ESPON

EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire policy making by territorial evidence

MSP-LSI – Maritime Spatial Planning and Land-Sea Interactions

Targeted Analysis
Version 20/02/2020

Scientific Annex: Methodology for Land Sea Interactions (LSI) Analysis

This targeted analysis activity is conducted within the framework of the ESPON 2020 Cooperation Programme, partly financed by the European Regional Development Fund.

The ESPON EGTC is the Single Beneficiary of the ESPON 2020 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland.

This delivery does not necessarily reflect the opinion of the members of the ESPON 2020 Monitoring Committee.

Authors
Sue Kidd, Stephen Jay, Hannah Jones, Leonnie Robinson, Dave Shaw – University of Liverpool (UK)
Marta Pascual, Diletta Zonta, Ecorys (Belgium)
Katrina Abhold, Ina Kruger , Katriona McGlade, Ecologic Institute (Germany)
Dania Abdhul Malak, Antonio Sanchez, University of Malaga (Spain)

Advisory Group
Project Steering Group: Holger Janssen, Ministry of Energy, Infrastructure and Digitalization Mecklenburg-Vorpommern, Germany (Lead Stakeholder); Lenca Humerca-Solar,Ministry of the Environment and Spatial Planning, Directorate Spatial Planning, Construction and Housing, Slovenia, Katarzyna Krzwda & Agata Zablocka, Ministry of Maritime Economy and Inland Navigation, Department for Maritime Economy, Poland, Sandra Momcilovic, Ministry of Construction and Physical Planning, Croatia, Katharina Ermenger, and Gregor Forschbach, Federal Ministry of the Interior, Building and Community, Germany, Lodewijk Abspoel, Ministry for Infrastructure and Water Management, Netherlands.

ESPON EGTC
Michaela Gensheimer, Senior Project Expert, Johannes Kiersch, Financial Expert

Version 20/02/20

Information on ESPON and its projects can be found on www.espon.eu.

The web site provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects.

This delivery exists only in an electronic version.

Contact: info@espon.eu

MSP-LSI – Maritime Spatial Planning and Land-Sea Interactions

Scientific Annex:
Methodology for Land Sea Interactions (LSI) Analysis

Table of Contents

List of Maps

List of Figures

List of Tables

Abbreviations

CER	Container Exchange Route
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
DSO	Distribution Service Operators
EEZ	Exclusive Economic Zone
ESPON	European Territorial Observatory Network
ESPON EGTC	ESPON European Grouping of Territorial Cooperation
EU	European Union
EUR	Euro
FTE	Full time equivalent
GDP	Gross Domestic Product
GW	Gigawatt
ha	Hectares
HBO	Dutch higher professional education
IDON	Interdependent Directors' Consultative Body North Sea
ILO	International Labour Organization
IMO	International Maritime Organization
km	Kilometres
kWh	Kilowatt hours
LSI	Land-Sea Interaction
MARPOL	International Convention for the Prevention of Pollution from Ships
MBO	Dutch middle-level or vocational training level
MW	Megawatt
MSP	Marine Spatial Planning
nm	Nautical miles
NUTS	Nomenclature of Territorial Units for Statistics
O&M	Operation & Maintenance
R&D	Research and development
SVIR	Structural Vision Infrastructure and Spatial Planning of the Netherlands
SWOT	Strengths, Weaknesses, Opportunities, Threats
TSO	Transmission System Operator
TWh	Terawatt hours
UNCLOS	United Nations Convention on the Law of the Sea

Preface

Land-Sea Interactions (hereafter LSI) have been introduced in European legislation as part of the directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for Maritime Spatial Planning.

This was done to create flexibility for the European Member States in addressing the environmental, ecological, social, cultural, economic interrelations/interactions which exist between what happens at and in the seas/ocean with developments on land. The EU Member States which have jurisdiction over a part of a sea have the obligation to carry out a Maritime Spatial Planning process, resulting in a Maritime Spatial (policy) Plan by end of March 2021.

Addressing LSI in the process of analysing existing interrelations to benefit the policy/stakeholder decision making in a Maritime Spatial Plan offers the possibility to work with (long standing) pre-existing concepts like Integrated Coastal Management (ICM) resp. Integrated Coastal Zone Management (IZCM), having a legal status in a range of EU Member States and beyond through the Barcelona Convention and the related Protocol of Madrid.

At the same time, LSI also open the way to various different methods to look at the interaction and influence of activities on land with/on the marine system and maritime world and vice versa. LSI allow for analysing the entire value chain of goods and services from producer to end-consumer as well as the wider connections in the natural world, like migratory birds using land, sea, air and coasts without relating themselves to human delineations of judicial regions. All of this analysis is aimed to make well informed decisions nationally and aim for coherence across borders and sea basins benefiting all of those concerned.

As LSI is a new concept, allowing to build on other policies and institutional arrangements to address the topic on a national level, there are of course a lot of aspects which can be studied around LSI and questions to be asked. European legislators have not defined LSI for the very good reason that LSI differ for each region concerned, which is also of importance to those countries which are referred to as land-locked. Communities, business and ecological systems in those areas also benefit of and are dependent on the ocean, the seas and the coast. In many coastal states various concepts and methods have been used and applied to flesh out the topic, including story-telling, statistical research, SWOT analysis, territorial planning methods and supporting analyses.

It is for planners and stakeholders, jointly with and under guidance of the appropriate governmental levels, to decide what works for their situation and what topics of interest to take up as focus areas. Such may be the Motorways of the Seas, specific marine mammals or fish, energy transition for a better climate, effects of activities on land influencing the policy target of a healthy and biodiverse (marine) ecosystem, the tourism and leisure economy, dealing with sea level rise and much more.

In order to help planners in the EU Member States concerned, ESPON has been asked to conduct a “targeted analysis study” using existing ESPON methods and different case studies in various EU Member States to present a possible approach how LSI could be addressed in spatial planning, which could be informative to the Members of the Stakeholder Group and beyond, for instance the Member States Expert Group on MSP and DG Mare as well as DG Environment as focal points for the European Commission. The work is intended also to be informative for regions working nationally in and around sea basins for instance in the CPMR and for Members of European Parliament, notably those who are part of the EP Intergroup SEARICA.

This study is a first attempt to bring more light into the LSI issue. As is often the case when new issues are analysed, also this study had to struggle with challenges, all the more so as our seas

are still only partially well investigated areas. The statistical standards used in Europe today do not reproduce the diversity of LSI, neither in their functional nor in their spatial expression. There are gaps in the data basis that had to be used for the recommendations given in the present study.

Furthermore, Land-Sea Interactions and Sea-Land Interactions can be found in every aspect of life on earth, and are much broader than can be taken up in a policy document like a Maritime or Marine Spatial Plan. Let this study, which is a first approximation, not prevent you from further thinking about LSI, but use its findings and advice as a welcome contribution in making life of planners, stakeholders and politicians a bit more manageable. Land and Sea cannot be divided; Life on Land is Life below Water (and vice versa).

The Stakeholder Group

1 Introduction

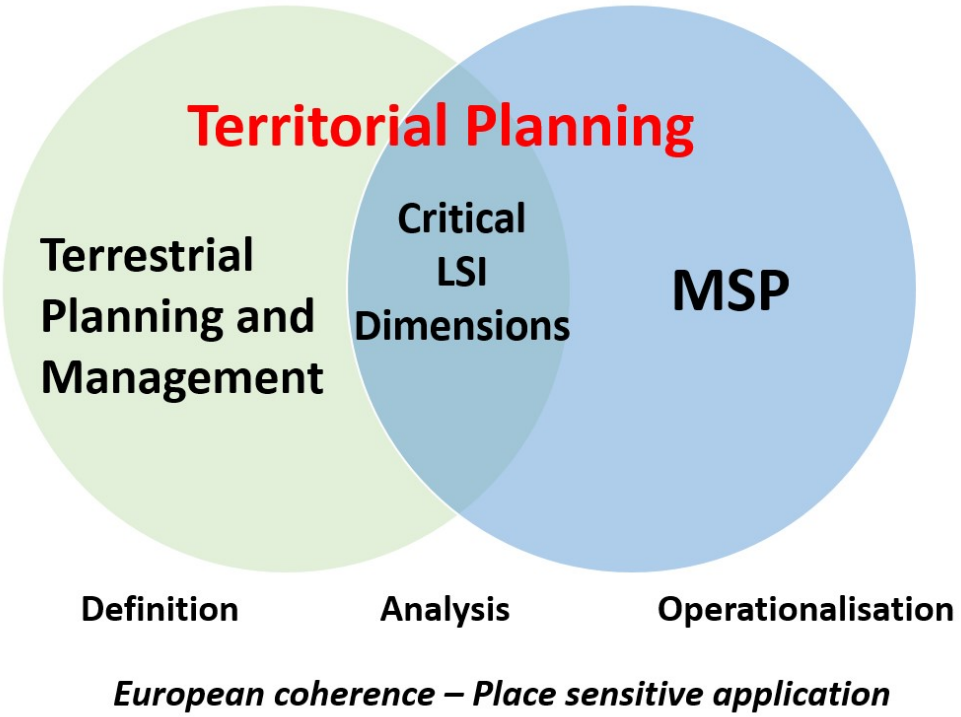
The overall objective of this targeted analysis was to improve stakeholders' planning processes through the coordinated, comparable and systematic acquisition and analysis of both marine and terrestrial data and information at a European, regional and sub-regional level.

The study is intended to enable evidence-based, coherent and transparent decision-making in EU Member States by developing an approach to considering land-sea interactions (LSI) in the development of national maritime spatial plans. It may also contribute to the extended use of territorial evidence (both quantitative and qualitative), thereby, adding a European LSI perspective to other fields of policy development. Figure 1 illustrates how the research has been conceptualised.

The MSP-LSI approach includes:

- A general framework for considering LSI in MSP/Terrestrial Planning;
- Proposed definitions of LSI, Coastal Area and LSI Core Area;
- A method for more detailed exploration of LSI with a particular focus on understanding the main impacts on land of key maritime sectors.

Figure 1: MSP-LSI overall research concept



The methodological framework was developed in an iterative manner as the research progressed. Following testing through five selected pilot case studies further refinements were thought appropriate and these are reflected in the *Guidelines for Good Management of LSI in MSP*. The case studies involved, a value chain analysis of critical sectors, a review of both general and sector specific governance/management arrangements related to LSI, and the spatial representation of LSI.

The case studies provide worked examples of LSI analysis and discussion of planning responses to associated opportunities and risks, focusing particularly on selected key sectors. To help operationalize LSI exploration, particularly with key maritime activities and impacts on land in mind, the following method was originally used and summarised in Figure 2.

LSI Scoping: LSI scoping is a useful first stage. This might involve an initial discussion with relevant stakeholders about the nature of LSI and what might be meant by the coastal area/core area in order to identify critical issues for further examination.

Analysis of Governance and LSI: This should entail a review of spatial planning arrangements on land and sea, and the relationships between them, including an identification of who has the competence to deal with LSI agendas at national, regional and local levels. Analysing these findings will help to identify areas where action may be beneficial and who has responsibility for action.

Value Chain Analysis: Based upon established value chain approaches used by the World Trade Organisation and others, the MSP LSI project has developed a spatialized approach to value chain analysis for considering LSI associated with maritime sectors. This helps to explore the spatial footprint of selected sectors, the spatial connectivity between different value chain segments, and consider the relative 'stickability' of economic and other benefits within coastal communities. From this, a spatial assessment of LSIs associated with selected sectors can be distilled and areas where action may be beneficial can be identified.

Mapping and LSI: Mapping activities can assist in defining the boundaries of a core area both on land and sea and visualising findings to support analysis and discussion. Experimentation with different scales of mapping and alternative infographic approaches may be helpful.

Recommendations for Good Management: In this final element, findings from the different aspects of investigations can be brought together to draw out key messages and develop recommendations for good management of LSI in Territorial Planning.

Figure 2: A method for exploring LSI in territorial planning

<table>
<tr><td colspan="4">LSI Scoping for MSP/Territorial Planning</td></tr>
<tr><td rowspan="3">.Governance Analysis</td><td>General context of the case study area and focal sectors</td><td rowspan="3">Value Chain Analysis</td><td>Developing the sector value chains</td></tr>
<tr><td rowspan="2">Spatial planning governance arrangements and LSI coverage in terrestrial/marine plans</td><td>Key sector characteristics</td></tr>
<tr><td>Sector framework conditions</td></tr>
<tr><td></td><td></td><td></td><td>Key sector actors</td></tr>
<tr><td></td><td></td><td></td><td>Sector statistics</td></tr>
<tr><td></td><td></td><td></td><td>Sector LSIs</td></tr>
<tr><td></td><td>Key LSI findings</td><td></td><td>Key LSI findings</td></tr>
<tr><td colspan="4">Mapping</td></tr>
<tr><td colspan="4">Recommendations for Good Management of LSI in MSP/Territorial Planning</td></tr>
</table>

The creation of a framework and methodological approach was applied to each case study, in order to establish the principles of coordinated, comparable and systematic acquisition and analysis of both marine and terrestrial data. This included preparing a guidance document,

setting out a structured approach to capturing data from the case studies and templates for local knowledge brokers to collect this data. The case study research aimed to capture: how LSI are understood and managed; conflicts and potential synergies in LSI; examples of good practice in LSI management; means to promote blue and green growth or territorial cohesion through LSI; how environmental impacts and future developments are taken into account in LSI; and LSI challenges, opportunities and risks for economic activities in the case study area.

The five case studies were selected as the central element of the MSP-LSI research. These cover different regional seas and types of coastlines and represent a variety of different LSI challenges (See Table 1). The case studies provide a test bed for the approach to addressing LSI in territorial planning which is being developed through the research, as well as worked examples of associated LSI sector value chain analysis and associated LSI management.

Table 1: MSP-LSI case study areas

Case study	Regional Sea	Scale of MSP activity	LSI Type-based on ESaTDOR typology [1]	Character	Territorial Boundary Agreed	MSP Framework	Focal sectors and sub-sectors for LSI
Croatian coast and islands (HR)	Mediterranean (Adriatic)	Sub-national	Transition	Rural	Largely but not ratified	Developing	Coastal Tourism Cruise Shipping
Slovenia (SI)	Mediterranean (Adriatic)	National	Transition/ Regional hub	Urban	Disputed in parts and not ratified	Developing	Coastal Tourism Mariculture
Gulf of Gdańsk (PL)	Baltic	Sub-National	Transition	Urban	Yes	MSP pilot embedded in regional seas plan	Maritime Cargo Transport Coastal Tourism
Pomeranian Bight (DE/PL/DK/ SE)	Baltic	Trans-national	Transition	Mixed	Yes	Mature	Offshore Wind Energy Coastal Tourism
Dutch North Sea Coast (NL)	North Sea	National	European Core	Mixed	Yes	Mature	Maritime Cargo Transport Offshore Wind Energy

In operationalising the case studies and providing a manageable focus to the research it was important that core area boundaries and critical sectors to be explored were clearly defined and agreed.

For each case study, we identified two focal sectors in dialogue with the stakeholders involved in the project. These built on and are consistent with previous European Blue Growth studies (in particular the “Study on the establishment of a framework for processing and analysing maritime

[1] European Sea and Terrirorial Development Opportunities and Risk (EsaTDOR) was an ESPON Applied Research project, see https://www.espon.eu/estador

economic data in Europe" (COGEA, 2017) and the "Annual Economic Report on EU Blue Economy" (DG Mare, 2018). We also defined the geographical/administrative boundaries that form a 'core area' on which the case study research was focused. On the land, this was aligned around NUTS 2 and 3 regions. At sea, this was broadly structured around the exclusive economic zone (EEZ), acknowledging that in some areas, the boundaries have not been formally agreed and that in some cases the EEZ cannot be fully included due to its large scale (see Appendix 1).

In many cases of course, impacts, opportunities and risks from LSI and associated planning responsibilities flow well beyond this core area. Wherever pertinent for the case study analysis, we moved beyond the core area both in terms of governance arrangements for managing land sea interactions and the impacts and outcomes of the value chain analysis. Some of these impacts, influences and governance arrangements are also likely to be cross-border and trans-national in character.

The value chain analysis was focused on analysing the internal segments of the focal sectors in an effort to understand and locate the activity segments that add value, identify most relevant actors involved in performing those segments and define the logistics, infrastructures and conditions that are important and necessary to support those activity segments. The spatial identification of these activity segments allows for the identification of the existing and potential LSI interactions of each of the focal sectors.

For each of the case studies, roles and responsibilities were allocated. Knowledge brokers were responsible for data and information gathering in case study area. This included information on the value chain analysis, as well as data on governance and management arrangements for LSI or mapping activities. Knowledge Brokers were responsible for completing the case study templates and worked in close cooperation with thematic leads for the value chain analysis and governance analyses.

2 Value Chain Analysis

2.1 Generic Steps in the Value Chain Analysis

The value chain analysis work for each of the sectors examined followed a series of six steps which are summarised in Figure 3 below.

Step 1. Develop the general sector value chain for use in territorial planning

Step 1 involved gathering a "general" value chain, with its segments, for each of the maritime activities. The identification and definition of these value chains involved looking at existing value chains (e.g. tourism value chain identified by WTO, 2013) and building a new value chain that includes the "entire" value chain with regards land sea interactions (door to door value chains or supply and demand value chains). All value chains have been developed in such a way that they emphasize the land-sea dynamics of the individual value chain segments.

The value chains aim at bringing forward the land-sea component of both natural processes and human activities stemming from each reference sector. This explains why the general value chains used in this report may have a different starting point – the land-sea interaction of a given activity – compared to the value chains identified by others (e.g. WTO), which do not have land-sea dynamics and impacts as their primary focus.

Step 2. Define key characteristics and assemble statistics

Step 2 involved gathering the key characteristics of each of the value chains. In order to do this, basic information was gathered related to the value chain of each of the maritime activities to be analysed. Then the most relevant actors /stakeholders for each of the segments of the value chain were identified also noting down their location addresses and roles in order to know "who is doing what and where". This information needs to becollated into an excel spreadsheet.

Whilst the overall value chains are general, these need to be tailored, thereby highlighting which segments of the maritime activities are important for each case study area. In order to perform this tailoring, it is important to understand which segments are more developed in the specific case study in terms of actors involved, economic importance, existing infrastructure, etc. This is why the tailoring of the general value chain can only be performed after key information, key actors and framework conditions affecting the value chain have been gathered along Step 2.

Step 3. Explore sector framework conditions (governance, socio-economic, environmental etc.)

Step 3 involved an examination of the key framework conditions that influenced the way the sector has, and is likely to perform. This includes sector related policies and strategies (not necessarily spatial planning orientated), factors that may influence the economics of the sector including competition from other areas, availability of labour etc. and environmental conditions. Further information regarding case study specific socio-economic and environmental framework conditions investigated can be found in the individual case study reports.

Step 4. Identify key sector actors (and map where possible)

Step 4 involved the identification of key sector actors and gaining an insight into their geographic concentration or spread. Mapping to visualize the spatial footprint of the sector can be valuable. It is important to recognize that the identification of key actors will, of necessity, be a qualitative exercise (as detailed company level data sets may be difficult to assemble) and may be undertaken as a desk-based exercise and/or as part of a stakeholder workshop. Using the different segments in the value chain to define relevant sector NACE codes can be a useful, but limited, starting point.

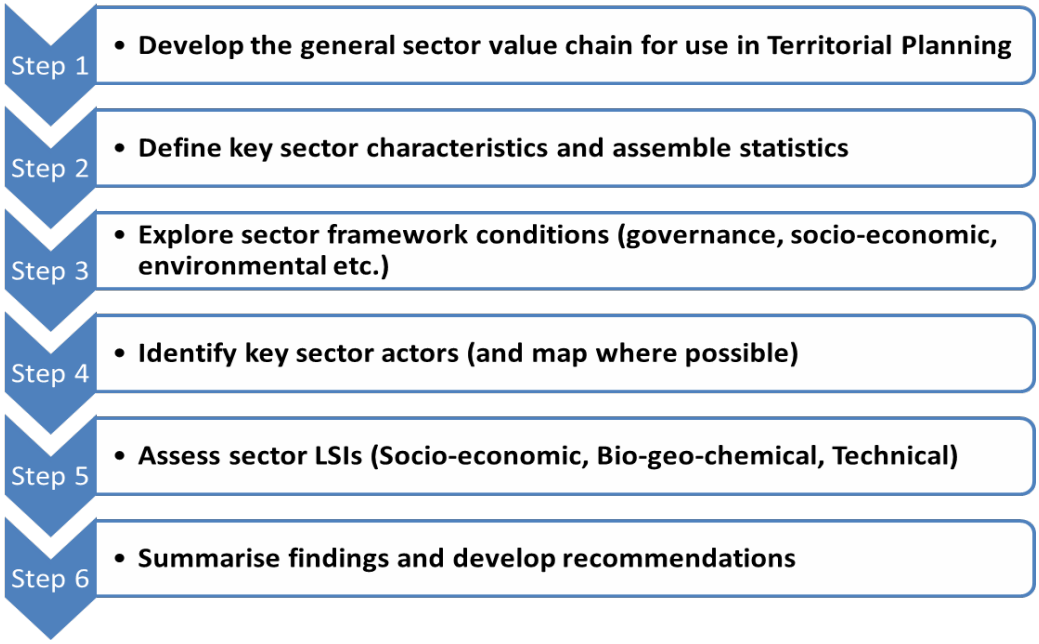
Step 5. Assess sector LSIs (socio-economic, bio-geochemical, technical)

Step 5 involved the identification of Land Sea Interactions (LSIs) extracting related information from material gathered in previous steps. Direct or indirect LSI can be assessed throughout the entire value chain of a maritime activity. However as LSIs tend to be more obvious at the land-sea interface, segments of the value chain that occur in this area were therefore highlighted. The findings of the assessment were then summarised in a bullet point list with their explanation. Here a distinction was made between environmental, socio-economic and technical LSIs as defined in the 2018 European Commission Report[2].

Step 6. Summarise findings and develop recommendations

Step 6 involved drawing the previously mentioned strands of analysis together to provide an overall assessment of LSI associated with different maritime sectors and develop recommendations for territorial planning responses.

Figure 3: Value chain analysis steps



2.2 Bespoking the value chain analysis to different maritime activities

The selection of maritime activities to be analysed in each case study area was decided following discussions with the stakeholders involved in the project.

Across the five case study areas, the following maritime activities were selected for spatialized value chain analysis:

- Coastal Tourism
- Cruise Shipping
- Mariculture

[2] Ecologic, 2017, *Land Sea Interactions in Maritime Spatial Planning*, DG Environment, Brussels.

- Shipbuilding
- Maritime Transport of Cargo
- Maritime Transport of Passengers
- Offshore Wind Energy

The following pages explain how the value chain analysis was performed specifically for each of these maritime activities so as to show how the value chain analysis for these maritime activities could be replicated elsewhere. The value chains chosen for analysis varied from case study to case study so there is some duplication in the narrative that follows because the knowledge brokers would only look at the value chain relevant for their particular case study area. Appendix 3 provides a summary of key value chain data collection sources.

2.2.1 Coastal Tourism Value Chain Analysis

The following diagram shows the various segments that constitute the general value chain for coastal tourism[3]:

Figure 4: General value chain for coastal tourism

This value chain was built based on the tourism value chain provided by the WTP 2013 report[4]. However, because the tourism value chain from this report was very detailed, included too many segments and it was not specifically built with the purpose of spatially highlighting the Land Sea Interactions of a coastal tourism value chain, the various sub-segments of this chain were merged into some more general combinations. This is why, the "general" value chain diagrams provided by this work differs from the existing ones already available in the literature.

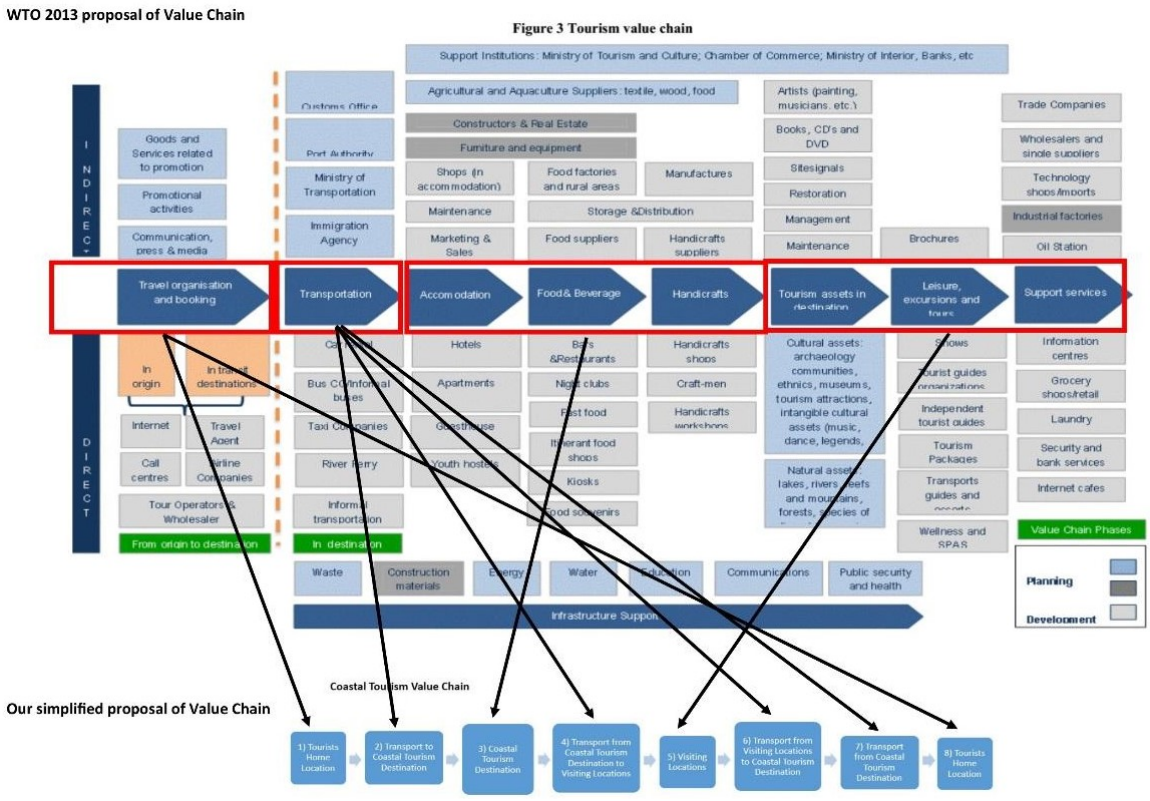
Although the focus is indeed different, the value chain approach adopted in this work remains coherent with the more general value chains presented in relevant literature e.g. the DG MARE Blue Growth Report[5], the WTO global value chains. Figure 5 shows how the WTP 2013 report value chain for coastal tourism and the one provided by this report can be reconciled with each other. A similar simplification process was undertaken for all subsequent value chains discussed in this report.

[3] Including Coastal Tourism activity but excluding Passengers Transport and Cruise Tourism

[4] World Trade Organization, 2013. Aid for Trade and Value Chains in Tourism. Page 23/Figure 3. http://www.oecd.org/dac/aft/aidfortradeandvaluechains.htm

[5] DG MARE Blue Growth: Scenarios and drivers for Sustainable Growth from the Oceans, Seas and Coasts. 2012 https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/publications/blue_growth_third_interim_report_en.pdf

Figure 5: Comparison of the coastal tourism value chains



The entire coastal tourism value chain can be summarized into the following 8 segments:

- Segment 1) Tourist Home Location. Place of origin of tourists.
- Segment 2) Transport to coastal tourism destination. Ways in which tourists transport themselves to the coastal tourism destination.
- Segment 3) Coastal Tourism Destination. Tourism destination areas (where they stay most of the time)
- Segment 4) Transport from Coastal Tourism Destination to Visiting Locations. What are the ways by which tourists transport themselves to visiting places?
- Segment 5) Visiting Locations. Visited places or performed activities outside of main stay area.
- Segment 6) Transport from Visiting Locations to Coastal Tourism Destination. Ways in which tourists transport themselves from visiting places.
- Segment 7) Transport from Coastal Tourism Destination. Ways in which tourists transport themselves out of the coastal tourism destination.
- Segment 8) Tourist Home Location. Place of origin of tourists and how they return home acknowledging that the outward and return trip might be different.

Whilst segments 1and 8 are essentially the same in this instance, they indicate that the coastal tourism value chain is essentially a closed loop where the origins of tourists and final destination are the same. For segments 2 and 8 there is a recognition that many tourists might avail themselves of various intervening opportunities, in travelling to or from the coastal tourism destination. It should be noted that other value chains considered in the case study

investigations were of a more linear character but in all instances highlighting the origin and final end point were key to their development.

Having developed the spatialised value chain, the following sample questions were provided to help understand and analyse how the value chain has developed in the case study area. In answering these questions a more detailed picture will emerge through the identification information related to key actors, framework conditions, quantitative data and impacts/risks/opportunities. The absence or unavailability of information needed to answer any of these questions will be highlighted in this process. It is important to recognise that data availability can be very variable across time and space and appropriate adjustments in approach may need to be made.

Table 2: Sample questions for value chain segments - coastal tourism

Segment of the Value Chain	**Sample Questions**
Segment 1) Tourist Home Location	Where do tourists come from? Are these tourists international of domestic? Are the numbers of arrivals increasing/decreasing/stabilizing?
Segment 2) Transport to Coastal Tourism Destination	How do tourists arrive to the coastal destination? What modes of transport do they use? Who owns these transport facilities? Are these transport facilities enough? (number, frequency, quality, price...)
Segment 3) Coastal Tourism Destination	What are the main coastal tourism destinations? How long do they stay at these destinations? What are the existing facilities at destination (accommodation, restaurants, public services, recreational activities, entertainment...)? Who owns these facilities? Are these facilities enough (number of beds, hotels, restaurants...)? Why? Does the case study have any strategy so as to further develop coastal tourism? How does the case study deal with potential impacts/risks that can be caused by the coastal tourism activity?
Segment 4) Transport from Coastal Tourism Destination to Visiting Locations	How do tourist travel themselves to visiting locations? How long does it take to arrive at these visiting locations? Is the infrastructure needed to perform this transport enough or does it need developing? Why? Who owns these transport services? Is there any strategy to develop them?

Segment 5) Visiting Locations	What are the main visiting locations? How long do tourists stay at the visiting locations? What do they do at the visiting locations (recreational activities, restaurants, museums...)? How much do they spend at the visiting locations (entry fees, souvenirs, food, etc.)?
Segment 6) Transport from Visiting Locations to Coastal Tourism Destination	How do tourist travel from visiting locations to the coastal tourism destination? Is the infrastructure needed to perform this transport enough or needs developing? Why? Who owns these transport services? Is there any strategy to develop them?
Segment 7) Transport from Coastal Tourism Destination	How do tourists leave the coastal destination? What transports do they use? Who owns those transport facilities? Are these transport facilities enough (number, frequency, quality, price...)?
Segment 8) Tourist Home Location	Where do tourists come from? Are these tourists international of domestic? Are the numbers of departures increasing/decreasing/stabilized?

Regarding the key information about the actors in the coastal tourism value chain, all information that was available regarding the following NACE codes of business associated with coastal tourism activity were sought (see Table 3).

Table 3: Coastal tourism activities and their related NACE codes

Sector/Group		**Activity**	**NACE code[6]**
Coastal Tourism	Tourism: Accommodation	Hotels and similar accommodation	I.55.10
		Holiday and other short-stay accommodation	I.55.20
		Camping grounds, recreational vehicle parks and trailer parks	I.55.30

[6] NACE Rev 2 Statistical classification of economic activities in the European Community. 2008. Eurostat Methodologies and working papers, European Commission, Luxembourg. ISBN 978-92-79-04741-1. Available at https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

		Other accommodation	I.55.90
	Tourism: Transport	Retail sale of automotive fuel in specialised stores	G.47.30
		Passenger rail transport, interurban	H.49.10
		Urban and suburban passenger land transport	H.49.31
		Passenger air transport	H.51.10
	Tourism: Other	Retail sale of cultural and recreation goods in specialised stores	G.47.6
		Retail sale of other goods in specialised stores	G.47.7
		Food and beverage service activities	I.56.00
		Travel agency, tour operator and other reservation service and related activities	N.79
	Cruise Tourism	Cruise tourism (+ cruise transport- H.50.10)	n.a.

Names and location addresses of key businesses were gathered (so as to geo-locate them and be able to map them spatially). They were also organized according to whether they belonged to one or several of the Value Chain sub-segments.

The result of this activity can lead to a map showing where these actors are located relative to the case study core area.

In order to perform a tailoring of the general value chain of coastal tourism to a specific case study, it is important to understand which segments are more developed in any case study location in terms of actors involved, economic importance, existing infrastructure, etc. This is why this tailoring of the general value chain can only be performed after the key information, key actors and framework conditions affecting the value chain have been gathered during Step 2, 3, 4 and 5.

In terms of the identification of LSIs for coastal tourism, these have been organized around the following typologies: environmental; socio-economic; technical, as recommended in previous work[7].

The **bio-geo-chemical LSIs** of coastal tourism may include:

- intensive use of space and resources which may lead to poor water and environmental quality;
- pollution, noise or species' disturbance;

[7] As defined in the European Commission Report "Land Sea Interactions in Maritime Spatial Planning Report". Land Sea Interactions in Maritime Spatial Planning. 2018. European Commission. Available at http://ec.europa.eu/environment/iczm/pdf/LSI_FINAL20180417_digital.pdf

- building new marinas, piers or berths has an impact on marine and coastal habitats;
- impacts on fish stocks

The **socio-economic LSIs** of coastal tourism may include:

- competition for coastal space with sectors such as aquaculture, offshore energy production and port development;
- impacts on income and job creation in coastal communities (direct employment at the port, or secondary from increased tourism spend in/at local businesses);
- impact on fish stocks, potentially leading to changes in commercial fishing activities and subsequent impact on fishermen's income, jobs and fishing communities

The **technical LSIs** of coastal tourism may include:

- innovation in terms of infrastructure to limit environmental pressures;
- provision of suitable access of boating locations (access to marinas, boat ramps, moorings);
- impacts on land infrastructure (increased beach access through roads and car parks).

By then looking at how these impacts may relate either directly or indirectly to specific value chain segments a further insight into the experience of LSI can be enabled. However, as LSI tend to be more obvious at the land-sea interface, value chain segments most associated with coastal areas can then by highlighted for particular attention as indicated below.

Table 4: Characterizing the significant element of LSI for the coastal tourism value chain segments

Segments of the Value Chain	**Main elements characterizing the LSI**
1) Tourists Home Locations	Impact of waste management; Employment and Income generation; Impacts on land infrastructure
2) Transport to Coastal Tourism Destination	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure
3) Coastal tourism destination	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure; Pollution, noise or species' disturbance
4) Transport from Coastal Tourism Destination to Visiting Locations	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure; Pollution, noise or species' disturbance
5) Visiting locations[8]	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land

[8] Highlighted LSI if visiting locations are located at the Land Sea interface. Not to be highlights if these are inland.

	infrastructure
6) Transport from Visiting Locations to Coastal Tourism Destination	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure
7) Transport from Coastal Tourism Destination	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure generation; Impacts on land infrastructure; Pollution, noise or species' disturbance
8) Tourists home location	Impact of waste management; Employment and Income generation; Impacts on land infrastructure

2.2.2 Cruise Shipping Value Chain Analysis

The general value chain for the maritime activity of cruise shipping was built based on previous cruise shipping value chain literature such as DG MARE Blue Growth Report[9]. However, some other sub-segments were added to these value chains so as to spatially highlighting the land sea interactions of the cruise shipping value chain.

Figure 6 shows the various segments that constitute the general value chain for cruise shipping:

Figure 6: General value chain for cruise shipping

The entire cruise shipping value chain can be summarized into the following 13 segments:

- Segment 1) Passengers start location. Cruise start location.
- Segment 2) Land transport to cruise starting terminal/port/marina. Ways in which cruise passengers arrive to their cruise starting terminals, ports or marinas.

[9] DR MARE, Blue Growth: Scenarios and drivers for Sustainable Growth from the Oceans, Seas and Coasts. 2012 https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/publications/blue_growth_third_interim_report_en.pdf

- Segment 3) Cruise starting terminal /port/ marina operation services. Terminal where the cruise starts.
- Segment 4) Sea Voyage. Main cruise shipping routes.
- Segment 5) Stop X terminal / port/ marina operation services. Terminal where cruise shipping routes temporary stop (stop-overs).
- Segment 6) Land transport from terminal / port / marina X to visiting locations. Ways in which cruise passengers arrive at their visiting locations.
- Segment 7) Visiting Locations. Visited places and activities performed at those places.
- Segment 8) Land transport from visiting locations to terminal / port / marina X. Ways in which cruise passengers arrive from their visiting locations back to the cruise ship,
- Segment 9) Stop X terminal / port/ marina operation services. Terminal where cruise shipping routes temporary stop (stop-overs).
- Segment 10) Sea voyage. Main cruise shipping routes
- Segment 11) Cruise ending terminal /port/ marina operation services. Terminal where the cruise ends.
- Segment 12) Land transport from cruise ending terminal/port/marina. Ways in which cruise passengers leave their cruise starting terminals, ports or marinas.
- Segment 13) Passengers end location. Cruise end location.

Having developed the spatialised value chain, the following sample questions were provided to help understand and analyse how the value chain has developed in the case study area. In answering these questions a more detailed picture will emerge through the identification information related to key actors, framework conditions, quantitative data and impacts/risks/opportunities. The absence or unavailability of information needed to answer any of these questions will be highlighted in this process. It is important to recognise that data availability can be very variable across time and space and appropriate adjustments in approach may need to be made.

Table 5: Sample questions for value chain segments- cruise shipping

Segment of the Value Chain	**Sample Questions**
Segment 1) Passengers Start Location	Where does the cruise shipping routes start? Where do cruise passengers come from? Are the numbers of cruise arrivals increasing/decreasing/stabilized?
Segment 2) Land Transport to Cruise Starting Terminal/Port/Marina	How do tourists arrive to the cruise terminal? What transports do they use? Who owns these transport facilities? Are these transport facilities enough (number, frequency, quality, price...)?
Segment 3) Cruise Starting Terminal /Port/ Marina	Where are main cruise terminals?

Operation Services.	What infrastructure is needed for cruise shipping at the terminals? Is this sufficient infrastructure? Why? Are there any strategies in the case study area to further develop the terminals and their associated infrastructure?
Segment 4) Sea Voyage.	What are main cruise shipping companies? Who owns them? What are principal sea routes for cruise shipping? How long do sea routes take? How many people are involved while at sea (jobs, entertainment, etc.)? How does the cruise shipping activity deal with its potential impacts/risk?
Segment 5) Stop X Terminal / Port/ Marina Operation Services	What are main cruise terminals while en-route? What infrastructure is needed for cruise shipping at terminals? Is this infrastructure enough? Why? Are there any strategies in the case study area to further develop the terminals and their infrastructure? What are the main cruise shipping destinations? How long do they stay at these destinations? What are the existing facilities in the destinations (restaurants, public services, recreational activities, entertainment...)? Who owns these facilities?
Segment 6) Land Transport from Terminal / Port / Marina X to Visiting Locations.	How do tourist travel to visiting locations? How long does it take to arrive to these visiting locations? Is there sufficient infrastructure needed to perform this task or does it need developing? Why? Who owns the transport services? Is there any strategy to develop it?
Segment 7) Visiting Locations	What are main visiting locations? How long do tourists stay at the visiting locations? What do they do at visiting locations (recreational activities, restaurants, museums...)? How much do they spend at visiting locations

	(entry fees, souvenirs, food, etc.)?
Segment 8) Transport from Visiting Locations to Terminal / Port / Marina X.	How do tourist travel back from visiting locations? Is there sufficient infrastructure needed to perform this task or does it need developing? Why? Who owns these transport services? Is there any strategy to develop it?
Segment 9) Stop X Terminal / Port/ Marina Operation Services.	What are main cruise terminals while en-route? What infrastructure is needed for cruise shipping at these terminals? Is this infrastructure enough? Why? Are there any strategies in the case study area to further develop the terminals and their associated infrastructure? What are the main cruise shipping destinations? How long do they stay at these destinations? What are the existing facilities at destination (restaurants, public services, recreational activities, entertainment...)? Who owns these facilities?
Segment 10) Sea Voyage.	Where do tourist come from? Are these tourists international or domestic? Are the numbers of departures and/or passengers increasing/decreasing/stabilizing?
Segment 11) Cruise Ending Terminal /Port/ Marina Operation Services	What are main cruise terminals? What infrastructure is needed for cruise shipping at the terminals? Is this infrastructure enough? Why? Are there any strategies in the case study area to further develop the terminals and their associated infrastructures?
Segment 12) Land Transport from Cruise Ending Terminal/Port/Marina	How do tourists leave the cruise terminals? What transports do they use? Who owns those transport facilities? Are these transport facilities enough (number, frequency, quality, price...)?
Segment 13) Passengers End Location.	Where are the tourists' home locations?

In completing the section regarding "Key information about the actors in the cruise shipping Value Chain", information should be gathered based on the following NACE codes of business for cruise shipping activity (See Table 6).

Table 6: Cruise shipping and related activities and their related NACE codes

Sector/Group		**Activity**	NACE code[10]
Cruise Shipping	Tourism: Transport	Retail sale of automotive fuel in specialised stores	G.47.30
		Passenger rail transport, interurban	H.49.10
		Urban and suburban passenger land transport	H.49.31
	Tourism: Other	Retail sale of cultural and recreation goods in specialised stores	G.47.6
		Retail sale of other goods in specialised stores	G.47.7
		Food and beverage service activities	I.56.00
		Travel agency, tour operator and other reservation service and related activities	N.79
	Cruise Tourism	Cruise tourism (+ cruise transport- H.50.10)	n.a.

Names and location addresses of key businesses were gathered (so as to geo-locate them and be able to map them spatially). They were also organized according to whether they belonged to one or several of the Value Chain sub-segments.

The result of this activity can lead to a map showing where these actors are located relative to the case study core area.

In order to perform a tailoring of the general value chain of cruise shipping to the specificities of a particular case study area, it is important to understand which segments are more developed in terms of actors involved, economic importance, existing infrastructure, etc. This is why this tailoring of the general value chain can only be performed after key information, key actors and framework conditions affecting the value chain have been gathered along Step 2, 3, 4 and 5.

In terms of the identification of LSIs of cruise shipping, these have been organized around the following themes: environmental; socio-economic; technical[11],

[10] NACE Rev 2 Statistical classification of economic activities in the European Community. 2008. Eurostat Methodologies and working papers, European Commission, Luxembourg. ISBN 978-92-79-04741-1. Available at https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

[11] As defined in the European Commission Report "Land Sea Interactions in Maritime Spatial Planning Report". Land Sea Interactions in Maritime Spatial Planning. 2018. European Commission. Available at http://ec.europa.eu/environment/iczm/pdf/LSI_FINAL20180417_digital.pdf

The **bio-geo-chemical LSIs** of cruise shipping may include:

- impacts on habitats and species associated with port development and channel dredging;
- impacts on marine and coastal habitats coming from building new marinas, piers or berths;
- modification of hydrographic conditions, underwater noise, increased risk of collision (e.g. by mammals), increased risk of accidents, pollution from marine litter and the introduction of non-indigenous species by vessels;
- wider impacts including poor air quality, airborne noise and traffic.

The **socio-economic LSIs** of cruise shipping transport may include:

- the impacts of port activity on income and employment and facilitation of ancillary and supply chain businesses;
- the displacement of other sectors including mineral extraction, offshore energy, aquaculture and other coastal maritime activities.

The t**echnical LSIs** of cruise shipping may include:

- the achievement of efficient connectivity with terrestrial transport networks.
- the setting up of efficient and new type of infrastructure to limit environmental pressure whilst providing suitable access at the coast.

By then looking at how these impacts may relate either directly or indirectly to specific value chain segments a further insight into the experience of LSI can be enabled. However, as LSI tend to be more obvious at the land-sea interface, value chain segments most associated with coastal areas can then by highlighted for particular attention as indicated below.

Table 7: Main elements characterising LSI for cruise shipping value chain segments

Segments of the Value Chain	**Main elements characterizing the LSI**
1) Passengers Start Location	Impact of waste management; Employment and Income generation; Impacts on land infrastructure
2) Land Transport to Cruise Station/Terminal Ports/ Marinas	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure
3) Cruise Starting Terminal/ Port/ Marina Operation Services	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure
4) Sea Voyage	Invasive non-native species; Impact on air quality; Displacement of other sectors; Employment and Income generation
5) Stop X Terminal/ Port/ Marina Operation Services	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure
6) Land Transport from	Accessibility to Infrastructure; Employment and Income generation,

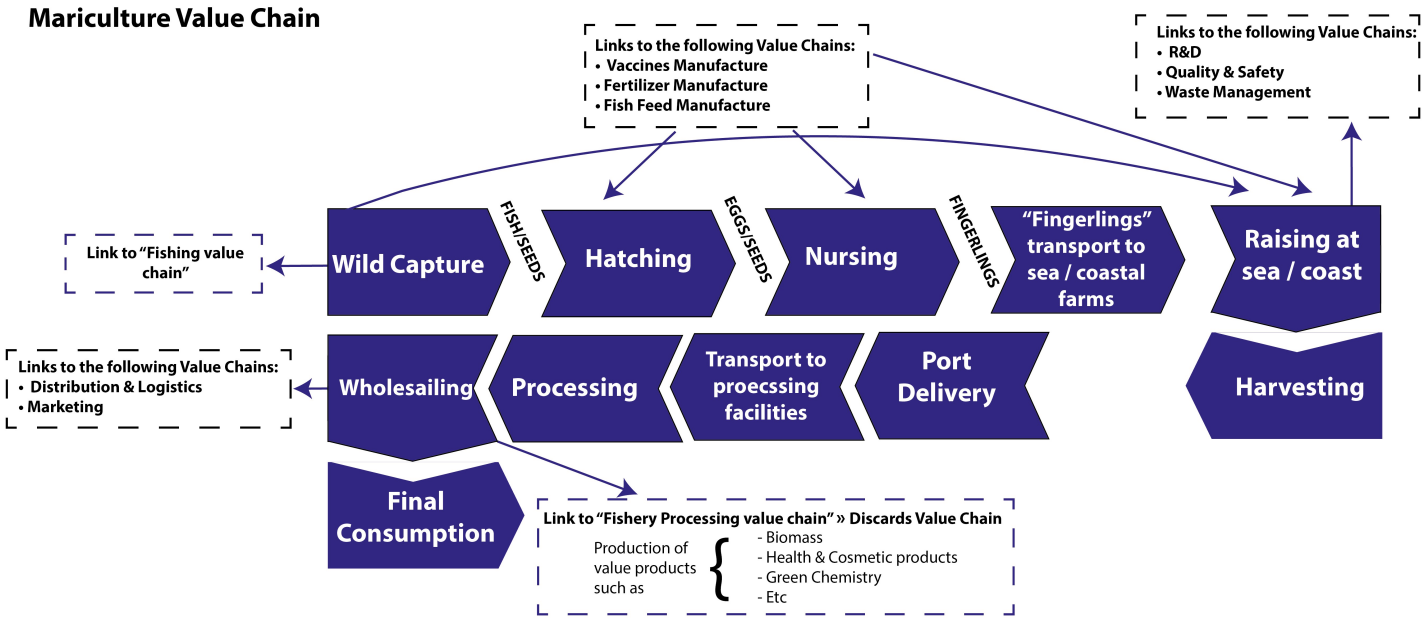
Terminal / Port / Marina X to Visiting Locations	Impacts on land infrastructure
7) Visiting Location	Impact of waste management; Employment and Income generation; Impacts on land infrastructure
8) Land Transport from Visiting Locations to X Terminal / Port / Marina	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure
9) Stop X Terminal/ Port/ Marina Operation Services	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure
10) Sea Voyage	Invasive non-native species; Impact on air quality; Displacement of other sectors; Employment and Income generation, Pollution, noise or species' disturbance
11) Cruise Ending Terminal/ Port/ Marina Operation Services	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure
12) Land Transport from Cruise Station/Terminal Ports/ Marinas	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure
13) Passengers End Location	Impact of waste management; Employment and Income generation; Impacts on land infrastructure

2.2.3 Mariculture Value Chain Analysis

The general value chain for the maritime activity of mariculture was built based on previous marine aquaculture value chain literature such as DG MARE Blue Growth Report[12]. However, some other sub-segments were added to these value chains so as to spatially highlight the land sea interactions of the mariculture value chain process from the wild capture of fish and egg/seeds to the final consumption of the products. The segments of the value chain were selected in terms of the spatial nature of each of the process steps, so as to show the spatial reach of these segments for the LSI analysis.

The following diagram shows the various segments that constitute the general value chain of fish and shellfish mariculture:

Figure 7: General value chain for fish and shellfish mariculture



The entire mariculture value chain process can be summarized into the following 11 segments:

- Segment 1) Wild capture. Fish and shellfish production can start with capture in the wild of small fish or eggs/seeds.

[12] DG MARE Blue Growth: Scenarios and drivers for Sustainable Growth from the Oceans, Seas and Coasts. 2012 https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/publications/blue_growth_third_interim_report_en.pdf

- Segment 2) Hatching. Captured or imported small fish or shellfish seeds are then brought into hatcheries so that they reproduce and create eggs or more seeds.
- Segment 3) Nursing. Selected small fish and seeds are then brought into nursery areas (inland or at sea) to increase in size until they become what is known as “fingerlings“.
- Segment 4) Fingerlings are transport to sea/coastal farms. Fingerlings are transported (by sea if the nursing takes place at sea; or by land transport if nursing takes place inland) to where the mariculture farms are located (sea (offshore) or coastal areas).
- Segment 5) Raising at sea/coast. Fingerlings are then raised in these farms until they reach a size suitable for the market.
- Segment 6) Harvesting. Species are then harvested from the farms.
- Segment 7) Port Delivery. Species are then delivered to the ports and stored there (if necessary).
- Segment 8) Transport to processing facilities (if they need processing)
- Segment 9) Processing at relevant processing facilities.
- Segment 10) Wholesaling. Products are sold through the distribution and logistics structure of the area to retailers, final consumers, etc.
- Segment 11) Final Consumption. Products are finally consumed.

Having developed the spatialised value chain, the following sample questions were provided to help understand and analyse how the value chain has developed in the case study area. In answering these questions a more detailed picture will emerge through the identification information related to key actors, framework conditions, quantitative data and impacts/risks/opportunities. The absence or unavailability of information needed to answer any of these questions will be highlighted in this process. It is important to recognise that data availability can be very variable across time and space and appropriate adjustments in approach may need to be made.

Table 8: Sample questions for value chain segments- Fish and shellfish mariculture

Segment of the Value Chain	**Sample Questions**
Segment 1) Wild capture	Who does this capture? Are these fished or captured in the area? Are these fish/shellfish imported? From where?
Segment 2) Hatching.	Where does this hatching take place (land/sea)? Domestic or international (and then imported)? How does the hatching facility deal with vaccines, fertilizers, fish feed and the generated waste at the facilities?
Segment 3) Nursing.	Where does this nursery activity take place (land/sea)? Domestic or international (and then imported)? How does the nursery facility deal with vaccines, fertilizers, fish feed and the generated waste at the facilities?

Segment 4) Fingerlings transport to sea/coastal farms	How are these fingerlings transported to the farms? Is the infrastructure needed to perform this transport enough or needs developing? Why? Is there any strategy to develop it?
Segment 5) Raising at sea/coast	How long does it take? What are the spatial requirements of these farms in terms of other activities (for example other activities (mainly fishing) not allowed in a 500m buffer zone, or all activities totally excluded in an area of X km^2)? How is area dealing with the waste generated at the farms?
Segment 6) Harvesting.	Who does it (hired fishermen, aquaculture company personnel)? How long does it take?
Segment 7) Port Delivery.	How are these harvested products delivered to port? By boats? Who does it (hired fishermen, aquaculture company personnel)? Once at port are they, directly distributed by transport to the processing or wholesale facilities or are they stored at the port? Is there enough facilities at the ports to receive this harvest and even store it, if necessary? Why? Is there any strategy to develop this infrastructure if any of it is missing or inadequate?
Segment 8) Transport to processing facilities	How are the products transported to the processing facilities (car, train, refrigerated trucks, etc.)? Where are these processing facilities located (nearby ports or inland)? Is the infrastructure needed to perform this transfer sufficient or does it need developing? Why? Is there any strategy to develop it?
Segment 9) Processing.	Where is the processing industry in your area? What do they process (biomass, health and cosmetics, chemistry, etc.)? How many companies? How many employees? What are the statistics (revenues, budgets, etc.)? Is the activity increasing, decreasing...? Why? What is missing to develop the industry? How do they deal with the discards of the processing activity?

Segment 10) Wholesaling	Who sells the fish and shellfish? Is the market local, national or international? How much is each element worth?
Segment 11) Final Consumption	Who are main buyers (restaurants, supermarkets, direct buyers and householders etc.)? Are these increasing, decreasing...? Why? Is there any statistical (revenues, budgets, etc.)?

In order to ascertain key information about the actors of the mariculture value chain it is recommended to gather all information that is available regarding the following NACE codes for businesses associated with mariculture activity (Table 9).

Table 9: Mariculture related activities and their related NACE codes

Sector/Group	**Activity**	NACE code[13]
Extraction of marine living resources	Marine fishing	A.03.11
	Marine aquaculture	A.03.21
	Processing and preserving of fish, crustaceans and molluscs	C.10.20
	Manufacture of oils and fats	C.10.41
	Other food products n.e.c	C.10.89
	Prepared meals and dishes	C.10.85
	Research and experimental development on biotechnology	M.72.11
	Wholesale of other food, including fish, crustaceans and molluscs	G.46.38
	Retail sale of fish, crustaceans and molluscs in specialised stores	G.47.23
	Freight transport by road	H. 49.41

[13] NACE rev. 2; Statistical classification of economic activities in the European Community. 2008. Eurostat Methodologies and working papers. European Commission, Luxembourg. ISSN 1977-0375. Available at https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

	Freight rail transport	H. 49.20
	Sea & Coastal freight water transport	H. 50.20
	Freight air transport	H. 51.21
	Restaurants & mobile services activities	I. 56.10

Names and location addresses of key businesses were gathered (so as to geo-locate them and be able to map them spatially). They were also organized according to whether they belonged to one or several of the Value Chain sub-segments.

The result of this activity can lead to a map showing where these actors are located relative to the case study core area.

In order to perform the tailoring of the general value chain of mariculture to the case study, it is important to understand which segments are more developed in the case study in terms of actors involved, economic importance, existing infrastructure, etc. This is why this the tailoring of the general value chain can only be performed after key information, key actors and framework conditions affecting the value chain have been gathered along Step 2,3,4 and 5.

In terms of the identification of LSIs associated with mariculture, these have been organized around the following typologies: bio-geochemical; socio-economic; technical[14],

The **bio-geochemical LSIs** of mariculture may include:

- intensive use of space and resources which may lead to poor water and environmental quality;
- pollution, noise or species' disturbance;
- building new marinas, piers or berths may have an impact on marine and coastal habitats;
- impacts on fish stocks;
- the presence of algal blooming and toxic algae near fish cages;
- the presence of wild fish feeding on and impacting mariculture yields;
- presence of bio toxins in shellfish;
- fish cage pressures on space;
- pressures on the environment through the introduction of alien species;
- pressures on the environment from excess nutrients and suspended particles;
- increased environmental protection demands;
- increased danger of contributing to plastic waste in the oceans through nets;

The **socio-economic LSIs** of mariculture may include:

[14] As defined in the European Commission Report "Land Sea Interactions in Maritime Spatial Planning Report". Land Sea Interactions in Maritime Spatial Planning. 2018. European Commission. Available at http://ec.europa.eu/environment/iczm/pdf/LSI_FINAL20180417_digital.pdf

- competition for coastal space with other sectors such as offshore energy production, port development, fishing, shipping and coastal tourism;
- impacts on income and job creation in coastal communities (direct employment at the port, at the mariculture farms, at processing companies or secondary from increased tourism spend in/at local businesses, restaurants, supermarkets, etc.);
- impact on fish stocks, potentially leading to changes in commercial fishing activities and subsequently impacting on fishermen's income, jobs and fishing communities;
- impacts on tourism because of associated poor water quality (less bathing and less water recreational activities)

The **technical LSIs** of mariculture may include:

- innovation in terms of infrastructure to limit environmental pressures;
- provision of suitable access of boating locations (access to marinas, boat ramps, moorings);
- impacts on land infrastructure (increased port and land infrastructures).
- By then looking at how these impacts may relate either directly or indirectly to specific value chain segments a further insight into the experience of LSI can be enabled.

However, as LSI tend to be more obvious at the land-sea interface, value chain segments most associated with coastal areas can then by highlighted for particular attention as indicated below.

Table 10: Main elements characterising LSI for fish and shellfish mariculture value chain segments

Segments of the Value Chain	Main elements characterising the LSI
1) Wild capture	Impacts on fisheries; Employment and Income generation; Impacts on land infrastructure
2) Hatching[15]	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure; Impacts on waste management; Invasive non-native species; Impact on coastal processes
3) Nursing[16]	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure; Impacts on waste management; Invasive non-native species; Impact on coastal processes
4) Fingerlings transport to sea/coastal farms	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure; Impact on air quality
5) Raising at sea/coast[17]	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impact on coastal processes; Invasive non-native species; Impacts on land infrastructure; Pollution, noise or species' disturbance

[15] Highlighted LSI if these are located at near coastal areas at the Land Sea interface. Not to be highlighted if these are located further offshore.

[16] Ibid.

[17] Ibid.

6) Harvesting [18]	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure
7) Port Delivery	Accessibility to Infrastructure; Employment and Income generation; Impacts on land infrastructure; Pollution, noise or species' disturbance
8) Transport to processing facilities	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure; Impact on air quality
9) Processing	Impact of waste management; Employment and Income generation; Impacts on land infrastructure; Pollution, noise or species' disturbance
10) Wholesaling	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure
11) Final Consumption	Accessibility to Infrastructure; Employment and Income generation, Impacts on land infrastructure

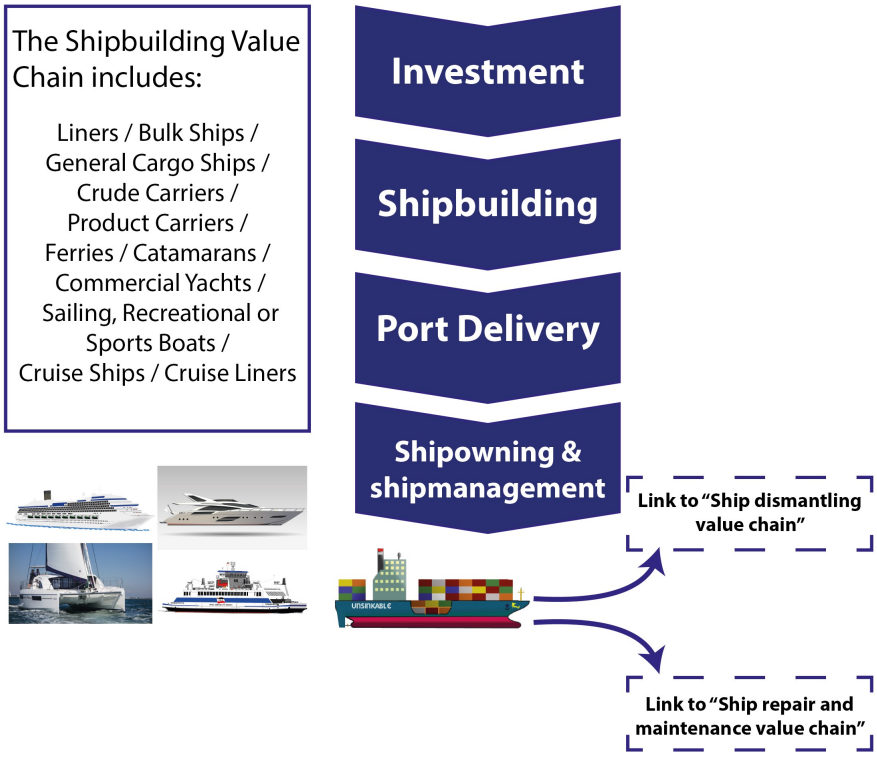
[18] Ibid.

2.2.4 Shipbuilding Value Chain Analysis

The general value chain for the maritime activity of shipbuilding was built based on previous value chain literature such as DG MARE Blue Growth Report. However, some other segments were added to these value chains so as to spatially highlight the LSI of the shipbuilding value chain process from investments to the ship owning and ship management passing through the shipbuilding per se. The segments of the value chain where selected in terms of the spatial nature of each of the process steps, so as to show the spatial allocation of these segments for the LSIs analysis.

The following diagram shows the various segments that constitute the general value chain of shipbuilding:

Figure 8: General value chain for shipbuilding



The entire shipbuilding value chain process can be summarized into the following 4 segments:

- Segment 1) Investment. This segments involves all activities related to the actual investment for building a ship or parts of the ship.
- Segment 2) Shipbuilding. Here is where the actual ship or parts of the ship are built at the shipyards.
- Segment 3) Port Delivery. This is the segment that involves all the transport pathways for the ship or parts of the ship to arrive to its final destination.
- Segment 4) Ship owning and Ship management. This is the segment where the owner of the ship of parts of the ship is located.

Having developed the spatialised value chain, the following sample questions were provided to help understand and analyse how the value chain has developed in the case study area. In answering these questions a more detailed picture will emerge through the identification information related to key actors, framework conditions, quantitative data and impacts/risks/opportunities. The absence or unavailability of information needed to answer any of these questions will be highlighted in this process. It is important to recognise that data availability can be very variable across time and space and appropriate adjustments in approach may need to be made.

Table 11: Sample questions for value chain segments - shipbuilding

Segment of the Value Chain	Sample Questions
1) Investment	Who invests in the ships or parts of the ship? Where are these investors based?
2) Shipbuilding	Where does the shipbuilding take place (land/sea)? What do they build? For whom? For what other maritime sectors? Are shipbuilding companies domestic or international? Who do they employ (locals/foreigners)? Is there enough social skilled capacity in the region? How do the shipyards deal with the waste generated at the facilities?
3) Port Delivery[19]	Where does this port delivery take place (land/sea)? What businesses deal with this delivery? Are these businesses domestic or international? Is the infrastructure needed to perform this transport enough or does it need developing? Why? Is the infrastructures needed to store these ships or ship parts enough or does it need developing? Why?
4) Ship owning and Ship management	Who are main owners of the final ships or ship parts? From where are these owners?

In order to fill in the section key information about the actors of the shipbuilding value chain, the following NACE codes of business for shipbuilding activity is a useful starting point.

[19] LSI if port delivery of shipbuilding is done through the coastal area or through sea

Table 12: Shipbuilding activities and their related NACE codes

Sector/Group		Activity	NACE code[20]
Maritime Transport	Ports, warehousing and construction of water projects	Cargo Handling	H.52.24
		Warehousing and storage services	H.52.10
		Construction of water projects	F.42.91
	Shipbuilding and repair	Building of pleasure and sporting boats	C.30.12
		Building of ships and floating structures	C.30.11
		Repair and maintenance of ships and boats	C.33.15
	Other maritime transport activities	Engines and turbines, except aircraft, vehicle and cycle engines	C.28.11
		Dismantling of wrecks	E.38.31

Names and location addresses of key businesses were gathered (so as to geo-locate them and be able to map them spatially). They were also organized according to whether they belonged to one or several of the Value Chain sub-segments.

The result of this activity can lead to a map showing where these actors are located relative to the case study core area.

In order to tailor of the general value chain of shipbuilding to the case study, it is important to understand which segments are more developed in the specific case study area in terms of actors involved, economic importance, existing infrastructure, etc. This is why this tailoring of the general value chain can only be performed after key information, key actors and framework conditions affecting the value chain have been gathered along Step 2, 3, 4 and 5.

In terms of our identification of LSIs of shipbuilding, these have been organized around the following typologies: bio-geo-chemical; socio-economic; technical[21].

The **bio-geo-chemical LSIs** of Shipbuilding may include:

- intensive use of space and resources which may lead to poor water and environmental quality;
- possible pollution releases and noise from construction machinery;
- impacts from coastal infrastructure on marine and coastal habitats;

[20] NACE rev. 2; Statistical classification of economic activities in the European Community. 2008. Eurostat Methodologies and working papers. European Commission, Luxembourg. ISSN 1977-0375. Available at https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

[21] As defined in the European Commission Report "Land Sea Interactions in Maritime Spatial Planning Report". Land Sea Interactions in Maritime Spatial Planning. 2018. European Commission. Available at http://ec.europa.eu/environment/iczm/pdf/LSI_FINAL20180417_digital.pdf

- impacts while at the construction phase, such as the disturbance of seabed morphology, the re-suspension of sediment.

The **socio-economic LSIs** of shipbuilding may include:

- competition for coastal space with sectors such as aquaculture, offshore energy production and port development;
- impacts on income and job creation in coastal communities (direct employment at the port, or secondary from local supply businesses, R&D, technical support, etc.)
- positive socio-economic benefits associated with local income and employment (especially in construction phase);
- benefits to other sectors like tourism associated with recreational shipbuilding (e.g. yachts).

The **technical LSIs** of shipbuilding may include:

- innovation in terms of infrastructure to limit environmental pressures;
- provision of suitable access of boating locations (access to marinas, boat ramps, moorings);
- impacts on land infrastructure needed to store built parts or ships.

By then looking at how these impacts may relate either directly or indirectly to specific value chain segments a further insight into the experience of LSI can be enabled. However, as LSI tend to be more obvious at the land-sea interface, value chain segments most associated with coastal areas can then by highlighted for particular attention as indicated below.

Table 13: Main elements characterising LSI for shipbuilding value chain segments

Segments of the Value Chain	**Main elements characterising the LSI**
1) Investment	None
2) Shipbuilding	Impact on coastal processes; Impact of waste management; Invasive non-native species; Impact on air quality; Displacement of other sectors; Employment and Income generation; Impacts on land infrastructure
3) Port Delivery[22]	Accessibility to Infrastructure; Employment and Income generation; Impacts on land infrastructure
4) Ship owning and Ship management	None

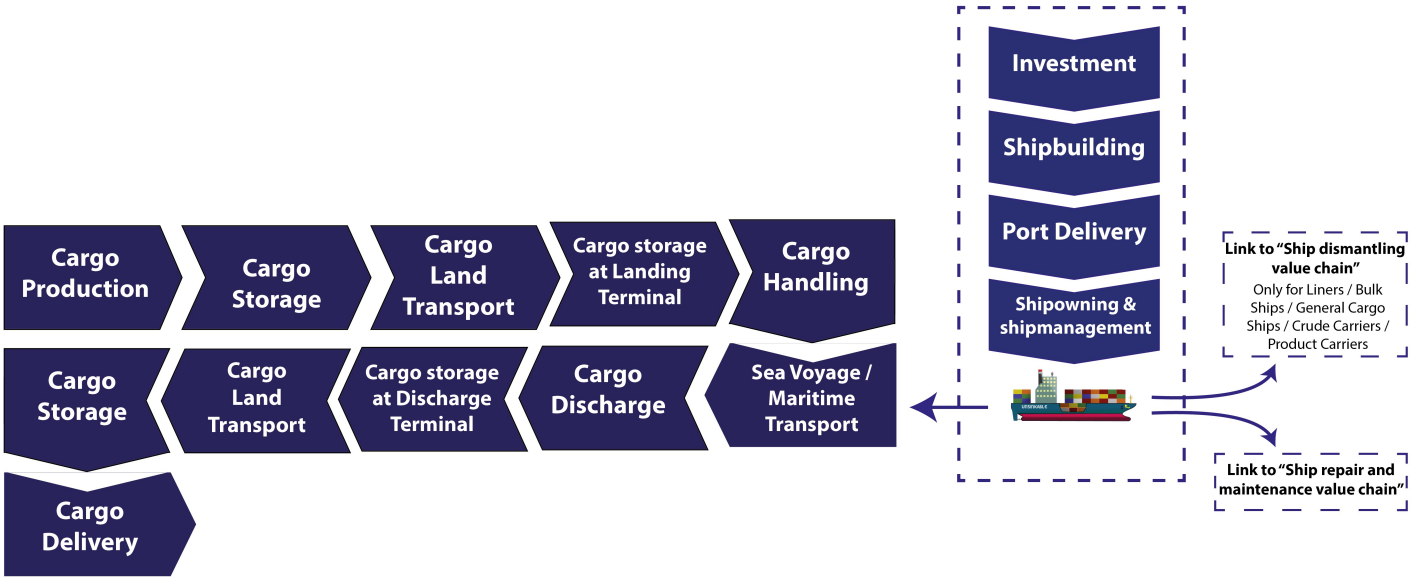
[22] LSI if port delivery of shipbuilding is done through the coastal area or through sea

2.2.5 Maritime Transport of Cargo Value Chain Analysis

The general value chain for the maritime activity of transport of cargo was built based on previous value chain literature such as DG MARE Blue Growth Report. However, some other segments were added to these value chains so as to spatial highlight the land sea interactions of the transport of cargo value chain process from the origins of the cargo passing through some form of maritime transportation until its final destination. The segments of the value chain were selected in terms of the spatial nature of each of the process steps, so as to show the spatial reach of each segment for the LSIs analysis.

Figure 9 shows the various segments that constitute the general value chain for maritime transport of cargo (shipbuilding value chain, also explained above on its own is also included in this figure to show where both value chains would meet):

Figure 9: General value chain for maritime transport of cargo



The entire maritime transport of cargo value chain process can be summarized into the following 11 segments:

- Segment 1) Cargo Production. Place where those products to be transported by sea are produced.
- Segment 2) Cargo Storage. Storage place of the cargo.
- Segment 3) Cargo Land Transport. Land transport mechanisms by which the cargo arrives to its exporting terminal.
- Segment 4) Cargo Storage at Landing Terminal. Storage place of the cargo at exporting terminal.
- Segment 5) Cargo Handling. Cargo handling activities at exporting terminal.

- Segment 6) Sea Voyage / Maritime Transport. Actual transport of the cargo to its destination.
- Segment 7) Cargo Discharge. Cargo discharge activities at landing terminal.
- Segment 8) Cargo Storage at Discharge Terminal. Storage place of cargo at landing terminal.
- Segment 9) Cargo Land Transport. Land transport mechanisms by which the cargo arrives to its final storage place.
- Segment 10) Cargo Storage. Storage place of the cargo.
- Segment 11) Cargo Delivery. Place where those cargo products are delivered. Final destination.

Having developed the spatialised value chain, the following sample questions were provided to help understand and analyse how the value chain has developed in the case study area. In answering these questions a more detailed picture will emerge through the identification information related to key actors, framework conditions, quantitative data and impacts/risks/opportunities. The absence or unavailability of information needed to answer any of these questions will be highlighted in this process. It is important to recognise that data availability can be very variable across time and space and appropriate adjustments in approach may need to be made.

Table 14: Sample questions for value chain segments - Maritime transport of cargo

Segment of the Value Chain	**Sample Questions**
1) Cargo Production	What is produced? Where is produced? Who produces it? Are the producers owned locally or internationally?
2) Cargo Storage & 10) Cargo Storage	Where is the cargo products stored until being transported? How many storage facilities are there? Who owns these facilities? Where are these facilities located? Is the infrastructure needed to perform this storage enough or needs developing? Why?
3) Cargo Land Transport & 9) Cargo Land Transport	How is the cargo products transported? Where are they transported? Who transports them? How many businesses? Who owns these transport services? Are these transport businesses enough or does it need developing? Why? Is the infrastructure needed to perform this transport enough or does

	it need developing? Why?
4) Cargo Storage at Landing Terminal & 8) Cargo Storage at Discharge Terminal	Where are these cargo products stored until being transported? How many storage facilities are there? Who owns these facilities? Where are these located? Is the infrastructure needed to perform this storage enough or does it need developing? Why
5) Cargo Handling & 7) Cargo Discharge	How long does it take? What are the cargo types? Is the infrastructure needed to perform this handling enough or does it need developing? Why? Who are the main people dealing with the cargo handling (jobs)? Are these employees domestic or foreign? How is area dealing with the potential waste generated?
6) Sea Voyage / Maritime Transport	Where is the cargo exported? Where is the cargo imported from? What are main maritime transport routes? How long does the voyage take? What requirements do cargo transporting ships need to fulfil in terms of environmental and health and security issues?
11) Cargo Delivery	What is the final destination of the cargo?

In order to fill in the section regarding key information about the actors in the maritime transport of cargo value chain information should be gathered that related to the following NACE codes of businesses for maritime cargo transport activity.

Table 15: Maritime transport of cargo related activities and their related NACE codes

Sector / Group		Activity	NACE Code[23]
Maritime Transport	Other maritime transport activities	Freight transport by road	H. 49.41
		Freight rail transport	H. 49.20
		Sea & Coastal freight water transport	H. 50.20
		Freight air transport	H. 51.21
	Ports, warehousing and construction of water projects	Service activities incidental to water transportation	H.52.22
		Cargo handling	H.52.24
		Warehousing and storage services	H.52.10
		Construction of water projects	F.42.91
	Shipbuilding and repair	Building of ships and floating structures	C.30.11
		Repair and maintenance of ships and boats	C.33.15
	Other maritime transport activities	Sea and coastal freight water transport	H.50.20
		Inland freight water transport	H.50.40
		Other transportation support activities	H.52.29
		Non-life insurance	K.65.12
		Reinsurance	K.65.20
		Rental and leasing services of water transport equipment	N.77.34
		Engines and turbines, except aircraft, vehicle and cycle engines	C.28.11
		Agents involved in the sale of machinery, industrial equipment, ships and aircraft	G.46.14
		Dismantling of wrecks	E.38.31

[23] NACE rev. 2; Statistical classification of economic activities in the European Community. 2008. Eurostat Methodologies and working papers. European Commission, Luxembourg. ISSN 1977-0375. Available at https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

Names and location addresses of key businesses were gathered (so as to geo-locate them and be able to map them spatially). They were also organized according to whether they belonged to one or several of the Value Chain sub-segments.

The result of this activity can lead to a map showing where these actors are located relative to the case study core area.

The tailoring of the general value chain for the maritime transport of cargo to the case study, requires an understanding of which segments are more developed in the case study in terms of actors involved, economic importance, existing infrastructure, etc. This is why this tailoring of the general value chain can only be performed after key information, key actors and framework conditions affecting the value chain have been gathered along Steps 2, 3, 4 and 5.

In terms of our identification of LSIs of maritime transport of cargo, these have been organized around the following typologies: bio-geo-chemical; socio-economic; technical[24]

The **bio-geo-chemical** LSIs of marine cargo transport may include:

- impacts on habitats and species associated with port development and channel dredging;
- modification of hydrographic conditions, underwater noise, increased risk of collision (e.g. by mammals), increased risk of accidents, pollution from marine litter and the introduction of non-indigenous species by vessels;
- wider impacts including poor air quality, airborne noise and traffic.

The **socio-economic LSIs** of marine cargo transport may include:

- the impacts of port activity on income and employment and facilitation of ancillary and supply chain businesses;
- the displacement of other sectors including mineral extraction, offshore energy and others.

The **technical LSIs** of marine cargo transport may include:

- the achievement of efficient connectivity with terrestrial transport networks.

By then looking at how these impacts may relate either directly or indirectly to specific value chain segments a further insight into the experience of LSI can be enabled. However, as LSI tend to be more obvious at the land-sea interface, value chain segments most associated with coastal areas can then by highlighted for particular attention as indicated below.

Table 16: Main elements characterising LSI for maritime transport of cargo value chain segments

Segments of the Value Chain	Main elements characterising the LSI
1) Cargo Production	Impact of waste management; Employment and Income generation; Impacts on land infrastructure

[24] As defined in the European Commission Report "Land Sea Interactions in Maritime Spatial Planning Report". Land Sea Interactions in Maritime Spatial Planning. 2018. European Commission. Available at http://ec.europa.eu/environment/iczm/pdf/LSI_FINAL20180417_digital.pdf

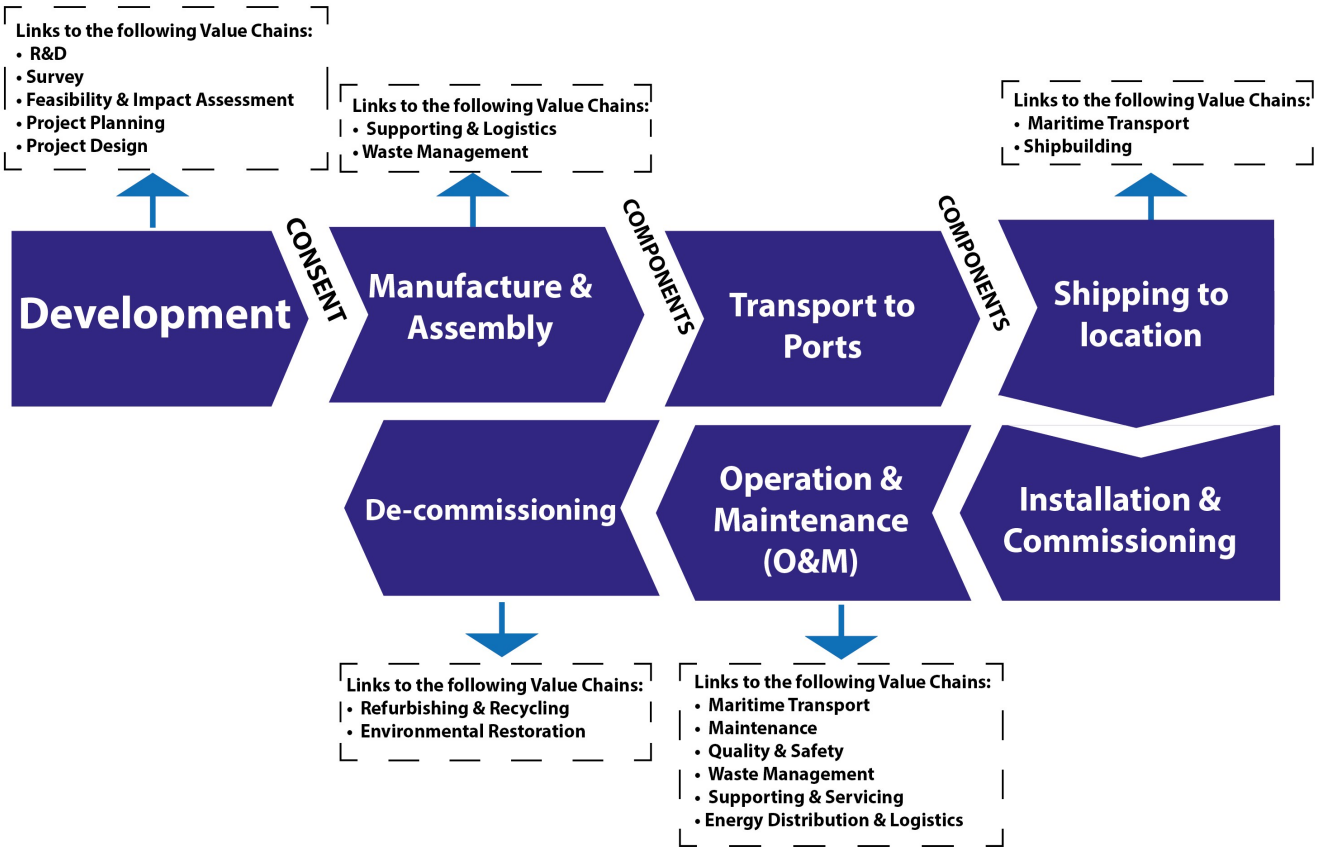
2) Cargo Storage	Impact of waste management; Employment and Income generation; Impacts on land infrastructure
3) Cargo Land Transport	Accessibility to Infrastructure; Employment and Income generation; Impacts on land infrastructure
4) Cargo Storage at Landing Terminal	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impacts on land infrastructure
5) Cargo Handling	Impact on coastal processes; Impact of waste management; Invasive non-native species; Impact on air quality; Displacement of other sectors; Employment and Income generation; Impacts on land infrastructure
6) Sea Voyage / Maritime Transport	Invasive non-native species; Impact on air quality; Displacement of other sectors; Employment and Income generation; Pollution, noise or species' disturbance
7) Cargo Discharge	Impact on coastal processes; Impact of waste management; Invasive non-native species; Impact on air quality; Employment and Income generation; Impacts on land infrastructure
8) Cargo Storage at Discharge Terminal	Impact of waste management; Displacement of other sectors, Employment and Income generation; Impacts on land infrastructure
9) Cargo Land Transport	Accessibility to Infrastructure; Employment and Income generation; Impacts on land infrastructure
10) Cargo Storage	Impact of waste management; Employment and Income generation; Impacts on land infrastructure
11) Cargo Delivery	Impact of waste management; Employment and Income generation; Impacts on land infrastructure

2.2.6 Offshore Wind Energy Value Chain Analysis

The general value chain for the maritime activity of offshore wind energy was built based on previous ocean energy value chain literature such as DG MARE Blue Growth Report. However, some other segments were added to these value chains so as to spatially highlight the LSI of the offshore wind energy value chain process from the development and design of the wind farms to final de-commissioning passing through the actual offshore wind energy installation, commissioning and operation and maintenance works. The segments of the value chain were selected in terms of the spatial nature of each of the process steps, so as to show the spatial allocation of these segments for the LSIs analysis.

The following diagram shows the various segments that constitute the general value chain of offshore wind energy:

Figure 10: General value chain for offshore wind energy



The entire ocean energy value chain process can be summarized into the following 7 segments:

- Segment 1) Development.
- Segment 2) Manufacture & Assembly
- Segment 3) Transport to Ports
- Segment 4) Shipping to Location
- Segment 5) Installation & Commissioning

- Segment 6) Operation & Maintenance (O&M)
- Segment 7) De-commissioning

Having developed the spatialised value chain, the following sample questions were provided to help understand and analyse how the value chain has developed in the case study area. In answering these questions a more detailed picture will emerge through the identification information related to key actors, framework conditions, quantitative data and impacts/risks/opportunities. The absence or unavailability of information needed to answer any of these questions will be highlighted in this process. It is important to recognise that data availability can be very variable across time and space and appropriate adjustments in approach may need to be made.

Table 17: Sample questions for value chain segments - Offshore wind energy

Segment of the Value Chain	**Sample Questions**
Segment 1) Development.	Who does the design? Where are main design and R&D facilities located? Is current development knowledge enough or do they need developing? Why? How many patents are in the market?
Segment 2) Manufacturing & Assembling.	Where does the manufacturing and assembling of the parts take place? How many manufacturing and assembling businesses are in the region? Who owns them?
Segment 3) Transport to ports.	How are these manufactured products transported? Where are they transported from? Who transports them? How many businesses are involved? Who owns these transport services? Are these transport businesses enough or do they need developing? Why? Is the infrastructure needed to perform this transport enough or does it need developing? Why?
Segment 4) Shipping to location.	Where are the manufactured products shipped from? Where are the main wind energy concessions located? How long does the transport take? What requirements do transporting ships need to fulfil in terms of environmental and health and security issues?

Segment 5) Installation & Commissioning.	How long does it take? Who does the installation work? What are the spatial requirements of these wind farms in terms of other activities (for example other activities (mainly fishing) not allowed in a 500m buffer zone, or all activities totally excluded in an area of X km^2? What requirements do farms need to fulfil in terms of environmental and health and security issues?
Segment 6) Operation & Maintenance (O&M).	Who does it (hired fishermen, company personnel)? How long does it take? What are the spatial requirements of these wind farms in terms of other activities during O&M works? What requirements do farms need to fulfil in terms of environmental and health and security issues?
Segment 7) De-commissioning.	How many farms are de-commissioned? Who does it? How long does it take? What are the spatial requirements of these wind farms in terms of other activities during de-commissioning works? Once de-commissioned where is the material deposited? If at port, are the storage facilities at the port enough? Is there any strategy to develop this infrastructures if they are missing? What requirements do farms need to fulfil in terms of environmental and health and security issues while de-commissioning?

In order complete the section regarding key information about the actors of the offshore wind energy value chain information that was available regarding the following NACE codes businesses of the offshore wind energy activity should be gathered (see Table 18).

Table 18: Offshore wind energy related activities and their related NACE codes

Sector/Group		**Activity**	**NACE code[25]**
Production of energy		Offshore wind energy	n.a.
		Production of electricity	D.35.11
		Transmission services of electricity	D.35.12

[25] https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

Names and location addresses of key businesses were gathered (so as to geo-locate them and be able to map them spatially). They were also organized according to whether they belonged to one or several of the Value Chain sub-segments.

The result of this activity can lead to a map showing where these actors are located relative to the case study core area.

In order to perform the tailoring of the general value chain of offshore wind energy to the case study it is important to understand which segments are more developed in the case study in terms of actors involved, economic importance, existing infrastructure, etc. This is why this tailoring of the general value chain can only be performed after key information, key actors and framework conditions affecting the value chain have been gathered along Step 2, 3, 4 and 5.

In terms of our identification of LSIs of offshore wind energy, these have been organized around the following typologies: bio-geo-chemical; socio-economic; technical[26].

The **bio-geo-chemical LSIs** of offshore wind energy may include:

- intensive use of space;
- pollution, noise and species disturbance;
- collision risk to birds from offshore wind turbines;
- building new offshore and/or landside infrastructure has an impact on marine and coastal habitats;
- impacts on coastal processes (i.e. presence of offshore structures affecting physical process (wave and tidal streams) leading to changes in local coastal processes and potential impacts at the coastline e.g. beach erosion);
- impacts on fish stocks

The **socio-economic LSIs** of offshore wind energy may include:

- impacts on income and job creation in coastal communities (direct employment on the energy platforms (operation and maintenance works), ports, or secondary from development, manufacture and design of pieces or parts of the energy infrastructures (R&D));
- competition for actual sea and coastal space with sectors such as aquaculture, shipping, recreational activities, fisheries and port development;
- potential displacement of some of these sectors stated above;
- impact on the jobs and income of these competing activities (i.e. potential subsequent impact on fishermen's income, jobs and fishing communities)
- impact on other coastal activities such as coastal tourism through the visual impact of the ocean energy infrastructure;

The **technical LSIs** of offshore wind energy may include:

- innovation in terms of infrastructure to limit environmental pressures;

[26] As defined in the European Commission Report "Land Sea Interactions in Maritime Spatial Planning Report". Land Sea Interactions in Maritime Spatial Planning. 2018. European Commission. Available at http://ec.europa.eu/environment/iczm/pdf/LSI_FINAL20180417_digital.pdf

- provision of suitable access to offshore wind energy infrastructures and to coastal infrastructures;
- accessibility to land based electricity grids;
- technical capabilities and limitations for cable laying;
- impacts on land infrastructure (increased need for infrastructure in coastal areas);

By then looking at how these impacts may relate either directly or indirectly to specific value chain segments a further insight into the experience of LSI can be enabled. However, as LSI tend to be more obvious at the land-sea interface, value chain segments most associated with coastal areas can then by highlighted for particular attention as indicated below.

Table 19: Main elements characterising LSI for offshore wind energy value chain segments

Segments of the Value Chain	**Main elements characterizing the LSI**
1) Development	Impact of waste management; Employment and income generation; Impacts on land infrastructure
2) Manufacture & Assembling	Impact of waste management; Employment and income generation, Impacts on land infrastructure
3) Transport to ports	Accessibility to infrastructure; Impact of waste management; Employment and income generation; Impact on coastal processes; Impact on air quality, Impacts on land infrastructure; Pollution, noise or species disturbance
4) Shipping to location	Accessibility to infrastructure; Impact of waste management; Displacement of other sectors, Employment and income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure; Pollution, noise or species disturbance
5) Installation & Commissioning	Accessibility to infrastructure; Impact of waste management; Displacement of other sectors, Employment and income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure; Pollution, noise or species' disturbance
6) Operation & Maintenance (O&M)	Accessibility to infrastructure; Impact of waste management; Displacement of other sectors, Employment and income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure; Pollution, noise or species disturbance
7) De-commissioning	Accessibility to infrastructure; Impact of waste management; Displacement of other sectors, Employment and income generation; Impact on coastal processes; Invasive non-native species; Impact on air quality, Impacts on land infrastructure; Pollution, noise or species disturbance

3 Governance Analysis

In order to explore the current roles and potential impacts of emerging practice in relation to MSP and LSI, each of the case study areas were subject to a review of the planning and policy arrangements that were evident both in the sea and on the land. In this section we seek to provide a synthesis overview drawn from all of the case study material identifying common themes and differences. This analysis also included a review of the multiple European policies that are impacting on marine space and therefore on land sea interactions. European policy frameworks are constrained by country specific context and need to be translated into national policy agendas which will vary considerably from country to country. Land use/territorial/spatial planning systems remains an exclusive national competence of each country and these specific systems reflect the history, administrative structures and particular economic, social cultural and political priorities of that country. Marine spatial planning although a common European objective required in each country by the MSP Directive 2014/89/EU (European Union, 2014) its form and structure is country specific and in many cases is being overlain on more established terrestrial spatial planning systems. Analysis was conducted with the following three key areas of focus:

- **Policy Frameworks**. What is legal context for territorial planning? What competences are embedded in the institutional arrangements for territorial planning in the sea and on the land at a variety of spatial scales? What plans and strategies have been and are being prepared in the land and sea and what influences can they have on land based planning, sectors and LSI issues.
- **Spatial Management.** How is the development of marine based activities regulated and authorised and how do these processes manage land sea interactions?
- **Good Governance** How are open and transparent decision making processes being embedded LSI in decision making processes?

The analysis which was conducted provides a picture of the current planning situation for each case study area investigating both of these areas for both the land and the sea.

3.1 Policy frameworks

The first step in the governance analysis process is to establish the legislative context for planning in each case study area. These may be well established in both terrestrial and marine areas as is the case in Germany where the competent authority (in this instance the Lander) has had responsibility for territorial waters since 2002, or very recent for example Slovenia. Table 20 below provides a summary of the Territorial Planning Legislation which exists in each of the Case study Areas and describes the degree of integration between terrestrial and marine planning.

Table 20: Legislative Competences for Territorial Planning

	Territorial Planning Legislation	**Degree of Integration**
Croatian Coast and Islands	Physical Planning Act of 2013, (amended in 2017 to take into account the EU MSP Directive 2014/89/EU) looks at planning for the whole territory, and in the absence of an EEZ, out to the Protected Ecological and Fishing Area.	Integrative approach at national regional and local levels, with both the regional and local administrations having boundaries extending into the sea.

Gulf of Gdańsk	Spatial Planning and Management Act of 2003 (recently modified in 2018) and the Act on the Sea Areas of the Republic of Poland and maritime administration 1991.	Currently separation of planning for the land and sea, albeit within an integrated national policy context with vision out to 2030.
Netherlands	Spatial Planning Act (2008) re-defined the legal framework for spatial planning for the land, territorial waters and out to the Exclusive Economic Zone. The notion of an integrated space also evident in the National Water Act.	Integrative approach and further streamlining planned. Environment and Planning Act (Omgevingswet) streamlining the current system expected in 2019.
Slovenia	Spatial Planning Act 2017 (came into force June 2018)	Integrative approach envisaged through a single body, the Ministry for Environment and Spatial Planning who is preparing national spatial documents for land and sea.
Pomeranian Bight	Germany - Länder have had responsibilities out to the limits of territorial waters at least since 2001. The Spatial Planning Act 2017 - gives the nation state responsibility for MSP in the EEZ. Poland- Spatial Planning and Management Act of 2003 (recently modified in 2018) and the Act on the Sea Areas of the Republic of Poland and maritime administration 1991.	Germany: Länder spatial planning includes territorial sea areas, and close collaboration between national and Länder bodies for planning across marine space. Poland: Currently separation of planning for the land and sea, albeit within an integrated national policy context with vision out to 2030. Transnational/cross-border collaboration working across land/sea integration facilitated by well-established networks VASAB etc.

When conducting governance analysis it is also essential to establish who is responsible for territorial planning in each area. In most cases planning will take place within national jurisdictions, there is a widespread recognition that marine planning, particularly within the context of many of Europe's relatively enclosed seas, that the consequences of LSI are often transnational and cross border nature. Transnational or cross border collaboration which exists between countries, for example, as is the case in the Baltic Sea, also need to be taken into consideration. Table 21 below provides examples of the actors identified as part of the five case studies areas considered during this project.

Table 21: Key Actors involved in Territorial Planning

	Key Actors and Agencies involved in LSI	
	Sea	**Land**
Croatia Coast and Islands	The Ministry of Construction and Spatial Planning and the Croatian Institute for Spatial Planning Regional Bodies Municipalities	The Ministry of Construction and Spatial Planning and the Croatian Institute for Spatial Planning Regional Bodies Municipalities
Gulf of Gdańsk	Directors of the Maritime Office to prepare the MSP Minister responsible for matters of maritime economy	Voivodeship Municipalities (gmina) taking into account higher level strategies
Netherlands	Interdepartmental Directives Consultative Body (IDON) under the leadership of Ministry of Infrastructure and Water Management co-ordinates plan and policy making in the sea	Largely the responsibility of coast municipalities, with 1km jurisdiction into the sea
Slovenia	Ministry of Construction and Spatial Planning and the Croatian Institute for Spatial Planning	Ministry of Construction and Spatial Planning and the Croatian Institute for Spatial Planning Municipalities
Pomeranian Bight	Germany-The Federal Ministry of the Interior, Building and Community along with other ministries supervises the Federal Maritime and Hydrographic Agency (BSH) in MSP matters deals with the EEZ area Ministry of Energy, Infrastructure and Digitalisation of Mecklenburg-Vorpommern deals with marine areas out to the territorial waters. Poland- Directors of the Maritime Office to prepare the MSP Minister responsible for matters of maritime economy	Bund provides legal basis of land use planning Länder of Mecklenburg-Vorpommern produces regional plans and policy Municipalities produce land use strategies and legally binding detailed land use plans Voivodeships Municipalities(gmina) taking into account higher level strategies

Examination of the Maritime Spatial Planning documentation which are applicable to each case study area is also key part of this process. This documentation can come in different forms and may include framework documents, strategic spatial plans, or precise zoning arrangements for

a particular activity. Table 22 below provides examples of the existing Marine Spatial Planning Frameworks applicable to the five case study areas investigated in this project.

Table 22: Current Spatial Planning Frameworks

	Existing Marine Spatial Planning Frameworks
Croatia Coast and Islands	Spatial plans are beginning to emerge and within the marine environment, different plans will cover different parts of the marine environment. There is an intention to create integrated plans for the land and sea at national regional and local scales within the inland waters. Other plans will be prepared for the epicontinental shelf, and the waters out to the edge of the Protected Ecological Fishing Area (ZERP). In addition, the special plans for the national parks that cover land and sea are due to be reviewed. Overall, the structure of the system is in place but plans have yet to emerge. MSP will be largely nationally led, with land-based plans being developed at the local, municipal scale.
Gulf of Gdańsk	An integrated 'Maritime Policy for the Republic of Poland until 2020 (with the 2030 perspective)' is the strategic document for sea use in Poland. This guides the development of the Maritime Spatial Plan of the Polish Sea Areas. A second draft has recently been published (January 2019).This provides a detailed zoning of the marine waters into a large number of distinct sea uses/categories which determine what, if any, development might be permitted in the sea. In September 2019 the draft plan at a scale 1:200 000 will be finished and following transnational consultations with neighbouring countries in accordance with the Espoo Convention, it will be submitted to the Minister responsible for matters of the maritime economy in order to be adopted by regulation. The plan will be adopted not later than 31 March 2021. Planning in the sea and on the land is currently separate and sea based planning has, to date, largely been shaped by land based uses and priorities although it is anticipated that once approved marine planning and land based planning can beginning to have more of a symbiotic relationship.
Netherlands	The current spatial vision for MSP in the Netherlands is laid out in the policy Document on the North Sea 2016-2021, an appendix to the National Water Plan. This covers all the marine space beyond that is 1km offshore, which is the responsibility of the municipalities.
Slovenia	A marine spatial plan covering the marine territory of Slovenia is emerging and stakeholder consultation has been facilitated through the SUPREME project. It is too early to speculate on the nature and form of the plan itself but national priorities, motorways of the sea and access to the Port of Koper create tensions with local municipal priorities focused on tourism and to a lesser extent fishing and aquaculture.
Pomeranian Bight	Collaborative mechanisms exist to promote cross border co-operation in relations to issues of mutual interest, but planning frameworks are at different stages of preparation in Poland and Germany. In Germany two different types of strategic plan covering the sea exist. From the territorial waters out to the EEZ the plan provides a framework for sea use prepared on behalf of the Federal Government. Within territorial waters one key planning documents is relevant, the Länder wide Mecklenburg-

	Vorpommern Spatial Development Programme. Onshore this programme is underpinned by a more spatially focused Regional Spatial Development Programme for Vorpommern, Both deal with the critical LSI issues. The State Development Programme was last updated in 2016. In Poland a more detailed style zoning plan is emerging (see Gulf of Gdańsk)

3.2 Spatial Management

Once you have considered the legislative arrangements within the area being examined the next stage is to assess the extent and success of its implementation. There may well be a requirement for an integrated planning approach, however you will need to investigate if this is actually being achieved. Maritime sectors which are the primary concern of MSP often have land based components, or supporting activities, and as such the responsibility for authorisation lies with land based planning agencies. In addition, frequently marine based planning authorities have relatively limited power to determine what development, which might be of significance for marine spatial planning, should be permitted or not. Table 23 below provides some illustrative examples of what MSP can achieve in managing LSI's.

Table 23: Illustrative examples of MSPs Role in Regulating LSI issues

	MSPs Role in Regulating LSI Activities
Croatia Coast and Islands	The Physical Planning Act places restrictions on marine activities and coastal development (which should be no closer than 100m from the coastline) within Protected Coastal areas (zones of special interest). The Strategy for Spatial Development requires an integrated approach to coastal planning – between national regional and local governance bodies and various stakeholders
Gulf of Gdańsk	The Directors of the Maritime Offices can veto urban development, or more specifically the plans of municipalities, if they consider that the developments will adversely affect coastal defence systems.
Netherlands	Recognising the spatial reach of logistic flows from the sea to the land associated with port facilities, a project exploring such issues was initiated and IDON is expected to take this further in the future. With wind energy, good processes of collaboration have been established. These include a code of conduct from the National Wind Energy Association which sets out basic rules for stakeholder engagement (including the public). Through this code changes in shipping routes have been identified which have enabled offshore wind concessions to be realised. The Policy Document on the North Sea, also establishes the concept of a free view of the horizon from the coast, meaning wind turbines should be at least 12 nautical miles from the shoreline.
Slovenia	The Waters Act seeks to protect and regulate water quality in the sea, on land and underground, and this can limit development in the Key Protected Areas. There is recognition that finding any new space for expansion of existing uses will require compromise. There are tensions between protecting natural areas, developing tourism and mariculture, and increasing port

	capacity at Koper and alongside the associated increases in marine traffic. MSP seeks to reconcile these conflicts. Meanwhile the municipalities are in the process of updating their own local plans focused on tourism development.
Pomeranian Bight	For PL – See above Gdańsk Bay The updated Spatial Development Plan for Mecklenburg-Vorpommern (adopted 2016) was more cognisant than earlier versions of the plan of LSI issues, for example safeguarding shipping, promoting offshore wind energy in accordance with national policy and safeguarding the natural environment.

4 Mapping

GIS data to illustrate the results of the value chain analysis were produced through a connectivity analysis. Latitude and longitude data of the value chain actors for each topic and case study were used to create a GIS point layer to understand the geographical area covered by them. Then, a cost connectivity analysis was carried out to generate the theoretically most efficient connections between the actors, being those mainly concentrated in the core of the case study, so the result in most cases is a network of flows from the core to the peripheral areas.

This analysis requires a cost layer: geographical information on transport routes and the cost of traveling through them. Main network of roads, trains (EuroGlobalMap. EuroGraphics, Sep 2017) and waterways (National Center for Ecological Analysis and Synthesis, NCEAS, 2013) has been used to produce the maps.

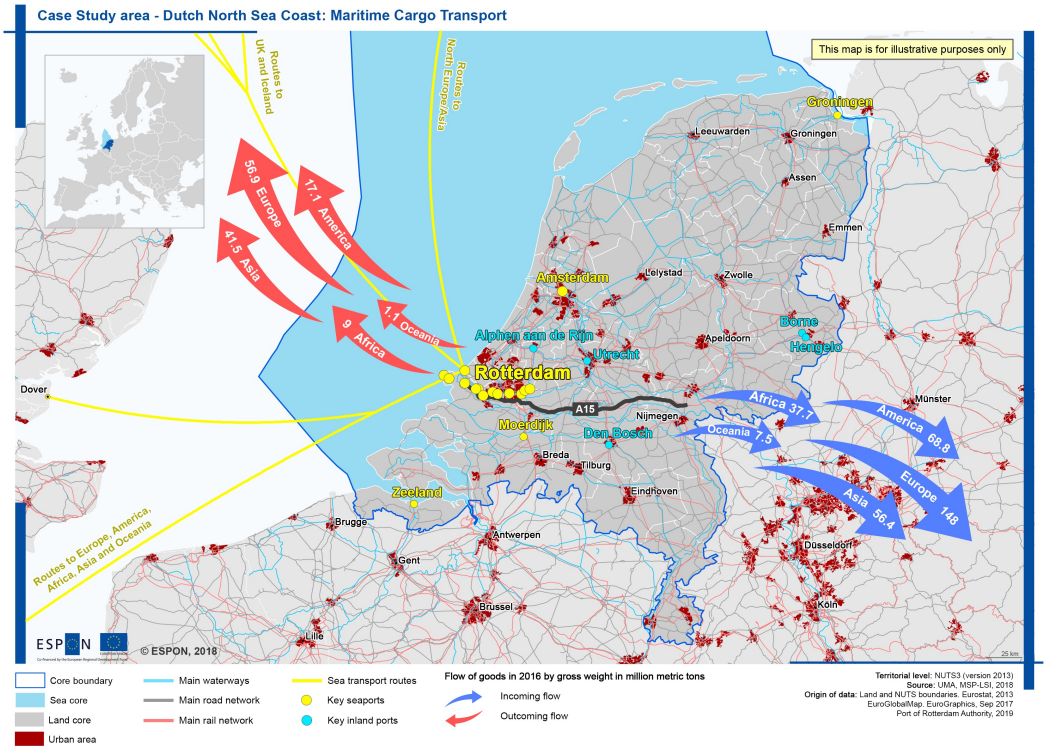
The purpose of the maps is merely illustrative; they do not intend to show an accurate reality of the connections between actors. Therefore, the cost of each communication channel was based just on a hierarchical criterion. Cost of land routes (roads and train tracks) was the same, while that of the waterways has been considered as minor to force the tool to join very distant points across the sea. Areas outside of these communication routes have the maximum cost value to prevent connection being generated through them. A scale of 1 to 99 has been used where the sea lanes have values from 1 to 3 (according to their intensity), roads and train tracks value 10, and the rest of the areas values of 90, for the sea, and 99, for land. This distinction between sea and land has been made to force connections across the sea.

The results of the connections between the actors were sometimes not coherent since this type of analysis generates a network that joins all the actors efficiently but does not consider that the center of this network should be the core of the case study. Therefore, in some cases, very close points were joined by paths that meant a longer or less logical way to reach this core. In these cases, a manual correction of the connections has been taken to represent an image more similar to reality. This correction has been based on expert criteria.

4.1 Value chain mapping approach

Mapping of value chain results was produced according to different criteria based on the available data and the conclusions of the analysis of each topic and case study. As discussed above, in most cases maps show the distribution of the actors and connections resulting from the connectivity analysis. Added to this information are different spatial data or statistics from additional sources and graphic elements that help to make the key messages of value chain analysis more comprehensible, or to link the maps with relevant content of the reports of each case study. In the other cases, data on the actors and the connections lacked interest and it was decided to show relevant locations and the main communication routes where the goods and passenger flows occur. Therefore, each map follows a tailor made approach to illustrate the results of the value chain analysis as best as possible. An example of a map produced for Maritime Cargo transport from the Netherlands Case study (Map 1) is shown below.

Map 1: Dutch North Sea Coast: Maritime Cargo Transport



4.2 ESaTDOR maps update

An update of the ESPON project ESaTDOR (European Seas and Territorial Development, Opportunities and Risks) maps has been carried out to represent a more recent image of some of the land-sea interactions identified and analyzed by the project. The same data and methodologies have been used for this purpose. These were described in the ESaTDOR Final Scientific Report[27].

Table 24:ESaTDOR maps updated from MSP-LSI

ESaTDOR maps updated for MSP-LSI	
Topic	**Map name**
General context	Marine ecoregions*
	Sea depth*
	GDP in coastal regions (coastal average)
	GDP in coastal regions (national averages)
	Population density in coastal areas

[27] https://www.espon.eu/sites/default/files/attachments/ESaTDOR_FR_Scientific_Report.pdf

	Population density per NUTS2 within water catchment areas
	Water catchment areas population density
Environment	Inorganic pollution (total kg of contaminants per year)
	Total number of invasive species
	Organic pollution (total kg of pesticides per year)
Transport	Container shipping at ports
	Container shipping at ports by direction
	Total shipping at ports
	Total shipping at ports by direction
	Cruise activity at ports
	Cruise activity at ports by direction
	Ferry passengers at ports
	Economic influence of container ports
	Economic influence of container ports
	Economic influence of cruise ports
	Marine exposure due to port influence based on port proximity and liquid energetic products
	Marine exposure due to port influence based on port proximity and volume of cargo
	Intensity of marine use: shipping lanes

*Mapping template updated. Same data was used.

4.3 Additional maps

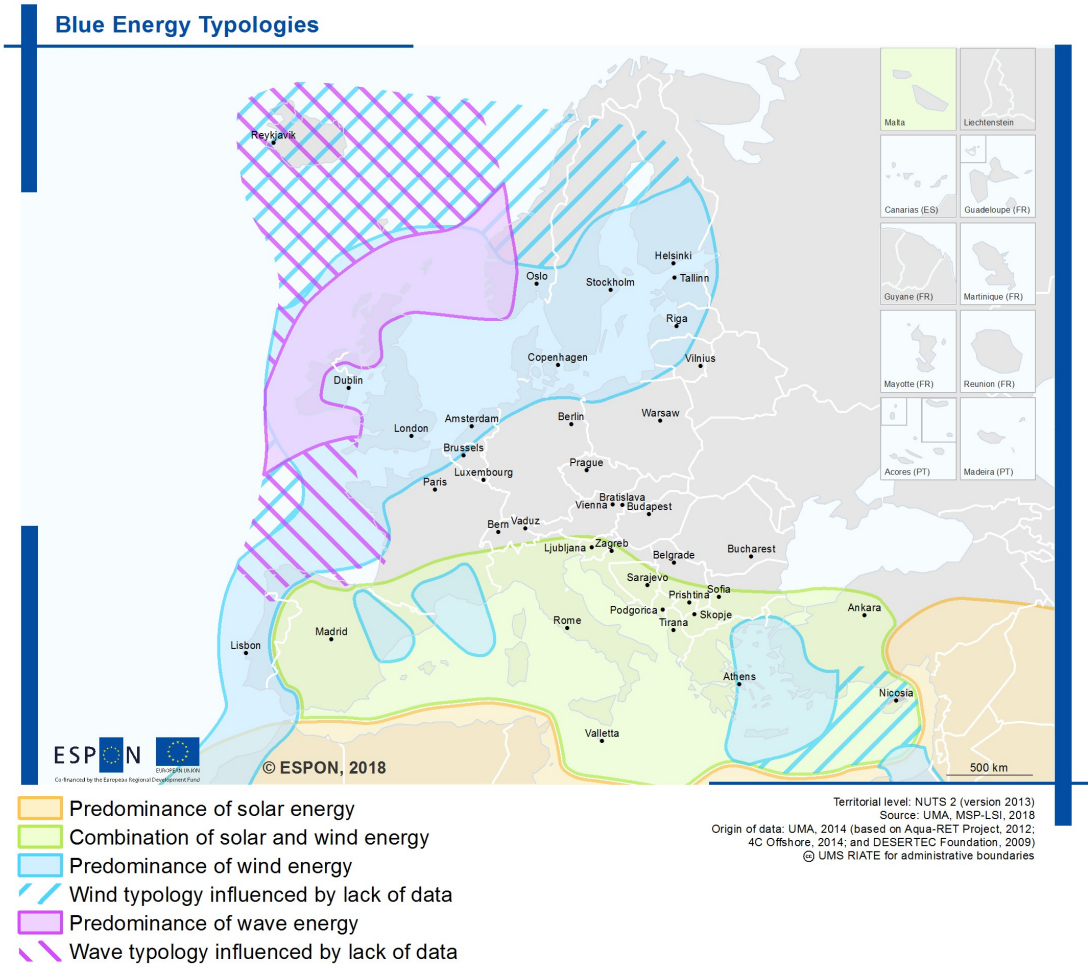
A series of maps on blue energy were produced for the project:

- Blue energy typologies,
- European wind power distribution
- European wave resource distribution

Datasets used in these maps were created in the context of Med-IAMER project (Integrated Actions to Mitigate Environmental Risks in the Mediterranean Sea) (MED Programme, 2014-2015) digitizing different sources of information. Full methodology and data sources are

described in the final report of the project[28]. As an example the map of Blue energy typologies can be seen below (Map 2).

Map 2: EU Blue Energy Typologies



Finally, another map on maritime transport, “Motorways of the Sea and Trans-European Transport Network”, was produced based on the data available in the European Atlas of the Seas and TENtec website. This map only represents the original information using the ESPON map template, without any additional analysis.

[28] http://www.medmaritimeprojects.eu/section/med-iamer-redirect/outputs

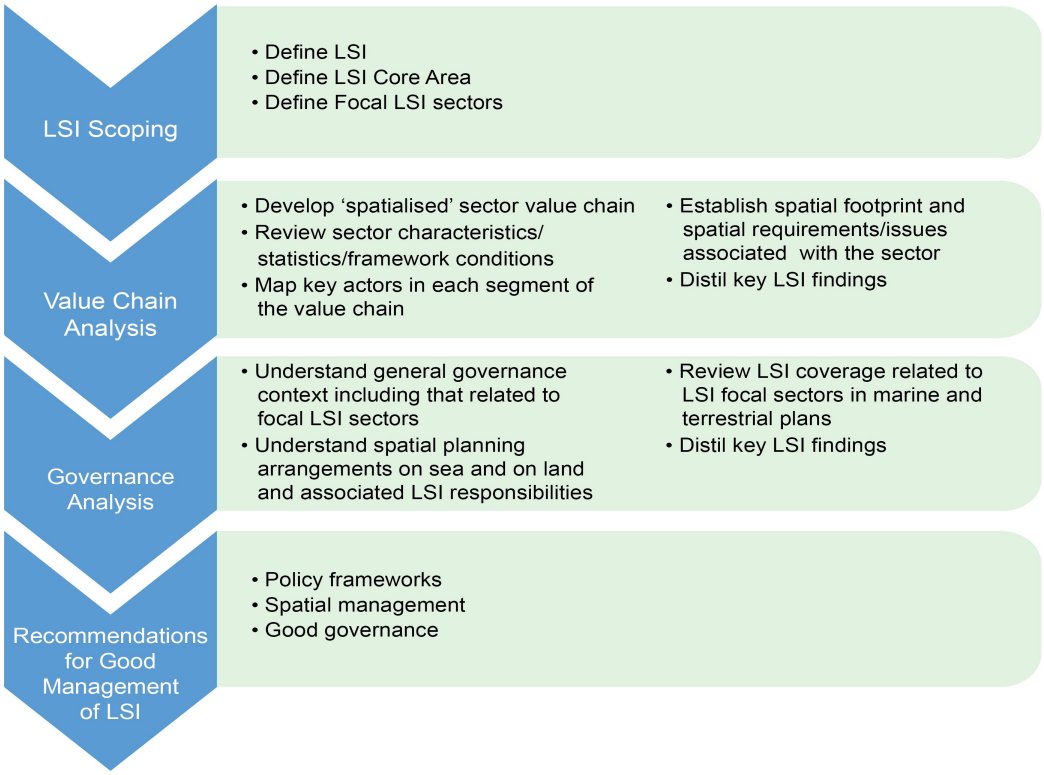
5 Reflections and Methodological Recommendations

This Scientific Methodology Report has described how the research was undertaken in each of the case study locations. The design was intended to ensure that the knowledge brokers, working on each of the case studies, would be able to collect the relevant information in a co-ordinated, comparable and systematic manner. These final reflections and recommendations are based on a critical review of what worked and how the method would benefit from adjustment. The conclusions have been reflected in the final Guidelines for Good Management of LSI in MSP (see Synthesis Report).

Recommendation 1: Following LSI scoping, start with the value chain analysis as this provides some focus for the governance analysis.

The tightness of the time schedule for this project meant that value chain work and governance analysis took place in parallel. However it is considered that investigating the key sectors and their spatial reach and impact would enable a more focused approach to consideration of the governance arrangements. This relates both to the spatial plans on land and sea that need to be investigated, and in developing a better understanding of the framework conditions that shape whether the sector develops or not. The recommended revisiosn to the methodology is illustrated in Figure 11.

Figure 11: Revised methodology for exploring LSI in MSP/Territorial Planning



Recommendation 2: Defining a core area for the analysis is important in trying to better understand the spatial impacts of LSI and in making the analysis manageable.

One of the key innovations in this project was an attempt to better understand the spatial footprint/LSI associated with maritime sectors and understand the extent to which benefits and costs, risks and opportunities had a degree of local stickability. This idea and concept may be helpful in better understanding what spatial planning can actually deliver and the trade-offs involved in sector development, and perhaps more specifically what role MSP has in shaping

the policy and regulatory framework for action. The core areas both on the land and sea need to be defined in such a way that they align with territorial governance jurisdictional competences.

Recommendation 3: There needs to be flexibility in the data collection and analysis which needs to be proportionate to the task in hand.

The research has tried to adopt a scientific, systematic and rational approach to data gathering, but problems arose in relation to the availability, specificity and accuracy of data at the right scale, within and between the case studies. In practice the method involves a significant degree of subjective interpretation and judgement. A looser framing of the elements of data collection and analysis is therefore also presented in the revised methodology shown in Figure 11. It suggests that in applying the method, experimentation and innovation should be encouraged along a spectrum ranging from in depth research to lighter touch investigations in the form, for example, of stakeholder workshops. It may be that much of the key information can be obtained quickly in this way if the right stakeholders are involved. In tailoring the approach to different contexts, it is important to consider how the process of data collection can be proportionate to the purpose for which it is intended.

6 References

COGEA (2017), *Study on the establishment of a Framework for Processing and Analysing Maritime Economic Data in Europe*, EC, Brussels, Available at https://webgate.ec.europa.eu/maritimeforum/system/files/Final%20Report_2.pdf

DG MARE (2012) *Blue Growth: Scenarios and drivers for Sustainable Growth from the Oceans, Seas and Coasts.* Available at https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/publications/blue_growth_third_interim_report_en.pdf

DG Maritime Affairs and Fisheries and the Joint Research Centre (2018), *The 2018 Annual Economic Report on the Blue Economy*, European Union, Brussels.

Ecologic, 2017, *Land Sea Interactions in Maritime Spatial Planning*, DG Environment, Brussels.

ESPON and the University of Liverpool (2013) European Sea and Territorial Development Opportunities and Risks (ESaTDOR): Scientific Report. Available at https://www.espon.eu/sites/default/files/attachments/ESaTDOR_FR_Scientific_Report.pdf

ETC-UMA, AVITEM, University of Thessaly & Plan Bleu (2015) Med Maritime Integrated Projects: *Med-IAMER. Final Report*. Available at http://www.medmaritimeprojects.eu/section/med-iamer-redirect/outputs

European Commission (2008) NACE *Rev 2 Statistical classification of economic activities in the European Community. Eurostat Methodologies and working papers*, European Commission, Luxembourg. ISBN 978-92-79-04741-1. Available at https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

European Commission (2018) *Land Sea Interactions in Maritime Spatial Planning*, European Commission. Available at http://ec.europa.eu/environment/iczm/pdf/LSI_FINAL20180417_digital.pdf

European Union, (2014) *Directive 2014/89/ of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning*. (OJ L157. 28.82014,European Union, Brussels.

World Trade Organization, 2013. *Aid for Trade and Value Chains in Tourism*. Available at http://www.oecd.org/dac/aft/aidfortradeandvaluechains.htm

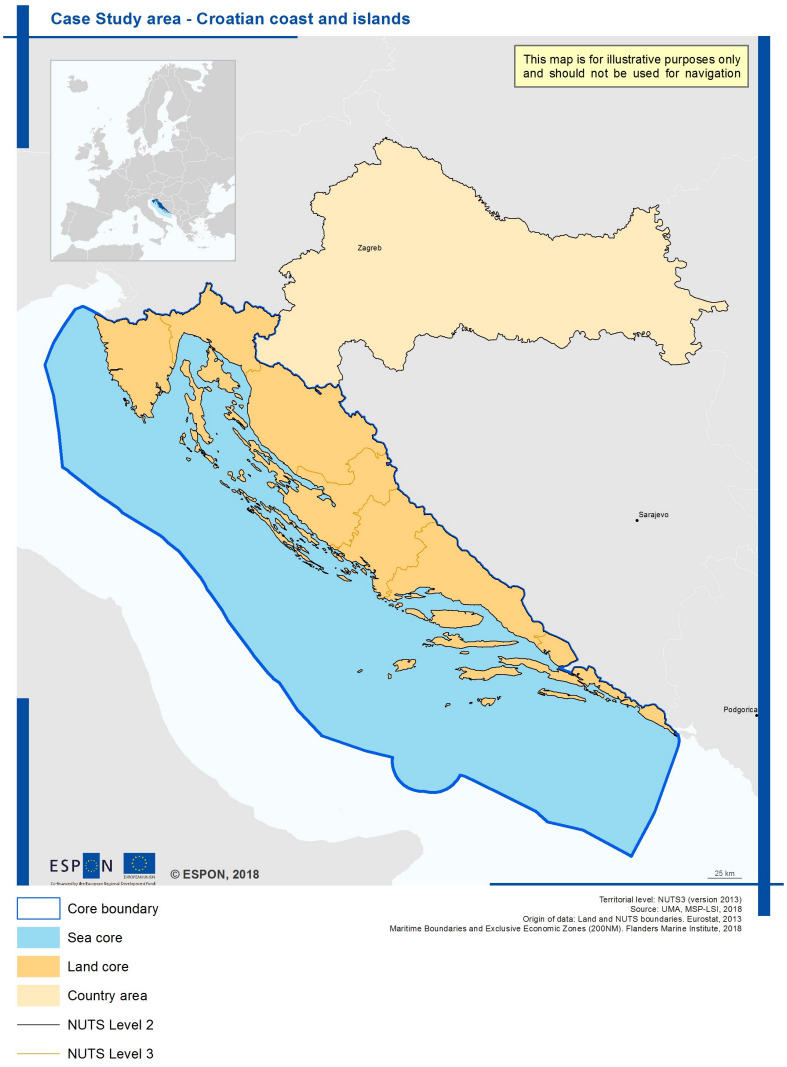
Appendix 1: Case study core areas and focal sectors

Case study 1 Croatian Coast and Islands

In terms of the core area for this case study, from a seaward perspective we are including all the maritime areas along the whole of the coastal strip as far out as the exclusive economic zone. On the land we are focusing on all of the coastal communities defined by NUTS 3 region but we have excluded those parts of the national territory that are inland.

In the Croatian Islands tourism activities of various forms are an important component to the local economy, although we understand that they are seasonal and can impose significant costs and requirements on local infrastructure, particularly during the summer months. Tourism is a recognised Blue Growth sector in Croatia and has several dimensions. In this case study LSI will be explored in relation to coastal tourism which is more widely dispersed throughout the area and cruise tourism which is more focused on specific points.

Map 1: Croatian Coast and Islands Case study Core Area

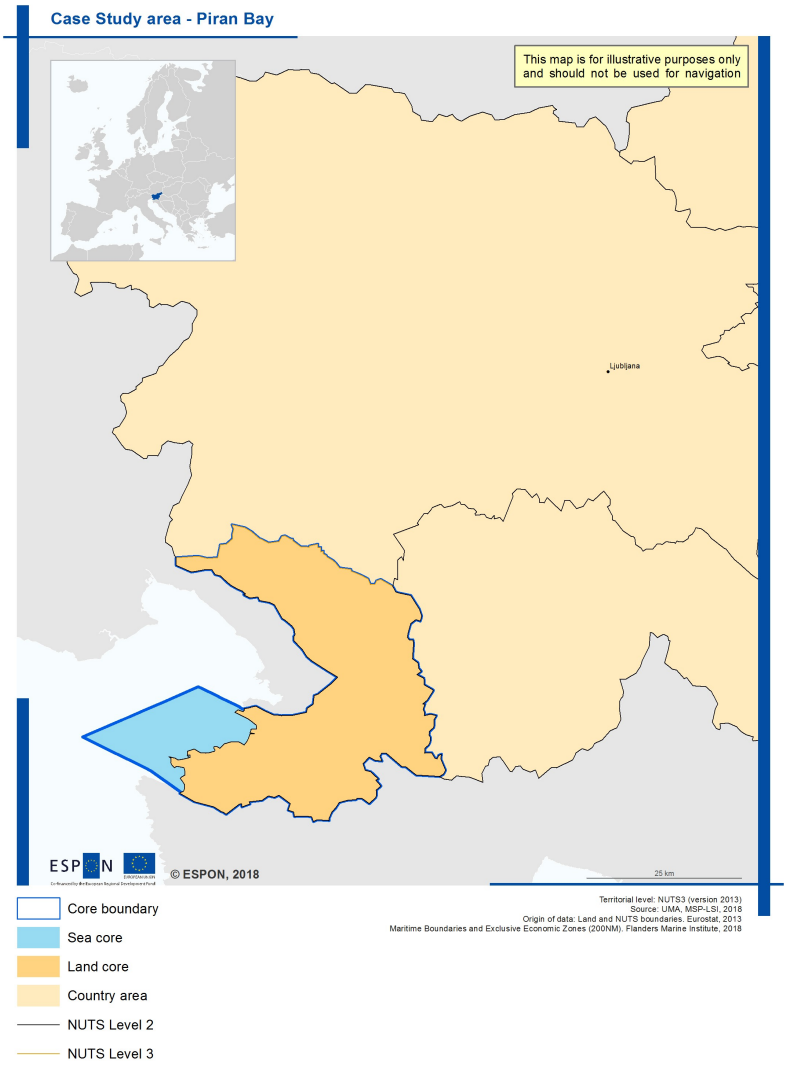


Case study 2 Slovenian Case study

This is the smallest case study area and the core within the marine regime is based on all of the marine waters that are currently claimed as being part of Slovenia territory and are not disputed. On the land we focus along the coastal strip and in particular on the area of Slovenian Case study, and for statistical purposes we are including the NUTS 3 region.

The critical LSI sectors to be explored are coastal tourism (which has many varied dimensions in Slovenian Case study) and aquaculture (fish and shell fish farms). Additionally, there are also other important activities with the bay such as salt pans and nature reserves, which given the local focus of the case study it may be possible to also explore.

Map 2: Slovenian Case study Case study Core Area

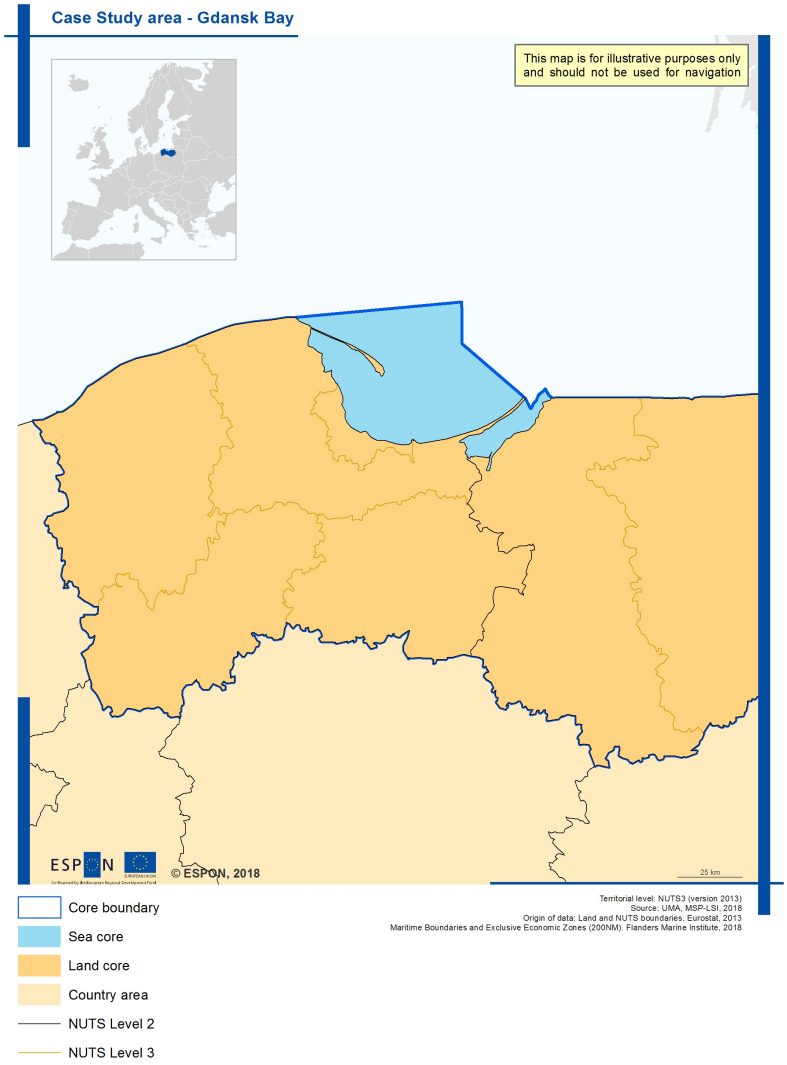


Case study 3 Gulf of Gdańsk

Here the core area within the sea is focused on Gulf of Gdańsk, which is an MSP Pilot area. On the land it includes two coastal NUTS 2 regions (Voivodeships) which have regional planning responsibilities.

The critical sectors for this case are short sea shipping with the operation of ports of Gdansk and Gdynia being of key importance for the Polish national economy and coastal tourism which is a sector presenting important growth potential for the region.

Map 3: Gulf of Gdańsk Case study Core Area

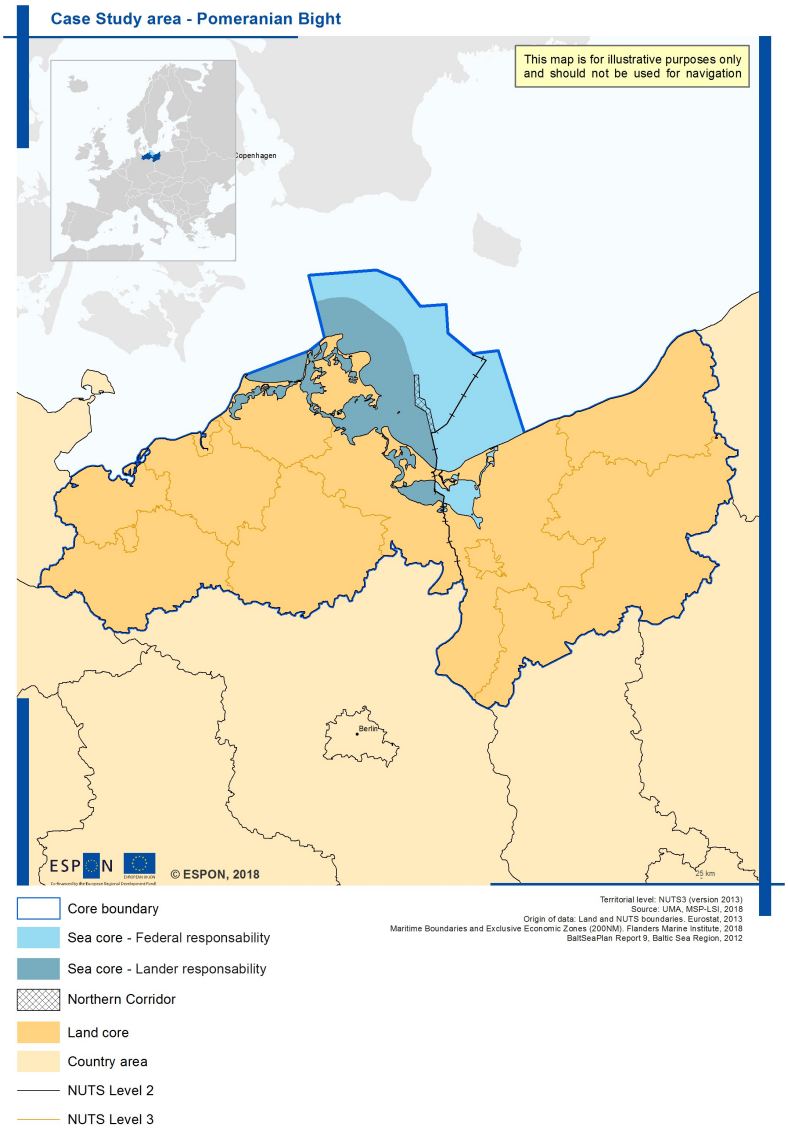


Case study 4 Pomeranian Bight

This is a transnational case study between Germany and Poland and has been the subject of an MSP pilot project. The sea core is intended to reflect the MSP pilot area in Germany and Poland. On the land the core has been defined at NUTS 2 level within both countries, corresponding with regional bodies with significant planning responsibilities.

Critical LSI sectors for evaluation include off-shore wind energy and coastal tourism. Interesting interactions arise between the potential negative consequences of changing sea-scapes due off-shore wind and coastal tourism activities and the relative attractiveness of the tourism offer on either side of the German Polish border.

Map 4: Pomeranian Bight Case study Core Area

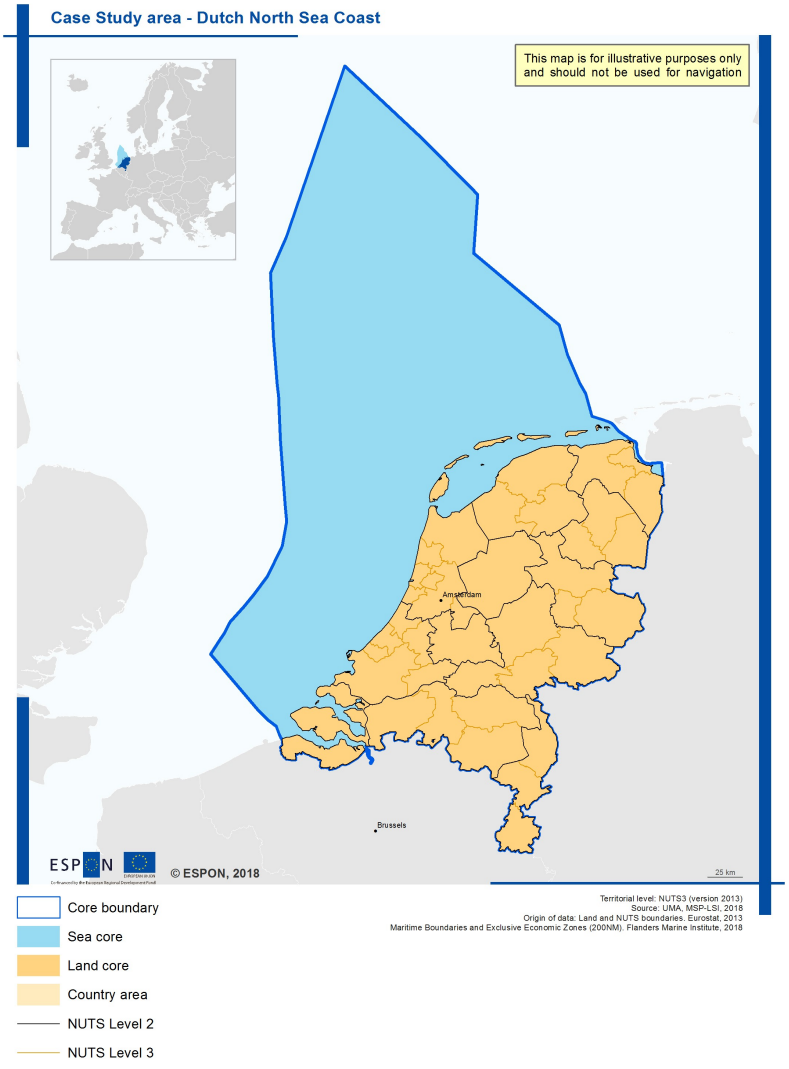


Case study 5 Dutch North Sea

In terms of the core area, this is defined as all of the territory which the Dutch government claims territorial control over both on land and sea.

In terms of critical sectors the research will focus on deep sea shipping and offshore wind, within the context of energy transition and an understanding of what the implications for land sea interaction might be.

Map 5: Dutch North Sea Case study Core Area



Appendix 2: MSP-LSI Value Chain Data Collection Sources

This Appendix provides examples of the types of data sources which can be used in an LSI value chain analysis.

Value Chain Sources
General Ecorys. (2012). Blue Growth Scenarios and drivers for Sustainable Growth from the Oceans, Seas and Coast: Final Report. Rotterdam / Brussels: DG MARE. Retrieved from https://webgate.ec.europa.eu/maritimeforum/system/files/Subfunction%202.3%20Marine%20aquatic%20products_Final%20v140812.pdf Aid for Trade and Value Chains in different sectors – WTO / OECD. Retrieved from http://www.oecd.org/dac/aft/aidfortradeandvaluechains.htm
Maritime Transport World Trade Organisation. (2013). AID FOR TRADE AND VALUE CHAINS IN TRANSPORT AND LOGISTICS. Geneva. Retrieved from http://www.oecd.org/dac/aft/AidforTrade_SectorStudy_Transport.pdf Ecorys. (2012). Blue Growth Scenarios and Drivers for Sustainable Growth from the Oceans, Seas and Coasts Marine: Profile Report Coastal tourism and yachting. Brussels / Rotterdam: DG MARE. Retrieved from https://webgate.ec.europa.eu/maritimeforum/system/files/Subfunction%204.1%20Coastal%20tourism_Final%20v130812.pdf
Coastal Tourism: World Trade Organisation. (2013). AID FOR TRADE AND VALUE CHAINS IN TRANSPORT AND LOGISTICS. Geneva. Retrieved from http://www.oecd.org/dac/aft/AidforTrade_SectorStudy_Transport.pdf Ecorys. (2012). Blue Growth Scenarios and Drivers for Sustainable Growth from the Oceans, Seas and Coasts Marine: Profile Report Coastal tourism and yachting. Brussels / Rotterdam: DG MARE. Retrieved from https://webgate.ec.europa.eu/maritimeforum/system/files/Subfunction%204.1%20Coastal%20tourism_Final%20v130812.pdf
Cruise Shipping: World Trade Organisation. (2013). AID FOR TRADE AND VALUE CHAINS IN TRANSPORT AND LOGISTICS. Geneva. Retrieved from http://www.oecd.org/dac/aft/AidforTrade_SectorStudy_Transport.pdf Ecorys. (2012). Blue Growth Scenarios and Drivers for Sustainable Growth from the Oceans, Seas and Coasts Marine: Profile Report Coastal tourism and yachting. Brussels / Rotterdam: DG MARE. Retrieved from https://webgate.ec.europa.eu/maritimeforum/system/files/Subfunction%204.1%20Coastal%20tourism_Final%20v130812.pdf
Mariculture: World Trade Organisation. (2013). AID FOR TRADE AND VALUE CHAINS IN AGRIFOOD. Geneva. Retrieved from http://www.oecd.org/dac/aft/Agrifood_Full_04July.pdf
Offshore Wind Energy: ECORYS. (2012). Blue Growth Scenarios and Drivers for Sustainable Growth from the Oceans, Seas and Coasts Maritime Sub-Function Profile Report Offshore Wind Energy. Rotterdam / Brussels: DG MARE. Retrieved from https://webgate.ec.europa.eu/maritimeforum/system/files/Subfunction%203.2%20Offshore%20Wind_Final%20v120813.pdf

MSP-LSI Case Study	Focal Sectors
Croatia Coast and Islands	**Coastal Tourism** All of the statistical data used in the value chain analysis of coastal tourism in the Croatian Case Study area came from national sources, namely the Croatian Bureau of Statistics and the Ministry of Tourism. The website for the Croatian Bureau of Statistics provides access to numerous databases providing statistics on a number of sectors[29]. In addition to the statistical databases available annual reports are published by the Ministry of Tourism[30].
	Cruise Shipping The statistical data for the Cruise Shipping Sector came from a number of sources. Information for many of the segments for this value chain were only partially available. Data on the revenues and expenses came from the financial reports of the Ports within the core case study area, namely Port Rijeka[31], Port Split[32], Port Dubrovnik[33], Port Šibenik[34] and Port Zadar[35]. It should be noted that it was not possible to further establish what proportion of these revenues could be directly attributed solely to cruise shipping as opposed to all port users. The Cruise Lines International Association (CLIA) produces regular economic reports highlighting the contribution of cruise tourism to the economies of Europe, which is able to provide statistic on numbers of passengers as well as employment figures.[36]. Employment and data related to tourism more generally was available from the reports of the Ministry for Tourism of Croatia[37]. Qualitative estimates drawn from academic thesis were also used to inform the analysis[38].

[29] Croatian Bureau of Statistics. Available at: https://www.dzs.hr/default_e.htm

[30] Ministry of Tourism. Tourism in Figures 2018. Available at : https://htz.hr/sites/default/files/2019-06/HTZ%20TUB%20ENG_2018_0.pdf

[31] Data source: Annual Report for the year ended 31 December 2017; http://www.lukarijeka.hr/_Data/Files/196_20180427145241355/Annual%20financ.report%202017%20consolid.%20.pdf

[32] 0 Data source: Financial report for NGO's for 2017; https://portsplit.hr/wp-content/uploads/295516_1.pdf

[33] Data source: Financial and revision reports on revision of financial reports for 2017; http://www.portdubrovnik.hr/assets/Financije%20i%20revizija_2017.pdf

[34] Data source: Financial report for NGO's for 2017; http://www.portauthoritysibenik.hr/dokumenti/pdf/izvjesca/2018/27-06-2018/LUS-Izvjestaj-revizora-2017-NO.pdf

[35] Data source: Financial report for NGO's for 2017; http://www.port-authorityzadar.hr/download/SKMBT_C22017062915230.pdf

[36] 4 Contribution of Cruise Tourism to the Economies of Europe 2017, available at https://es.cruiseexperts.org/media/2971/2017-europe-economic-impact-report.pdf

[37] Ministry of Tourism. Tourism in Figures 2018. Available at: https://mint.gov.hr/UserDocsImages//AA_2018_c-dokumenti//180608_HTZTUBENG_2017.PDF

[38] Nadramija, Mislav (2018), Cruise Tourism in Dubrovnik: Economic Benefits and Social Impacts, Rochester Institute of Technology Croatia.

MSP-LSI Case Study	Focal Sectors
The Gulf of Gdańsk	**Coastal Tourism** Examination of the statistic information on Coastal Tourism for the Gulf of Gdańsk focused on information available via the 2017 OECD report "Greening the blue economy in Pomorskie, Poland"[39] supported by information available from the Statistical Office in Gdańsk provided in their five-year cycle study Tourism in Pomorskie Voivodship in 2013-2017[40]. Reports from the Pomeranian Development Agency (Agencja Rozwoju Pomorza) were also used. [41]
	Maritime Transport of Cargo The examination of statistical information for Maritime Transport in the Gulf of Gdańsk utilised information available in the 2017 OECD Report "Greening the blue economy in Pomorskie, Poland"[42]. This was again supported by information from the Statistical Office in Gdańsk[43] and the Gdańsk City Portal[44]. Additional information was gathered from Port Authorities themselves including Port Gdańsk[45].

[39] OECD (2017): Greening the blue economy in Pomorskie, Poland. https://read.oecdilibrary.org/employment/greening-the-blue-economy-in-pomorskie-poland_9789264281509-en#page1

[40] https://gdansk.stat.gov.pl/en/publications/sport-tourism/tourism-in-pomorskie-voivodship-in-2013-2017,1,2.html

[41] Agencja Rozwoju Pomorza (2009): Gospodarka Wojewodztwa Pomorskiego, available at: https://www.paih.gov.pl/files/?id_plik=12088

[42] OECD (2017): Greening the blue economy in Pomorskie, Poland. https://read.oecdilibrary.org/employment/greening-the-blue-economy-in-pomorskie-poland_9789264281509-en#page1

[43] Statistical Office in Gdańsk https://gdansk.stat.gov.pl/en/

[44] Portal Miasta Gdańsk (2018): Rekordowo niskie bezrobocie na Pomorzu w czerwcu 2018. Available at: https://www.Gdańsk.pl/wiadomosci/rekordowo-niskie-bezrobocie-na-pomorzu-w-czerwcu-2018-raport,a,119634

[45] Port Gdansk: Accessed at: https://www.portgdansk.pl/about-port/development-plans

MSP-LSI Case Study	Focal Sectors
Slovenia	**Coastal Tourism** The majority of the data for Tourism in Slovenia was provided by the Statistical Office for the Republic of Slovenia[46] who produce periodic reports and statistics on tourism within the region[47] on the number of overnight stays within the region, along with nationalities of visitors and their mode of arrival. Data for specific resorts within the case study areas were also utilised for example the Tourist Board of Portorož[48]. Information regarding specific activities relating to tourism were obtained from private organisations operating within those sub-sectors including yachting[49] and information on cruises within the area[50]. Local news articles relating to tourist activity was also used as a source[51].
	Mariculture The majority of data used in the value chain analysis for mariculture in the Slovenia case study was obtained from the Agricultural Chamber of Slovenia[52] and the National Strategic Plan for the Development of Aquaculture in the Republic of Slovenia for the Period 2014-2020 produced by the national government[53]. Other sources of qualitative data sources included persons interviewed as identified by local knowledge brokers (see Case Study Report) and local organisations such as the Association of Breeders of Aquatic Animals (Društvo Rejcev Vodnih Živali Slovenije)[54]

[46] Statistical Office: Republic of Slovenia. Accessed at: https://www.stat.si/statweb

[47] It is Nice Everywhere … – Tourists and Tourism in Figures; Povsod je lepo ... – Turisti in turizem v številkah. 2017. Statistical Office of the Republic of Slovenia, Ljubljana. ISBN 978-961-239-371-7. Available at https://www.stat.si/StatWeb/File/DocSysFile/9626/It_is_%20nice_everywhere.pdf

[48] Portorož. Turist Biro. Available at http://www.turistbiro-ag.si/?choice=portorozinfo&lang=eng

[49] Yatch Center Izola - Jahtni Center Izola. 2011. Available at http://en.yachtcenter.si/

[50] Cruise Terminals. 2015. Luka Koper, Port of Koper. Available at https://www.lukakp.si/eng/terminals/single/cruise-terminal-255

[51] Slovenian Saltworks - Immeasurable pride and tragic fate - Slovenske soline - Neizmeren ponos in žalostna usoda. 2012. MMC RTV SLO, Sečovlje. Available at https://www.rtvslo.si/tureavanture/novice/slovenske-soline-neizmeren-ponos-in-zalostna-usoda/287325

[52] Aquaculture – Ribogojstvo. Agricultural Chamber of Slovenia. Available at: http://www.kgzs.si/gv/kmetijstvo/ribogojstvo.aspx

[53] National Strategic Plan for the Development of Aquaculture in the Republic of Slovenia for the Period 2014-2020 -- Nacionalni Strateski Nacrt Za Razvoj Akvakulture v Republiki Sloveniji Za Obdobje 2014-2020. 2014. Government of the Republic of Slovenia. Available at http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/podrocja/Ribistvo/NSNA_2014_2020.pdf

[54] Association of Breeders of Aquatic Animals - Društvo Rejcev Vodnih Živali Slovenije. Available at https://www.bizi.si/DRUSTVO-REJCEV-VODNIH-ZIVALI-SLOVENIJE/

MSP-LSI Case Study	Focal Sectors
Netherlands	**Maritime Transport of Cargo** The majority of statistical data used in the value chain analysis of maritime transport of cargo in the Netherlands came from the 2018 study conducted by Ecorys on behalf of the Ministry of Infrastructure and the Environment in conjunction with joint initiative for maritime sectors in the Netherlands, Maritime by Holland, Maritime Monitor 2018[55]. Background information providing some of the key characteristics of the value chain was also obtained from Eurostat data on ports in Europe[56]. The National Statistics office, Statistics Netherlands (CBS) also provided a great deal of statistical data used in the value chain analysis[57]. The CBS was able to provide data relating to recent and future trends affecting various segments of the value chain. Statistics highlighting direct added value and employment figures for the port of Rotterdam were obtained directly from the Port Authority[58].
	Offshore Wind Energy The data sources used for the Offshore Wind Energy in the Netherlands were probably the most varied of all value chains examined. Several of the sources used in the value chain analysis were national organisations including the National Statistics office, Statistics Netherlands (CBS)[59] and the website for the Netherlands Energy Agreement (energieopwek)[60] providing energy consumption and production data and the Netherlands Enterprise Agency on potential for growth within the sector[61]. Many of the statistics used in the value chain analysis were sourced from international trade organisations such as the Global Wind Energy Council (GWEC)[62] or internationally based companies and organisations including 4C Offshore[63], The International Trade Administration (ITA), U.S. Department of Commerce (known as export.gov)[64] and the multinational Price Waterhouse Coopers (PwC)[65].

[55] Ecorys (2018). "De Nederlandse Maritieme Cluster Monitor 2018". Available at: https://www.maritiemland.nl/maritieme-sector/publicaties/maritieme-monitor-2018/

[56] Eurostat Statistics Explained (2018). Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Maritime_ports_freight_and_passenger_statistics#Rotterdam.2C_Antwerpen_and_

[57] National Statistics Office, Netherlands (CBS) Available at: https://www.cbs.nl/en-gb/about-us/organisation

[58] Port of Rotterdam Authority (2018). "Facts and Figures". Vailable at: https://www.portofrotterdam.com/en/our-port/facts-figures-about-the-port

[59] CBS: Figures – Energy. Available at: https://longreads.cbs.nl/trends17-eng/economy/figures/energy/

[60] The Energy Agreement. Available at: http://energieopwek.nl/#over-het-energieakkoord

[61] Netherlands Enterprise Agency (2015) Offshore wind energy in the Netherlands: The roadmap from 1000 to 4500 MW offshore wind capacity. Available at: https://www.rvo.nl/sites/default/files/2015/03/Offshore%20wind%20energy%20in%20the%20Netherlands.pdf

[62] Global Wind Energy Council (GWEC) (2018). "Annual Market Update 2017". Global Wind report. Brussels, April 2018. Available for download at: http://files.gwec.net/register?file=/files/GWR2017.pdf

[63] 4C Offshore. Available at: https://www.4coffshore.com/about-us.aspx

[64] Export.Gov (2018). "Netherlands- Energy". Available at: https://www.export.gov/article?id=Netherlands-Energy; PwC (2018).

MSP-LSI Case Study	Focal Sectors
Pomeranian Bight	**Coastal Tourism** The Pomeranian Bight Case Study was the only transboundary case study and as such required examination of data sources from both Germany and Poland. National data sources from Germany included studies and reports commissioned by the Ministry of Energy, Infrastructure and Digitalization Mecklenburg-Vorpommern for example on the development of marinas[66], the Statistical Office for the State Office Mecklenburg Vorpommern[67] and their reports including the Statistical Yearbook 2018[68] and the Tourism Association Mecklenburg Vorpommern[69] where data could be obtained for example on the number of visitors and their country of origin. Sources from Poland included the Polish Trade and Investment Agency website[70] and official documentation from the Ministry of Sports and Tourism[71], the Statistical Yearbook of the Maritime Economy 2018 published by the Statistical Office of Szczecin[72] and the website of the West Pomeranian Voivodeship[73] and reports they have published[74]. Data sources from the private sector were also used such as the Annual Report on Tourism of the East German Savings Banks Association (Finanzgruppe Ostdeutscher Sparkassenverband)[75]. The

[65] PwC (2018). "De economische bijdrage van windenergie op zee". Available at: https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2018/08/31/de-economischebijdrage-van-windenergie-op-zee/20180606+Economische+bijdrage+van+windenergie+op+zee.pdf

[66] http://app-rpv.de/rpv-vorpommern/wpcontent/uploads/sites/2/2017/05/Standortkonzept_Sportboothaefen_Planungsregion_Vorpommern_gesamt_2017.pdf

[67] Statistical Office Mecklenburg Vorpommern: Accessed at: https://www.laiv-mv.de/Statistik/

[68] Statistisches Amt Mecklenburg-Vorpommern, Schwerin (2018). "Statistisches Jahrbuch

Mecklenburg-Vorpommern 2018". Available at: https://www.laivmv.de/static/LAIV/Statistik/Dateien/Publikationen/Statistisches%20Jahrbuch/Z011%202018%2000.pdf

[69] Tourismusverband Mecklenburg-Vorpommern e.V. (2018). "Incoming-Tourismus". Available at:https://www.tmv.de/incoming-tourismus/

[70] Polish Trade and Investment Agency. Accessed by: https://www.paih.gov.pl/regiony/wojewodztwa/zachodniopomorskie

[71] Polish Ministry of Sport and Tourism (2015). "Resolution No. 143/2015 of the Council of Ministers of 18 August 2015 on the adoption of the Tourism Development Programme until 2020". Available at: https://www.msit.gov.pl/download/3/12550/TourismDevelopmentProgrammeuntil20201f3c.pdf

[72] Statistical Office in Szczecin (2017) Statistical Yearbook of Maritime Economy, p. 344

[73] Pomorze Zachodnie (2018). "Turystyka"

[74] Frąckiewicz, A. (2017). "Problemy i potrzeby zachodniopomorskich pracodawców reprezentujących sektor usług turystycznych". Available at: https://www.wup.pl/images/uploads/II_DLA_INSTYTUCJI/badania/gospodarka/Raport_z_badania_pn._Problemy_i_potrzeby_zachodniopomorskich_pracodawc%C3%B3w_reprezentuj%C4%85cych_sektor_us%C5%82ug_turystycznych..pdf

[75] Ostdeutscher Sparkassenverband (2017). "Sparkassen-Tourismusbarometer: Jahresbericht 2017". Available at: http://www.osv-online.de/fileadmin/osv/dateien/tourismus/STourismusbarometer_2017_komplett.pdf

	Organisation for Economic Cooperation and Development (OECD) report 2018 on tourism performance and policy trends across 49 OECD countries and partner economies was also used in providing background information and context[76].
Pomeranian Bight (continued)	**Offshore Wind Energy** Much of the data for the Offshore Wind Energy value chain in the Pomeranian Bight came from national or government organisations. In Germany the most valuable sources of data were the Federal Association of Wind Farms Offshore (BWO eV)[77] and the German Offshore Wind energy Foundation[78] who have produced numerous reports on sector growth and current statistics. A report published by the Federal Ministry for Economic Affairs and Energy (BMWi) also provided data on potential future trends in the region[79]. For data on the Polish part of the case study area data was gathered from trade organisations such as the Polish Wind Energy Association who have published reports on the status of the industry[80]. International sector associations such as Wind Europe[81] also provides a wealth of statistics and news items focusing on specific countries[82] . Industry publications such as energy Voice also provided data on segments within the value chain showing periods of growth and decline[83].

[76] OECD (2018): COUNTRY PROFILES: TOURISM TRENDS AND POLICIES – POLAND https://www.oecd-ilibrary.org/docserver/tour-2018-en.pdf?expires=1542710597&id=id&accname=guest&checksum=71FB6CFEE79BFB7A03292E99813F

[77] The Federal Association of Windfarm Offshore. Accessed at: https://bwo-offshorewind.de/wer-wir-sind/

[78] German Offshore Wind Energy Foundation. Accessed at: https://www.offshore-stiftung.de/en/about-us

[79] 0 Wehrmann, B., (2019) Clean Energy Wire, Factsheet: German offshore wind power - output, business and perspectives 21 January 2019 https://www.cleanenergywire.org/factsheets/germanoffshore-wind-power-output-business-and-perspectives

[80] The Polish Wind Energy Association (2017). "The State of Wind Energy in Poland in 2016". Available at: http://psew.pl/wp-content/uploads/2017/06/Stan-energetyki-wiatrowej-w-Polsce-w-2016-r.pdf

[81] Wind Europe. Accessed at: https://windeurope.org/about-wind/

[82] WindEurope (018). "Ambitious 8 GW of offshore wind planned that will put Poland back on wind energy map". Available at: https://windeurope.org/newsroom/press-releases/ambitious-8gw-of-offshorewind-planned-that-will-put-poland-back-on-wind-energy-map/

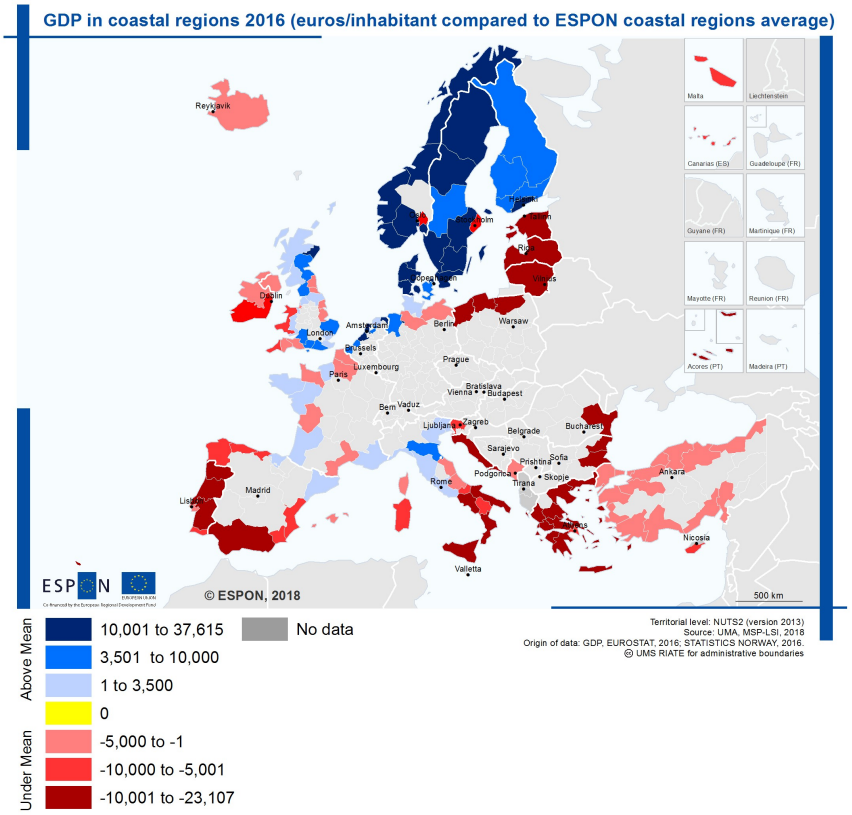
[83] Energy Voice: "For Heiner Kleen, Germany's renewable energy revolution looks like it will end in redundancy." Available at: https://www.energyvoice.com/otherenergy/181001/job-losses-mount-ingermany-as-wind-companies-seek-growth-abroad/

Appendix 3: ESaTDOR updated and additional maps

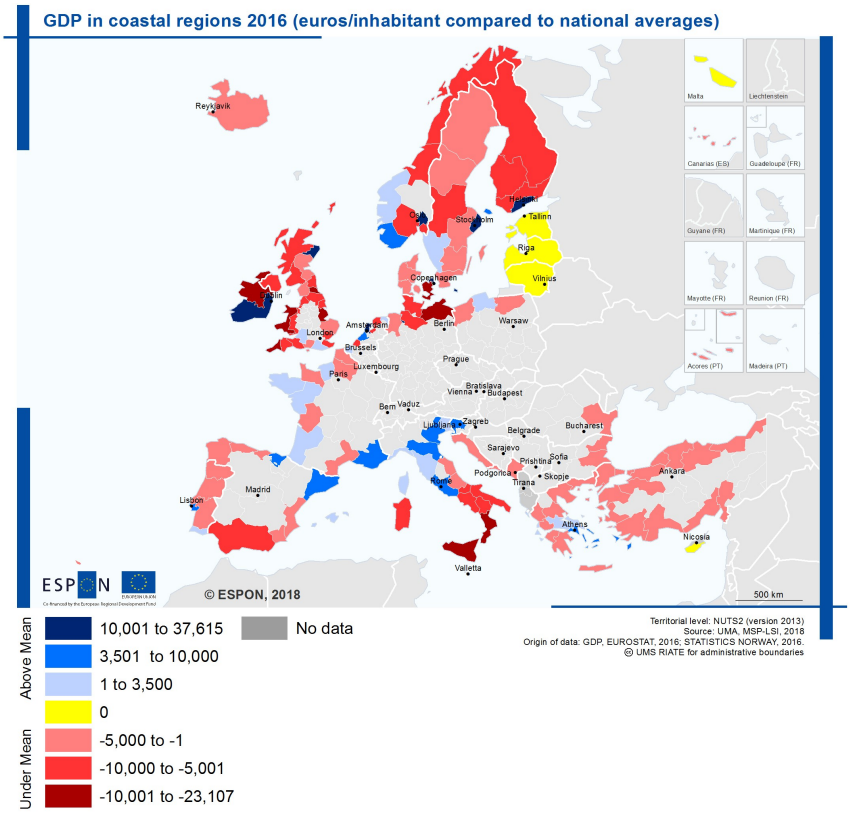
List of Maps

1. General Context

Map 3: GDP in coastal regions in 2016 compared to ESPON coastal regions average

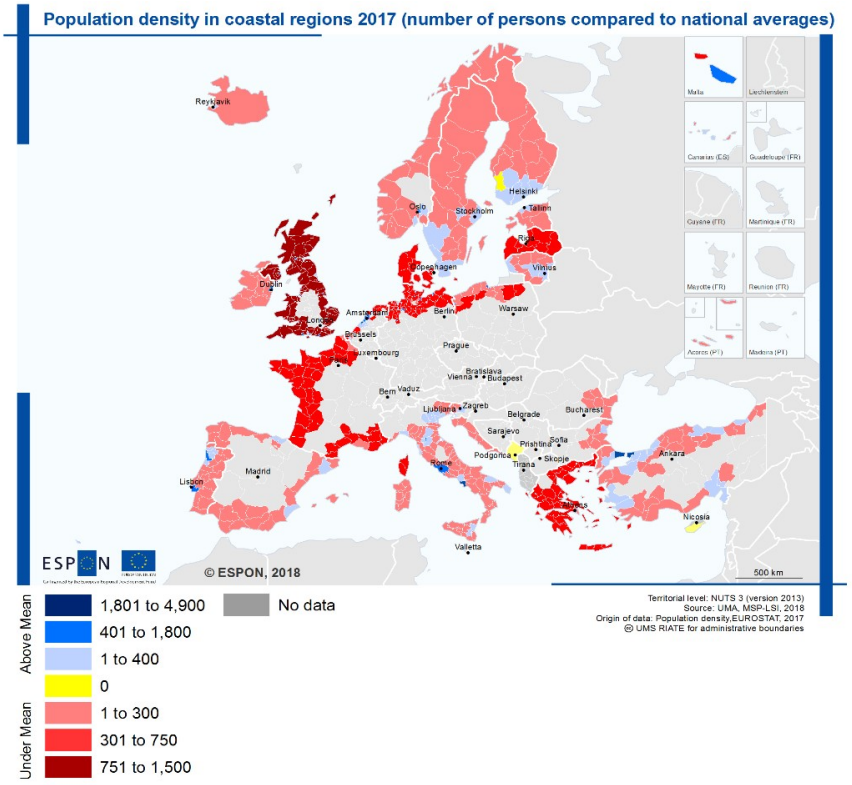


Map 4: GDP in coastal regions in 2016 compared national averages

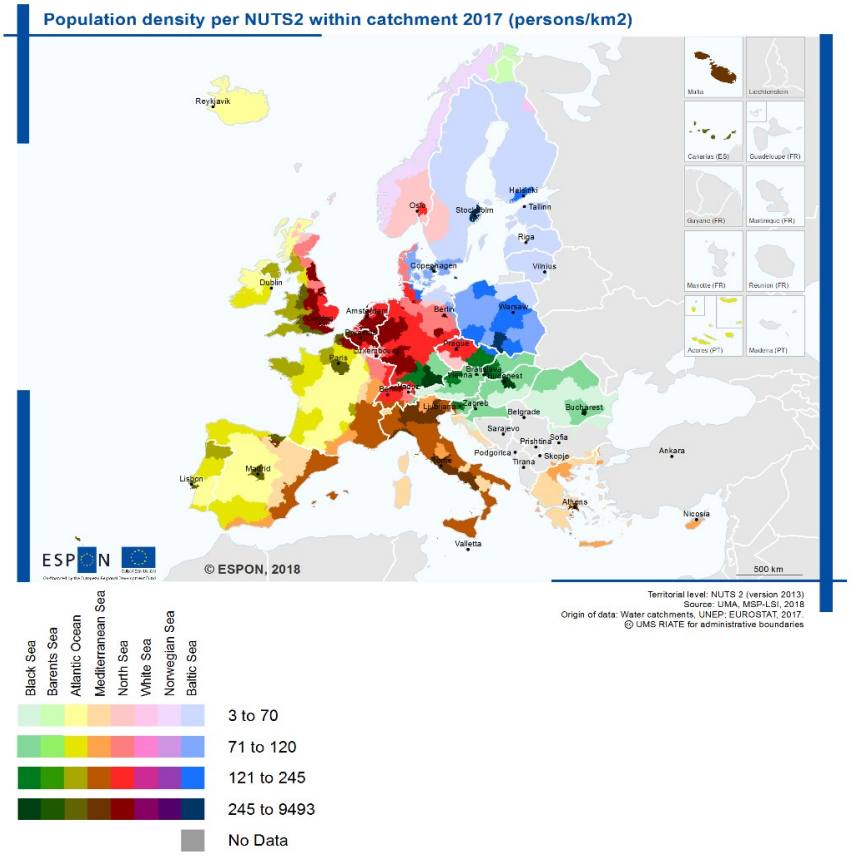


Map 5: Marine ecoregions

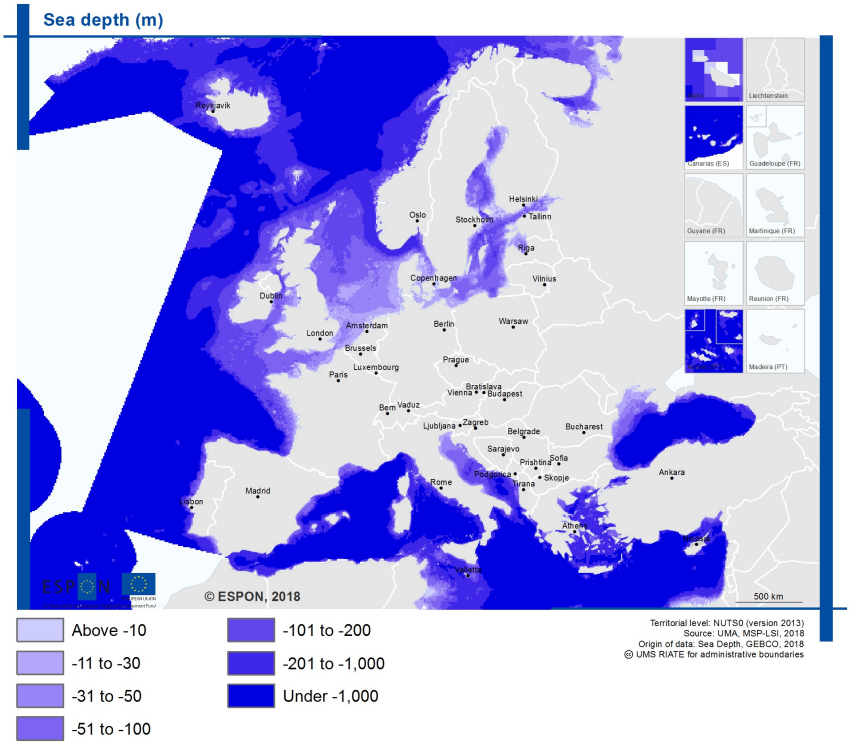
Map 6: Population density in coastal regions in 2017 compared to national averages



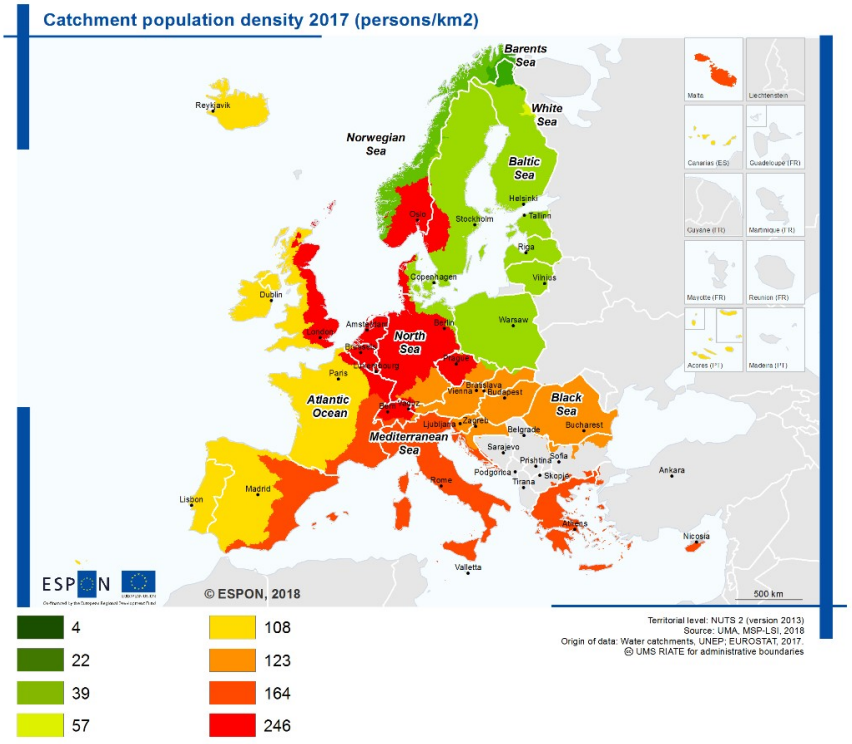
Map 7: Population density per NUTS2 within catchment in 2017



Map 8: Sea depth

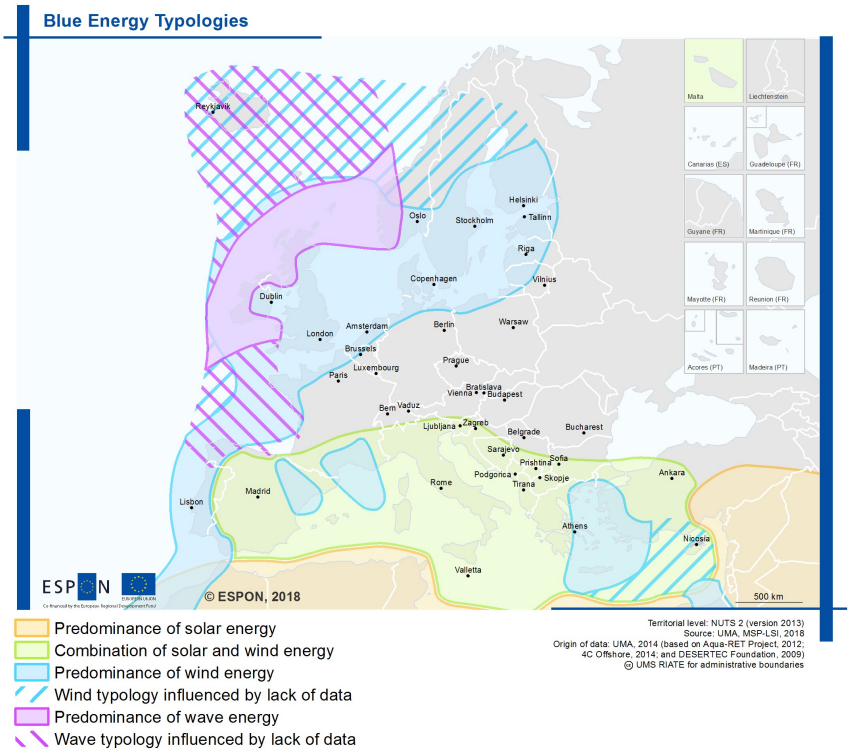


Map 9: Catchment population density in 2017

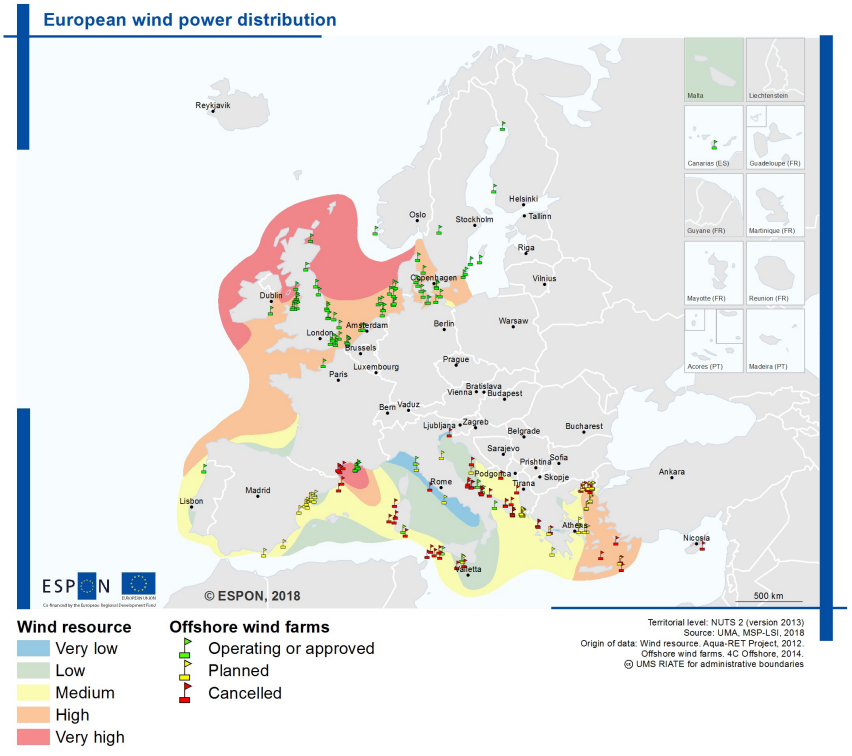


2. Energy undersea infrastructure

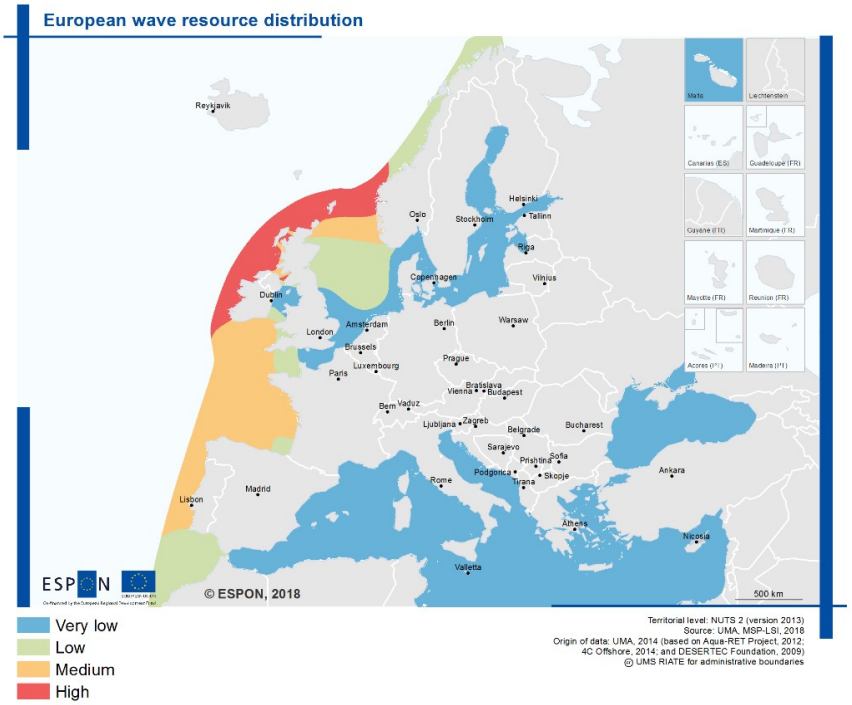
Map 10: Blue energy typologies



Map 11: European wind power distribution

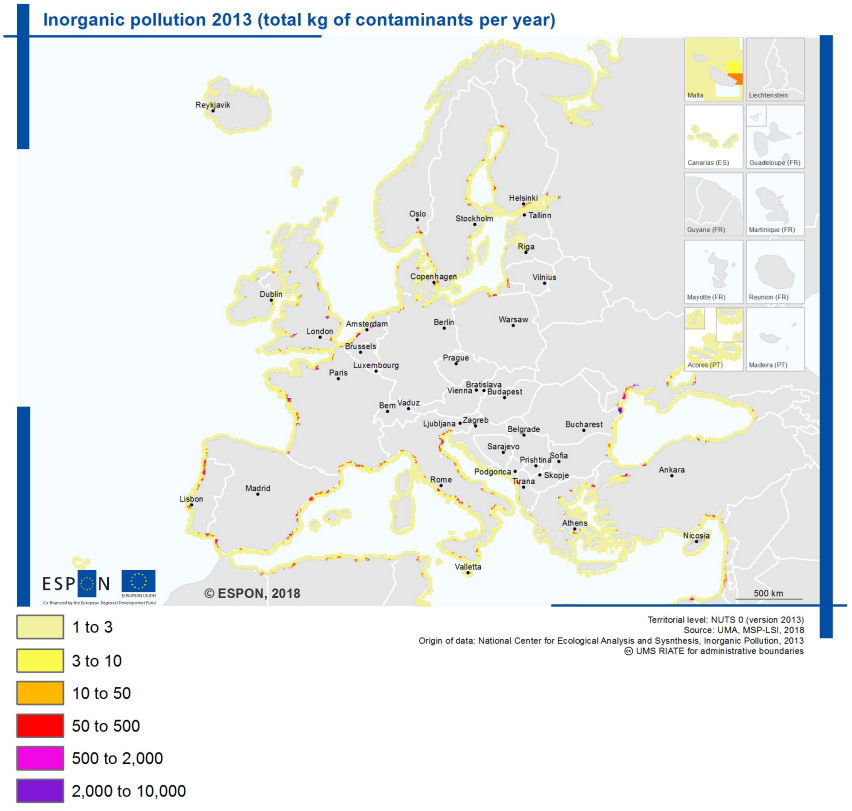


Map 12: European wave resource distribution

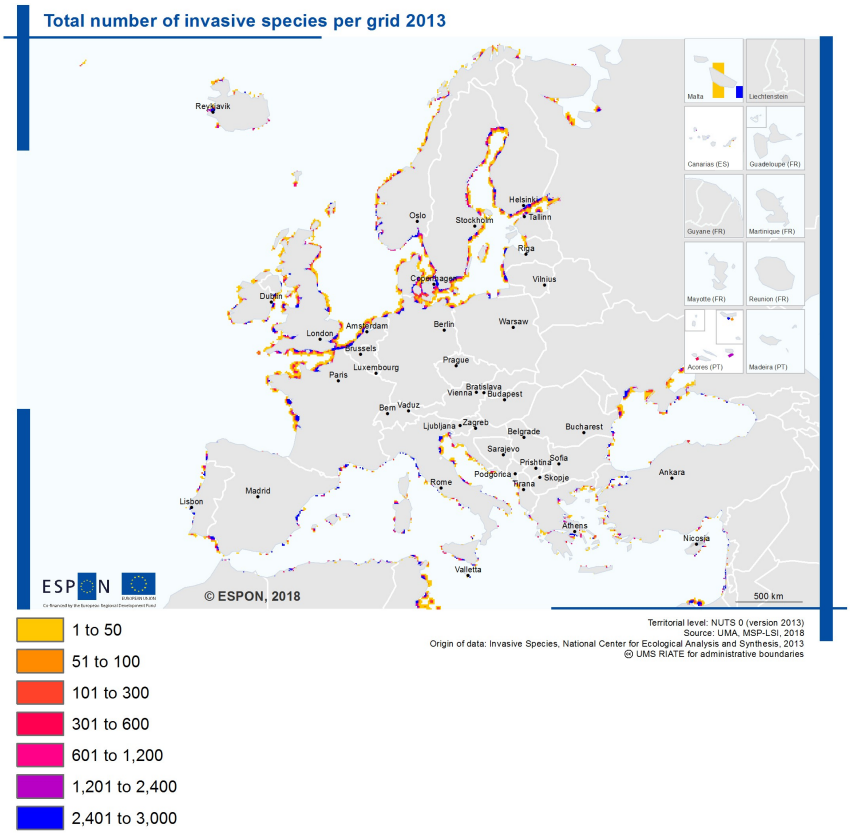


3. Environment

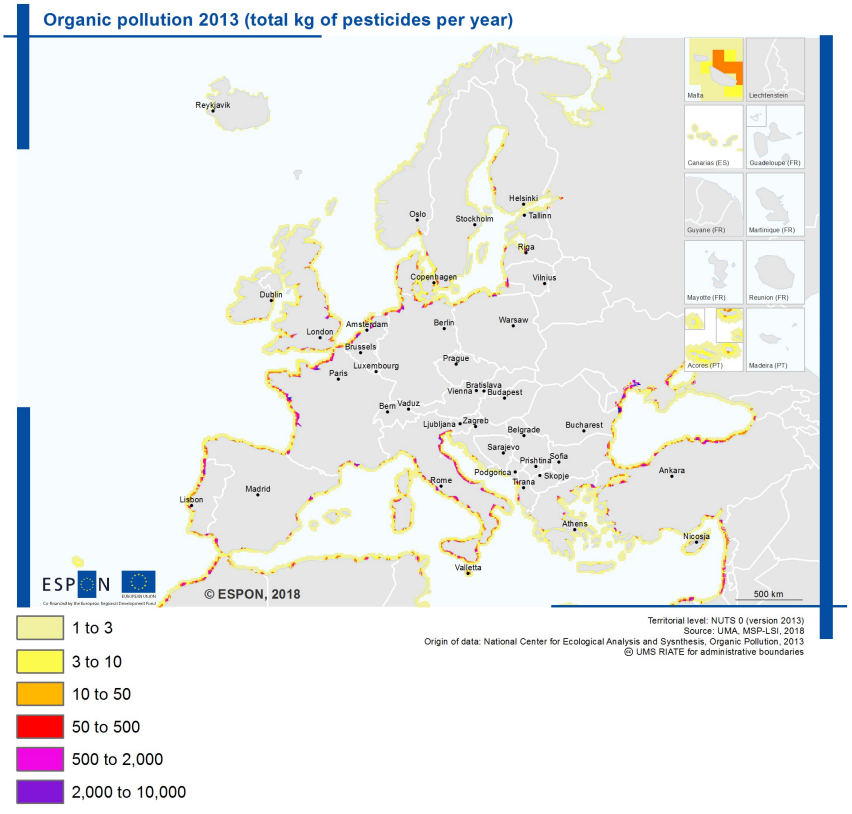
Map 13: Inorganic pollution in 2013



Map 14: Total number of invasive species in 2013

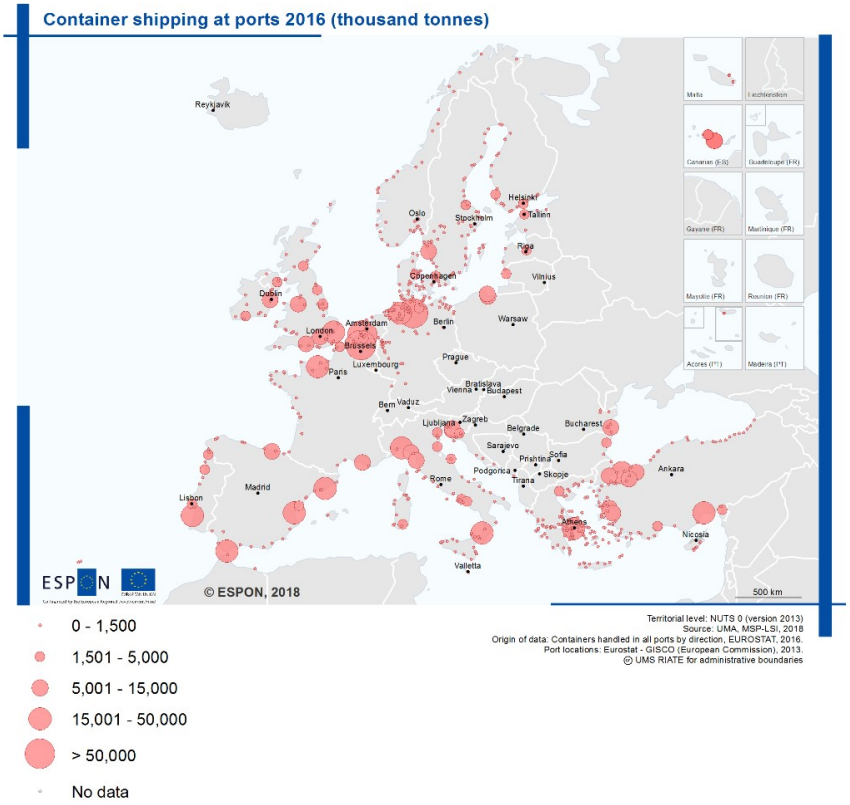


Map 15: Organic pollution in 2013

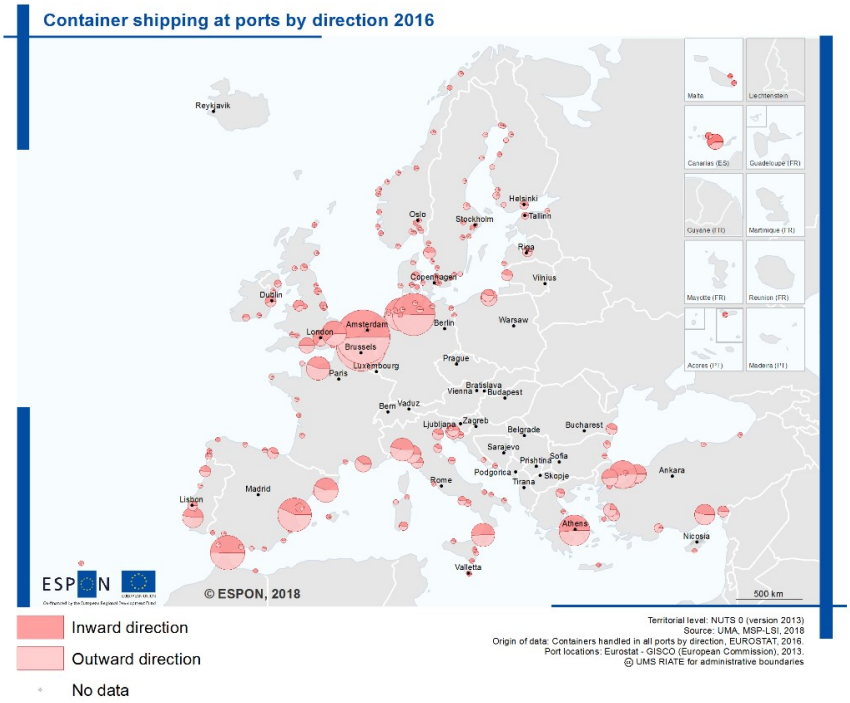


4. Transport

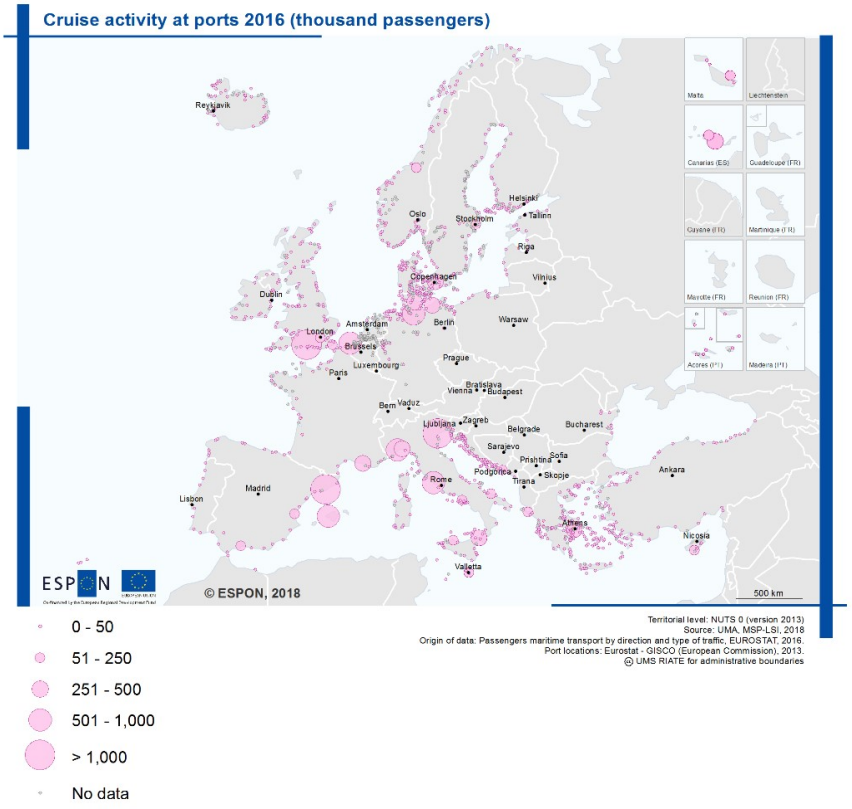
Map 16: Container shipping at ports in 2016



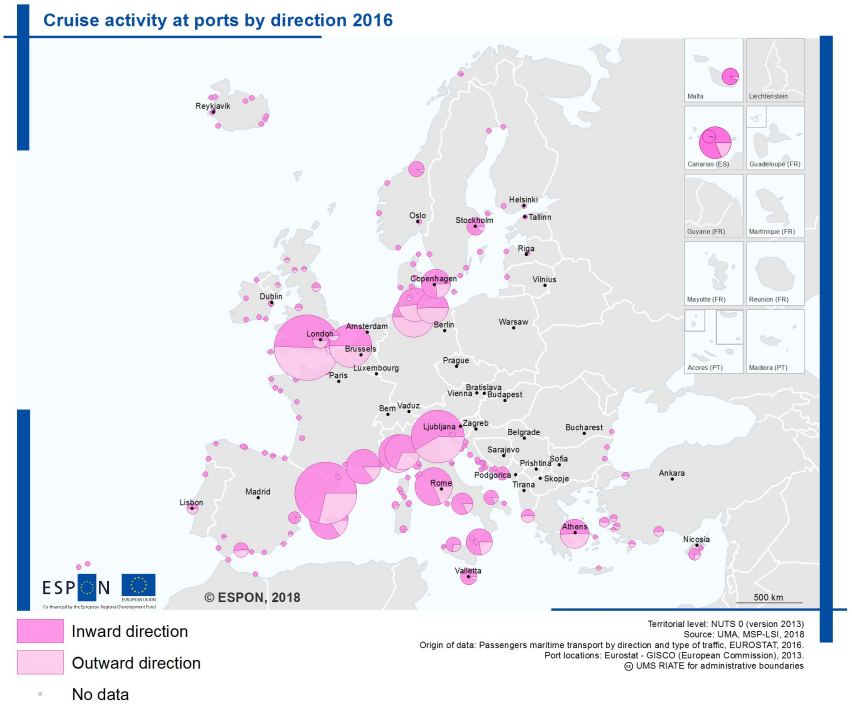
Map 17: Container shipping at ports by direction in 2016



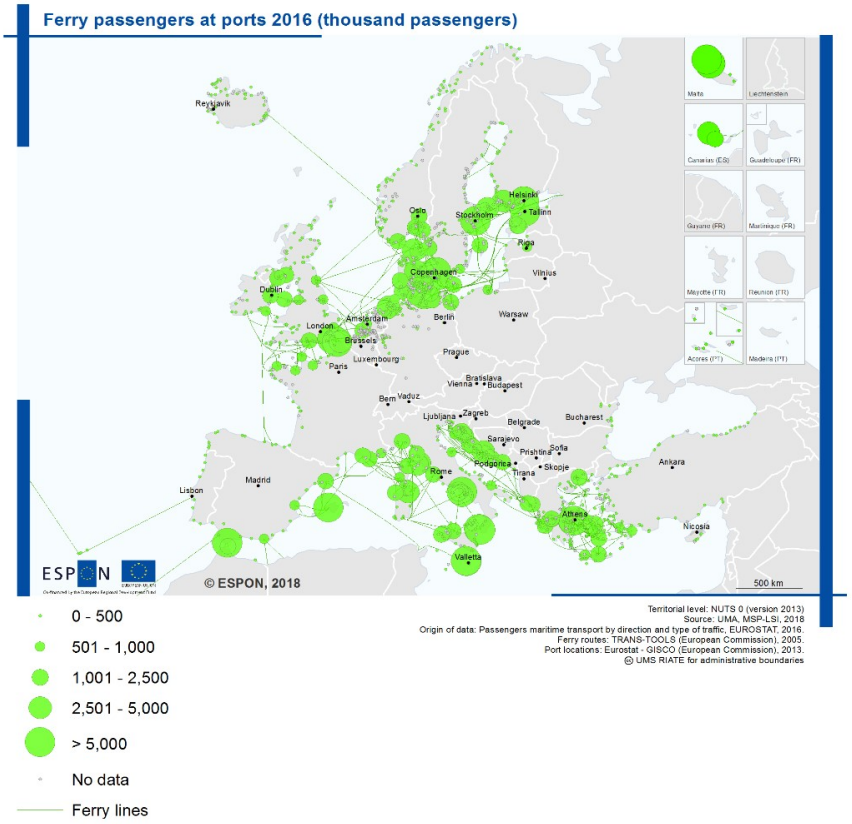
Map 18: Cruise activity at ports in 2016



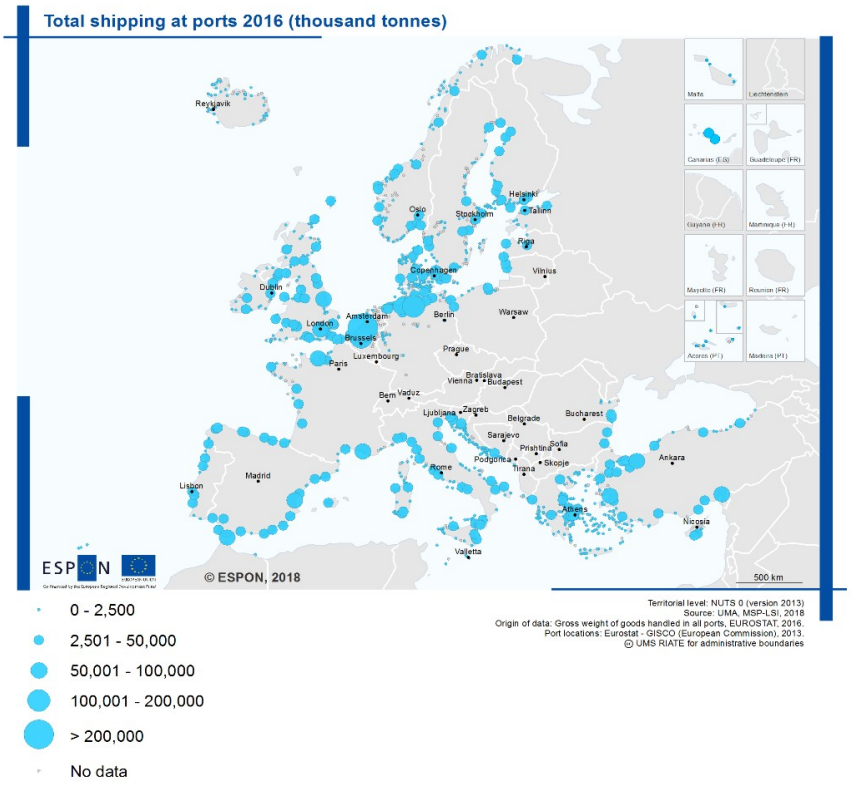
Map 19: Cruise activity at ports by direction in 2016



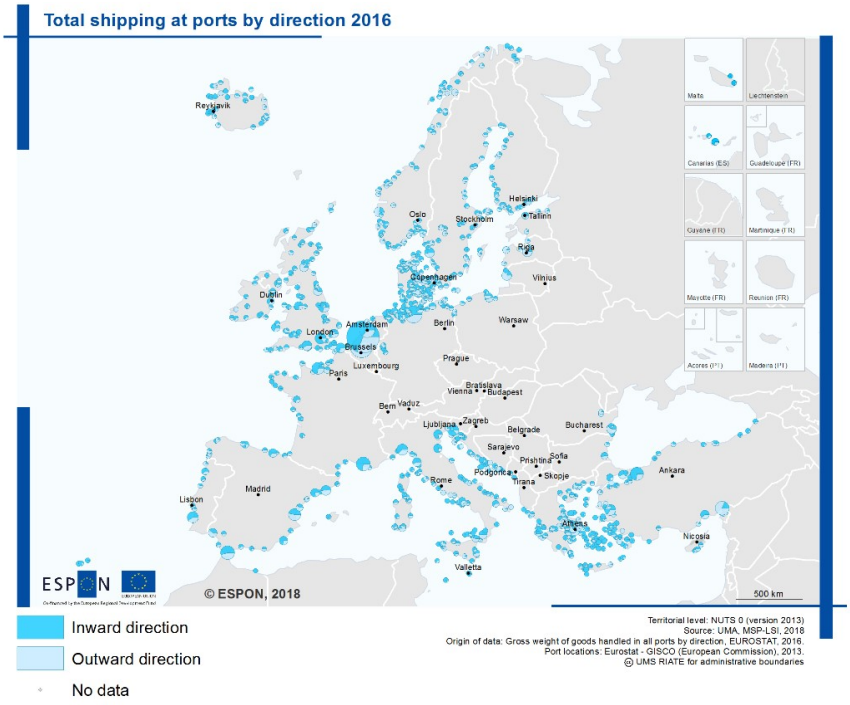
Map 20: Ferry passengers at ports in 2016



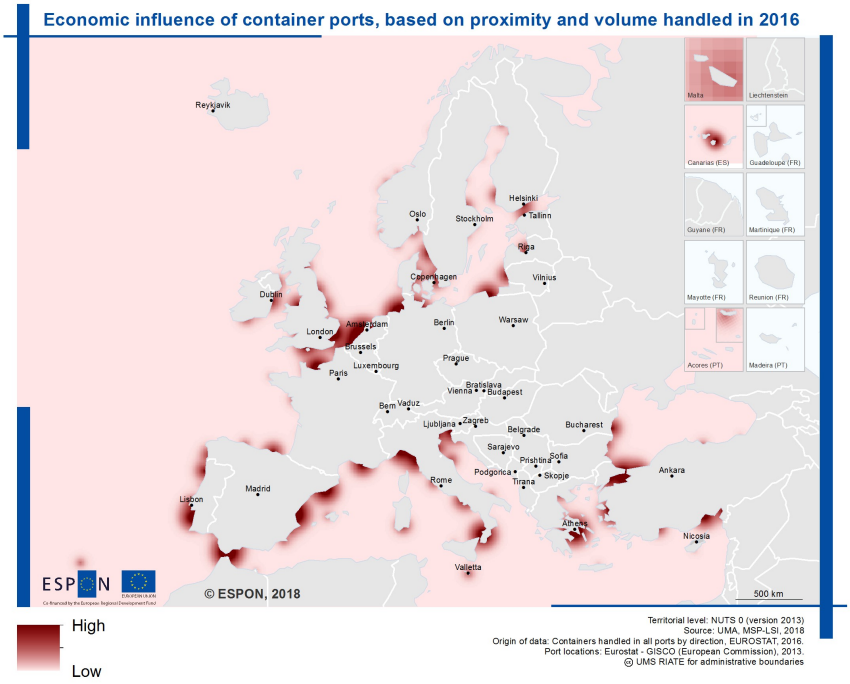
Map 21: Total shipping at ports in 2016



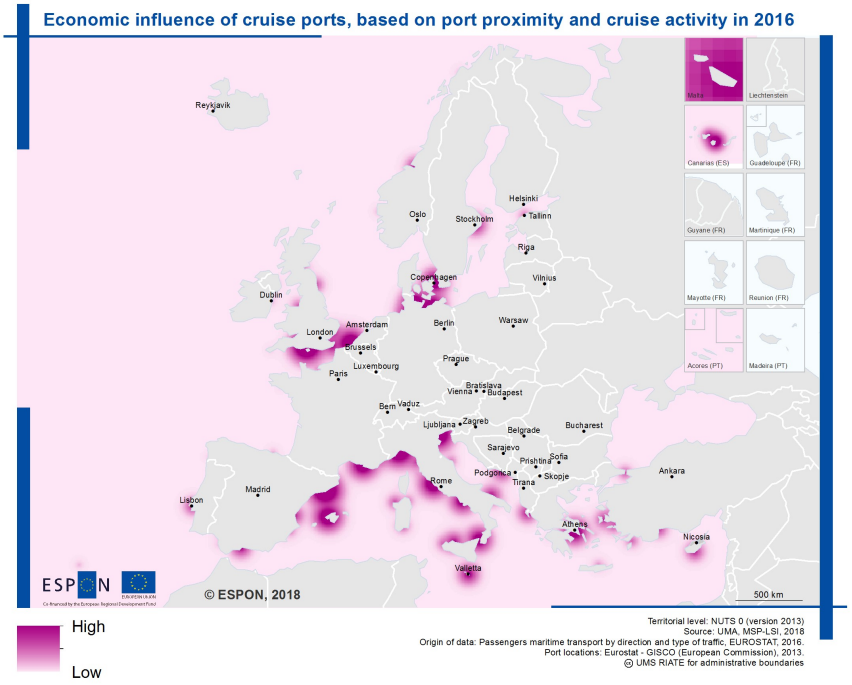
Map 22: Total shipping at ports by direction in 2016



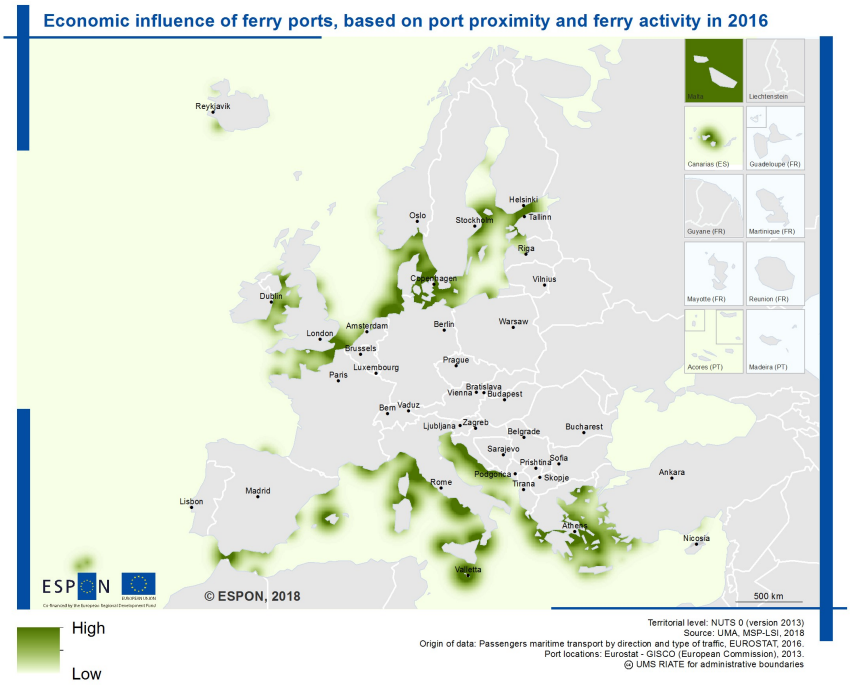
Map 23: Economic influence of container ports in 2016



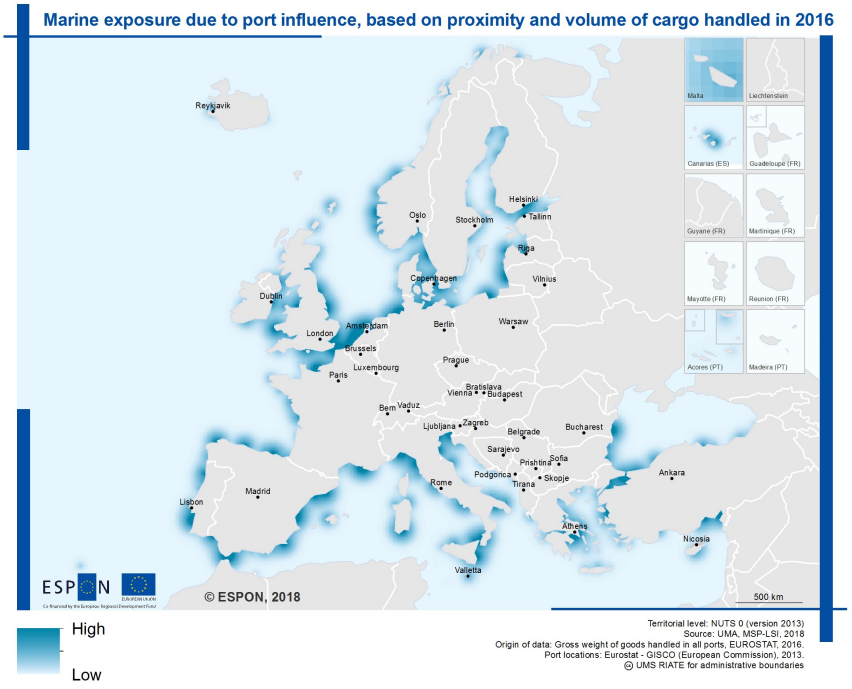
Map 24: Economic influence of cruise ports in 2016



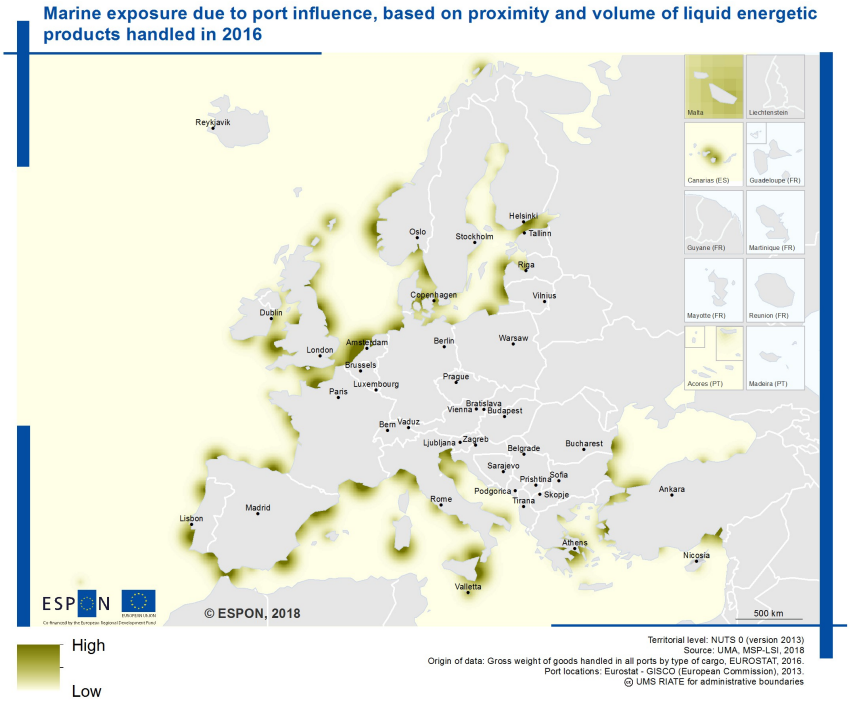
Map 25: Economic influence of ferry ports in 2016



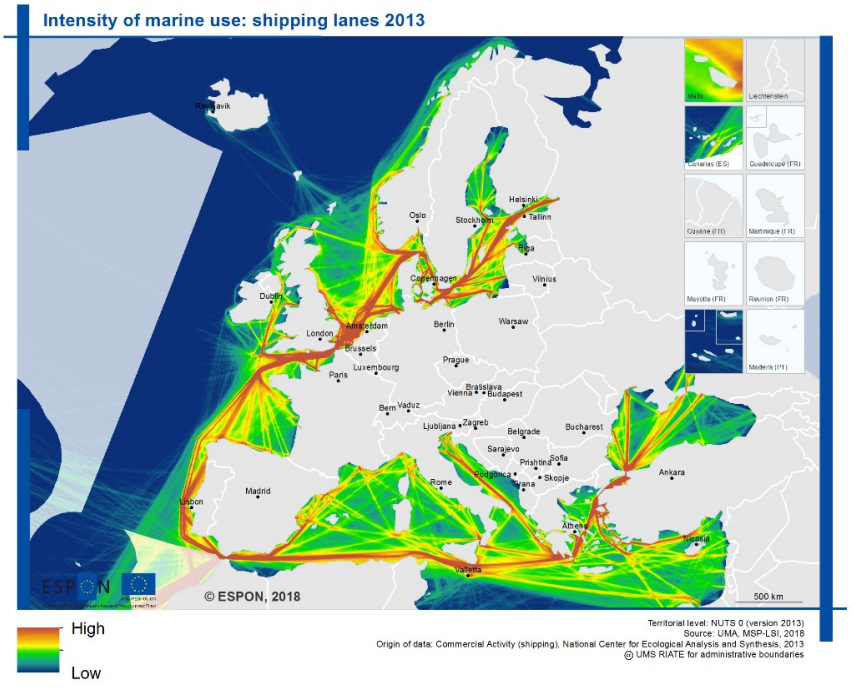
Map 26: Marine exposure due to port influence in 2016 (cargo)



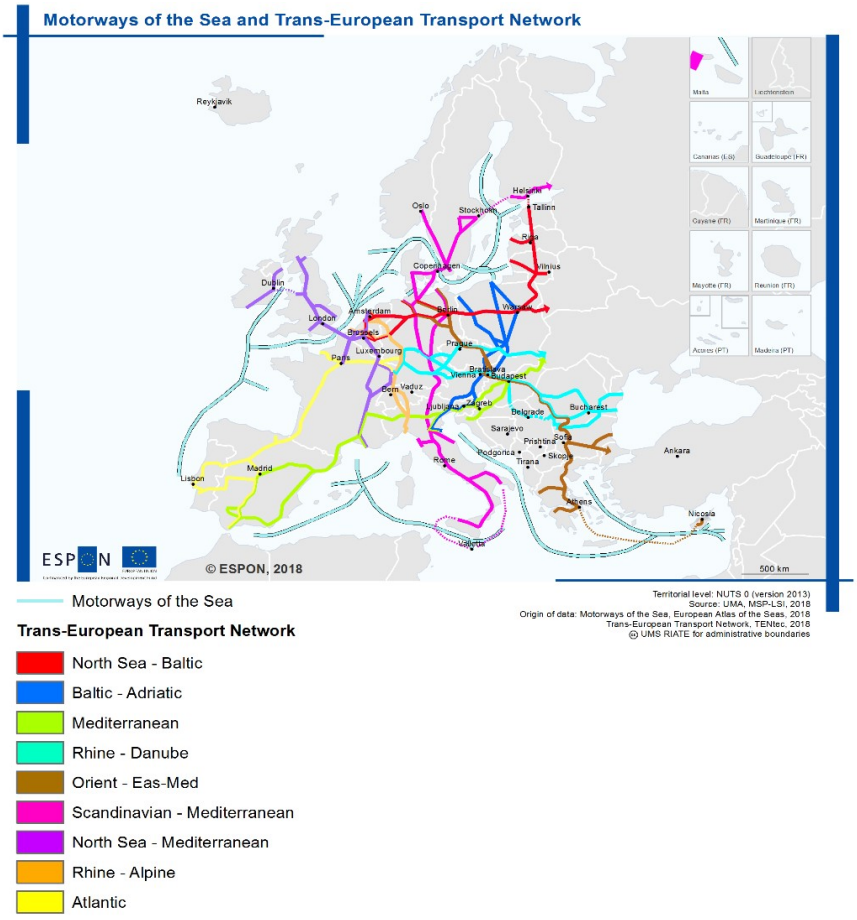
Map 27: Marine exposure due to port influence in 2016 (liquid energetic products)



Map 28: Intensity of marine use: shipping lanes in 2013



Map 29: Motorways of the Sea and Trans-European Transport Network



ESPON 2020 – More information

ESPON EGTC
4 rue Erasme, L-1468 Luxembourg - Grand Duchy of Luxembourg
Phone: +352 20 600 280
Email: **info@espon.eu**
www.espon.eu, **Twitter**, **LinkedIn**, **YouTube**

The ESPON EGTC is the Single Beneficiary of the ESPON 2020 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland.