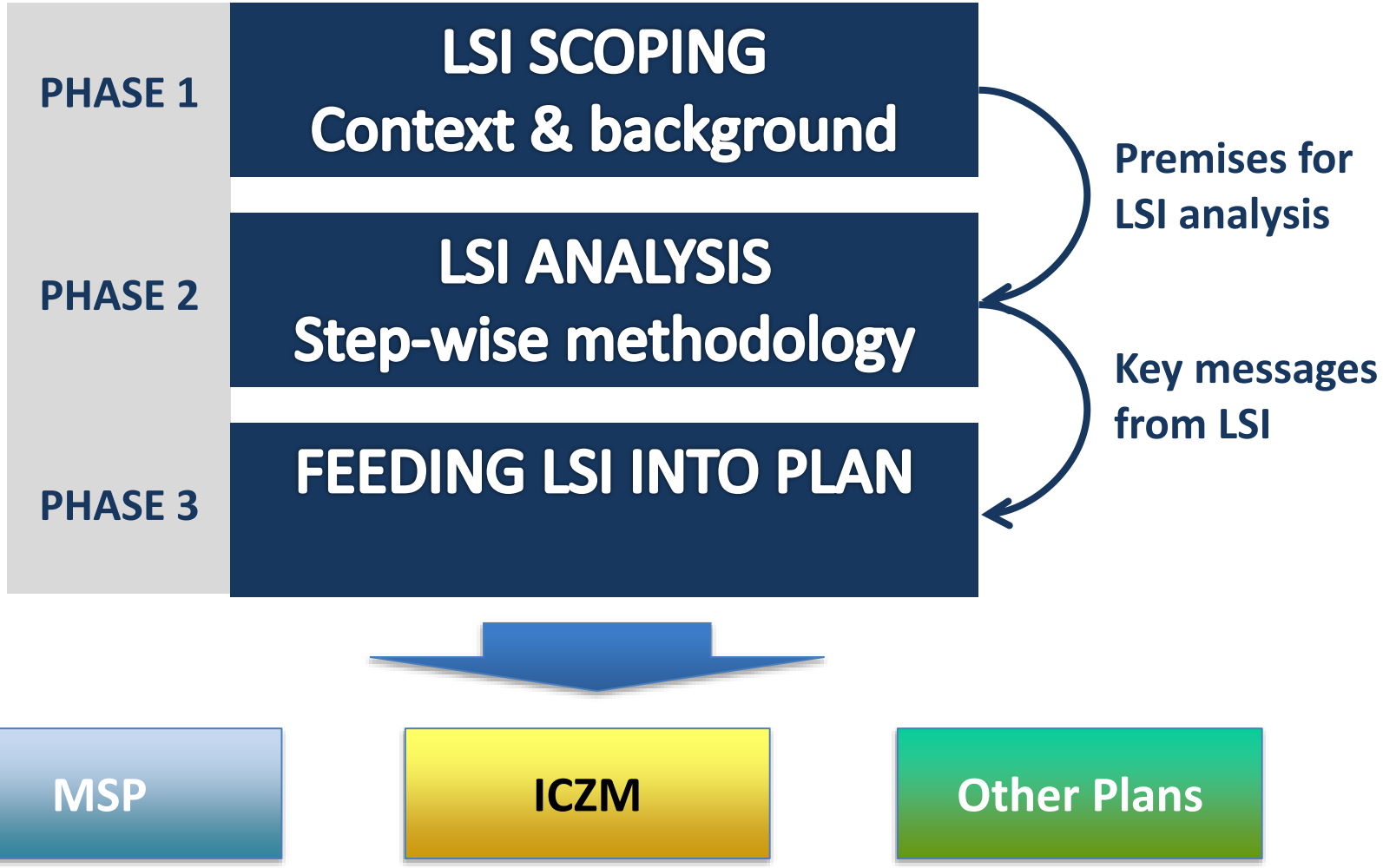
Strategic Plan for Environment and Development (SPED) - Source: EU MSP Platform, Malta country fiche (11.2018)

EXAMPLE 5: Italy

In **Italy** the Guidelines for MSP include several references to the need for the identification of the areas relevant in terms of LSI and provide a list of elements and factors to be considered in order to identify such areas:

- relevant river basins according to WFD
- terrestrial and marine protected areas
- UNESCO sites
- coastal areas with high landscape and seascape value
- areas with important coastal marine infrastructures (e.g. ports)

INTEGRATING LSI ANALYSIS IN PLANNING



INTEGRATING LSI ANALYSIS IN ICZM

Ref.	Provision	Consideration on LSI methodology
Art. 7.b	"Organise appropriate **coordination between the various authorities competent** for both the marine and land parts of coastal zones …"	Steps 6 of the proposed procedure aims at **identifying the institutions which have competence and responsibility on LSI issues**. Some of these shall be also involved in the institutional coordination requested by the ICZM Protocol. Step 5 focusing on policy, legal and planning aspects is also relevant to this regard.
Art. 8.1.a	The Parties "shall establish in coastal zones, as from the highest winter waterline, **a zone where construction is not allowed**. Taking into account, inter alia, the areas directly and negatively affected by climate change and natural risks, this zone may not be less than 100 meters in width…"	The delimitation and establishment of the so-called set-back zone clearly requires the **identification and analysis of some land-sea interactions**, in particular those related to coastal risks as flooding and erosions as well as long-term processes as those connected to sea level rise. Assessment of LSI due to human activities is also highly relevant; for example defence structures can influence coastal dynamics, while the presence of coastal infrastructures (such as ports) can limit the full application of the set-back concept.
Art. 9.1.e	The Parties "shall define **indicators** of the development of economic activities to ensure sustainable use of coastal zones and reduce pressure that exceed their carrying capacity"	The proposed methodology provides information on **most relevant LSI in the planning area, that shall be consider when developing indicators**. Moreover, step 11 focuses on the quantification of key LSI, which can therefore provide direct input to the computation of some indicators.

Thank you

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