Baltic LINes

Coherent Linear Infrastructures in Baltic Maritime Spatial Plans

# A PRACTICAL GUIDE TO THE DESIGNATION OF SHIP CORRIDORS IN MARITIME SPATIAL PLANNING

***Work Package 4.4***

Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

# Foreword

This practical guide has been developed by the partnership of several planning authorities in course of the Interreg project Baltic LINes. The guide is strongly related and therefore also added as annex to the Baltic LINes report "Identification of transnational planning criteria for energy and shipping in the Baltic Sea". However, the guide can also be used independently as tool for those maritime spatial planners that are looking for practical advices for the designation of ship corridors in their national sea area – irrespectively if they are from within the Baltic region or an absolutely different part of the world.

The guide presents a step-wise approach summarizing the most important topics to address when designating ship corridors for maritime spatial planning (MSP). It should not be seen as the one-and-only way to develop and designate ship corridors in MSP as national planning systems vary greatly and other options may be preferable. Especially when it comes to the project level, e.g. for shipping in the vicinity of offshore wind farms, thorough risk assessments have to be conducted on a case-by-case basis. However, after reviewing different national approaches and discussing the origins of similarities and differences in a profound group of maritime spatial planners from the Baltic, this guide claims to be a good example of how to prepare the first draft of ship corridor designations in MSP for national and international consultation.

Although the guide concentrates specifically on the spatial demands of the shipping sector one should not get the impression that this very sector is more important than other sectors. MSP is by definition an approach that aims to balance out different interests by following an ecosystem-based approach. Thus, the shipping sector should not gain more importance than other sectors from a planners' point of view. However, it does make sense to have a look at the spatial demands of each sector separately to be able to accomplish a solid weighing procedure at a later stage. In fact, the designation of ship corridors is often one of the first steps when drafting a MSP. So a guiding document may help to get the entire MSP process started.

In best case the guide will be used by many countries that have common borders. We are convinced that using similar planning approaches in MSP will increase mutual understanding and eventually lead to greater coherence in transnational maritime spatial planning. Coherency in plans is not only a goal of the EU MSP Directive (2014) but also ensures enhanced safety at sea which in turn contributes to better environmental conditions, lower economic costs and last but not least reduces risk for the loss of human life.

*Nele Kristin Meyer (BSH)*
*Hamburg, August 2018*

# STEP 1

**Data acquisition of IMO measures in national sea area**

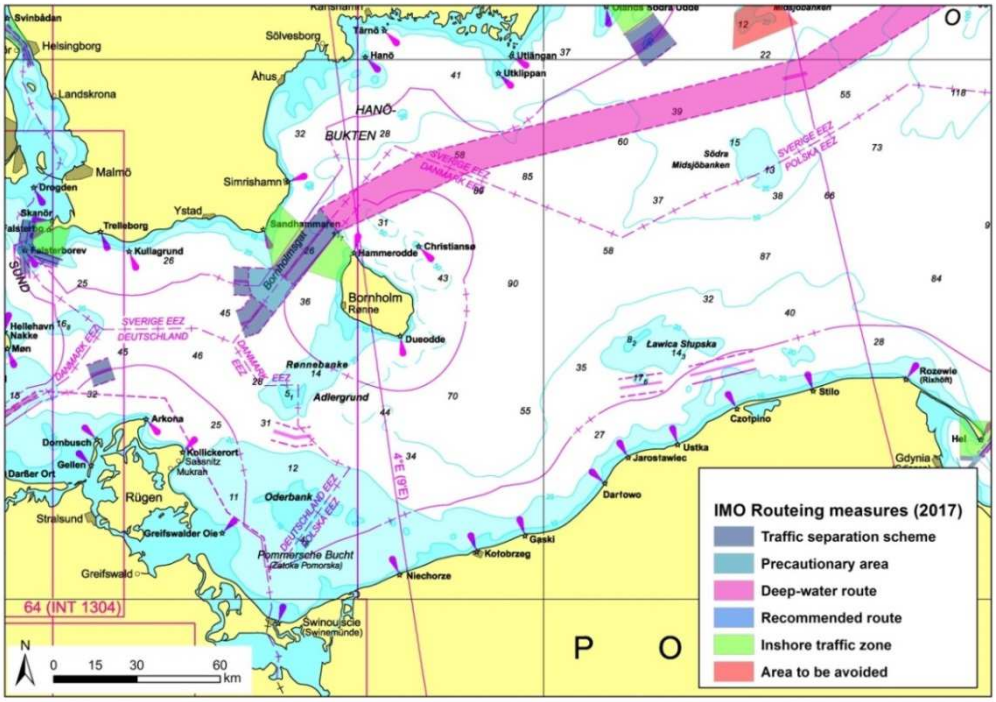
- ☑ Contact (national) competent authority for nautical charts/ ship traffic regulation
- ☑ Ask for relevant spatial navigation information in GIS format (most recent data)
- ☑ Compare to http://www.imo.org/en/ and https://gisis.imo.org/Public/Default.aspx
- ☑ Study internationally agreed regulations (e.g. by UNCLOS, COLREGs, GPSR and SOLAS)

**Transfer of existent IMO routeing (or updated IMO-routeing before plan adoption) and fixed uses as basis for first plan draft**

- ☑ Adapt dimensions from area-wide measures (TSS, roadsteads for anchorage)
- ☑ Define widths for linear routes (recommended route, deep-water route), see step 2
- ☑ Exclude ATBA for any designations for shipping

**Assessment of future plans for potential spatial regulation of ship traffic**

- ☑ Contact (national) competent authority for nautical charts and ship traffic regulation
- ☑ Ask for regulatory plans that may impact the spatial regulation of shipping in future
- ☑ Add additional corridors to your MSP if future development is likely




***Step 1: Different types of IMO routeing schemes need to be transferred to the MSP***

# STEP 2

## Data acquisition and preparation of Automatic Identification System (AIS) data

- ☑ Contact sources for AIS data for your national sea area (e.g. national stations, HELCOM, EMSA)
- ☑ Decide which ship types and time periods should be included for ship corridor designation
- ☑ Produce ship density maps (for the Baltic Sea you can use the ones produced by HELCOM)

***Info Box – HELCOM AIS Expert Working Group***

The Expert Working Group for Mutual Exchange and Deliveries of AIS & Data (HELCOM AIS EWG) works to facilitate mutual exchange and deliveries of Automatic Identification System (AIS) data and maintain and further develop HELCOM AIS. The working group agreed on a methodology to produce density maps and statistics from AIS data. Applying the same definitions and methodology improves the comparability of AIS data products between different countries. The methodology is available as Annex I of the Maritime Assessment report (HELCOM, 2018, p.194). Also the software (scripts and codes) for AIS data processing is available for download from HELCOM GitHub. Many of the GIS datasets and maps of the shipping density for the Baltic Sea are available for download via the HELCOM map and data service (MADS).

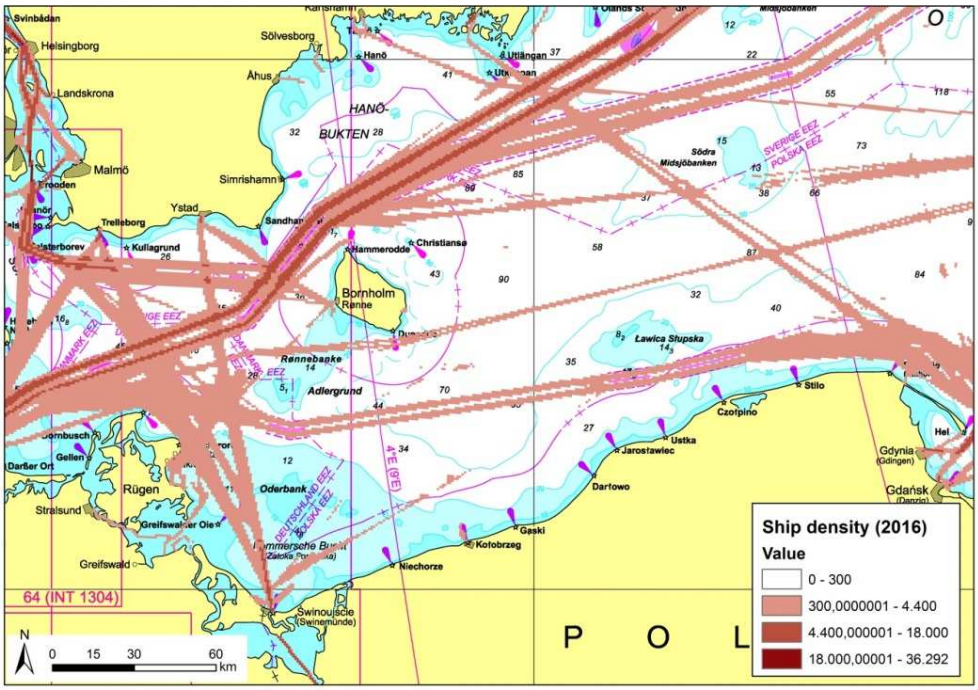
HELCOM MADS: http://maps.helcom.fi/website/mapservice
HELCOM GitHub: https://github.com/helcomsecretariat/AIS-data-processing-for-statistics-and-maps

## Assessment of current ship traffic patterns for first draft of ship corridor designations

- ☑ Decide for expert driven approach or quantitative method (see suggestion in info box)
- ☑ Determine the standard ship size frequenting the national sea area
- ☑ Define paths with certain traffic frequency
- ☑ Define ship corridor widths for different paths

## Consideration of safety issues

- ☑ Locate safety havens from nautical charts and indicate them in MSP
- ☑ Get an overview about common evaluation of safety distances for shipping
- ☑ Designate safety zones where necessary also with regard to leisure traffic




***Step 2: AIS data needs to be analyzed to designate ship corridors***

***Info box – Calculation of ship corridor width***

In course of offshore installations being developed more and more in the international sea area the shipping industry stated ambitions to determine the space they need (see Patraiko and Holthus 2013). According to the Shipping Advisory Board North Sea (2014) the AIS study by the Maritime Institute of the Netherlands (MARIN) delivers a valid and well-fitting method to determine path widths for maritime spatial planning. Also a White Paper on Offshore Wind Energy developed by the Netherlands (2013) assesses possibilities for an objective way to determine the safe distances between shipping lanes and offshore wind farms that are still consonant with nautical safety requirements. These guidelines mentioned are developed by shipping experts that highlight the importance of navigational safety and should be taken seriously by maritime spatial planners. Therefore, definitions and calculation methods for corridor width determination for moving traffic suggested by the paper are summarized hereafter.

1. Path: The space required by ships for manoeuvring under normal circumstances (also called shipping lane or corridor). The path width is dependent on the length of a standard ship and the estimated future traffic intensity on the route (e.g. for the next 20 years) since these parameters are relevant for how much space is needed for overtaking. The calculation of the path width can be based on an AIS study by the Maritime Institute of the Netherlands (MARIN) and assumes that paths with a traffic density of

    a. <4,400 vessels per year need space for two vessels aside,
    b. 4,400 - 18,000 vessels per year need space for three vessels aside, and
    c. >18,000 vessels per year need space for four vessels aside.

    Room for manoeuvring aside is given by two ship lengths per vessel. The standard ship size is determined by a statistical analysis of the ship sizes normally using the path; disregarded occasional visits of extraordinary ships. The standard ship size should cover about 98.5% percentile of all ships on route.

    Using the MARIN method, path widths for a standard ship size of 400m range between 0.9nm for the smallest paths with traffic densities <4,400 vessels per year and 1.7nm for the largest paths with > 18,000 vessels per year (see table A). When applying the method at real data one will recognize that a minimum traffic density, from which a path starts to be route that needs to be designated in MSP, is absent. This decision needs to be taken by the planning authorities and should be discussed with shipping experts. Example calculations for the Baltic Sea showed that paths with traffic densities of >500 vessels per year included roughly all important routes. If more detailed mapping (including smaller routes) is desired this threshold needs to be lowered.

    **Table A: Calculation of path widths for an example standard ship size of 400m**

| Ship traffic density (vessels per year) | Number of vessels taking over | Number of ship lengths needed | Path width for an example standard ship size of 400m |
|---|---|---|---|
| <4,400 | 2 | 4 | 4 x 400m = 1.6km (~0.9nm) |
| 4,400 - 18,000 | 3 | 6 | 6 x 400m = 2.4km (~1.3nm) |
| >18,000 | 4 | 8 | 8 x 400m = 3.2km (~1.7nm) |

2. Safety zones along paths: The space that is normally not used by ships but which may be used in an emergency case to avoid accidents (e.g. a collision). The width of a safety zone is dependent on a number of different criteria including space needed for collision avoidance, round turns and emergency anchoring. Collision avoidance manoeuvres usually take up to 0.3nm and round turns take about six ship lengths. This calculation results in a safety distance of 1.6nm for each side for a route frequented by traffic with a standard ship size of 400m.

# STEP 3

**Assessment of political goals and policies that impact the shipping sector**

- ☑ Collect information on political goals and policies related to maritime transport and economy
- ☑ Estimate potential spatial implications of these developments
- ☑ Discuss results with national competent authorities for ship regulation and legislation

**Assessment of economic development and industrial developments in the shipping sector**

- ☑ Gather knowledge regarding future economic developments (global and regional economic development, changes in trade flows)
- ☑ Gather knowledge regarding future developments in maritime industry and ports through stakeholder consultation
- ☑ Estimate potential spatial implications of these developments
- ☑ Discuss results with competent authorities and stakeholders from industry

**Assessment of changing natural conditions impacting the shipping sector**

- ☑ Study research on likely future climate conditions in the region
- ☑ Address specifically potential changes in ice coverage, sea level and/ or storm frequency

**Indication of area with changing spatial needs for shipping in future**

- ☑ Add additional space along corridors where increasing ship traffic/ larger ship sizes are likely
- ☑ Define additional corridors for newly-established and/ or growing ports
- ☑ Consider additional corridors for autonomous ships
- ☑ Adjust corridors if in conflict with changing ice cover and/ or sea level


***Step 3: Future developments need to be studied to estimate future spatial demands***

# STEP 4

### Assessment of spatial demands across sectors

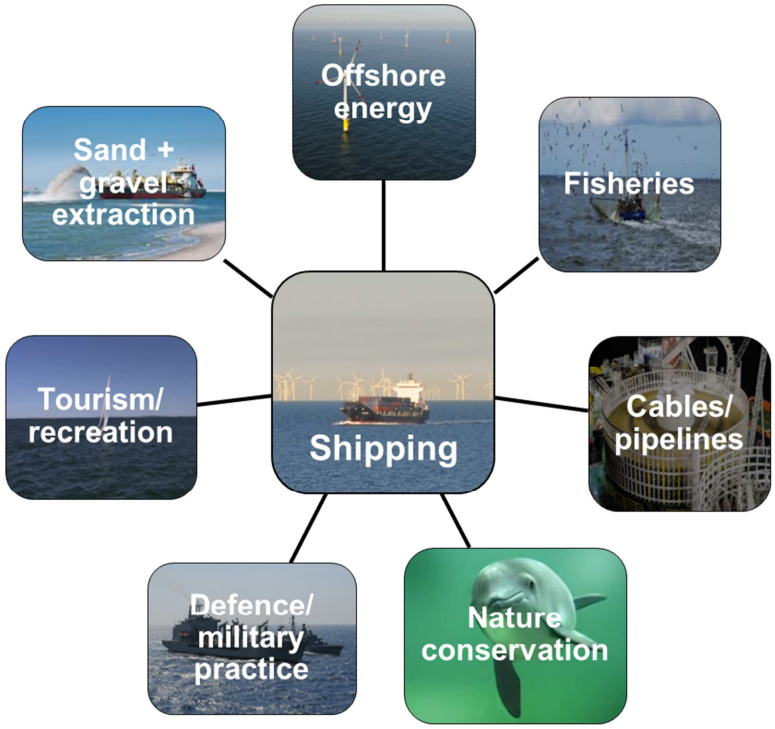
- ☑ Include the foreseen planning for the sectors in your map (e.g. nature protection, offshore installations, important fishing grounds, etc.)
- ☑ Remember that safety zones to fixed structures are needed

### Identification of potential conflicts between different uses

- ☑ Highlight overlapping areas that show conflicting uses
- ☑ Discuss potential conflicts with the competent planners from other sectors

### Development of planning solutions

- ☑ Identify different planning solution options (e.g. synergies between uses, exclusion of one of the uses, etc.)
- ☑ Find most suitable planning solution by weighting and cumulative impact assessment
- ☑ Keep other planning solutions to discuss during consultation/ hearings




***Step 4: Balancing between the spatial demands of shipping and other sectors needs to be done***

# STEP 5

**Assessment of transnational ship traffic**

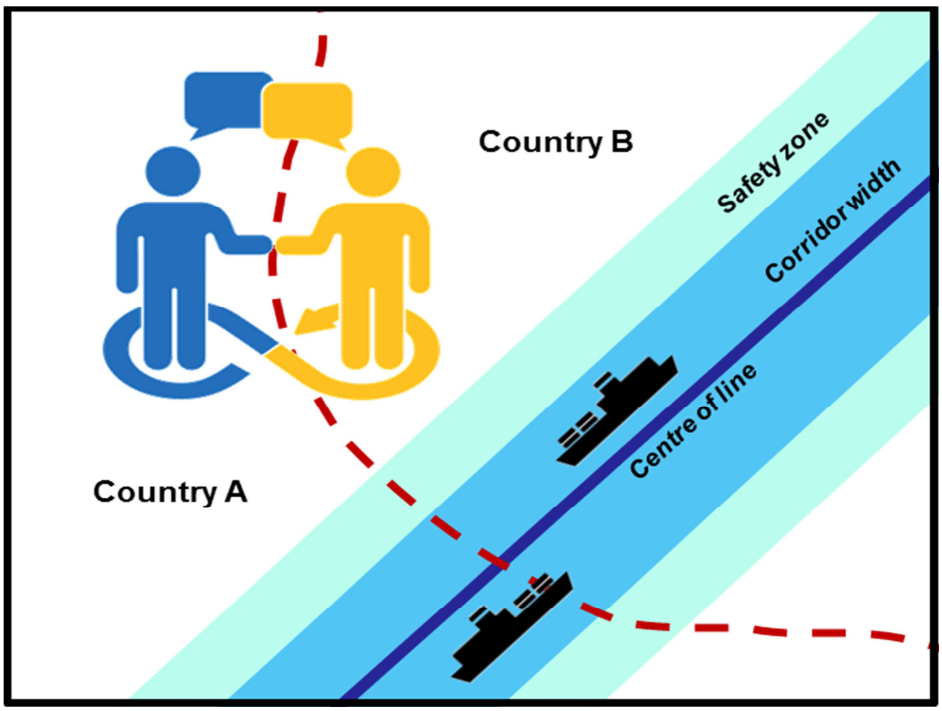
- ☑ Examine nautical charts for IMO measurements along border regions
- ☑ Analyze AIS data for direction and density of continuing ship traffic in neighboring countries

**Analysis of designated ship corridors along borders**

- ☑ Contact national contact points for MSP in neighboring countries (get in touch with the competent maritime spatial planners for shipping)
- ☑ Ask for GIS data of existing and/ or planned designations for shipping
- ☑ Find out which method was used to designate the corridors in the respective country

**Alignment of ship corridors across borders**

- ☑ Compare the plans of your neighboring country with your draft corridor designations
- ☑ Highlight potential mismatches to the competent planner in the neighboring country
- ☑ Discuss planning solutions in transnational working group
- ☑ Align ship corridors at borders (minimum solution: alignment of ship corridor center lines)




***Step 5: Transnational exchange between planners to increase coherency of designations***

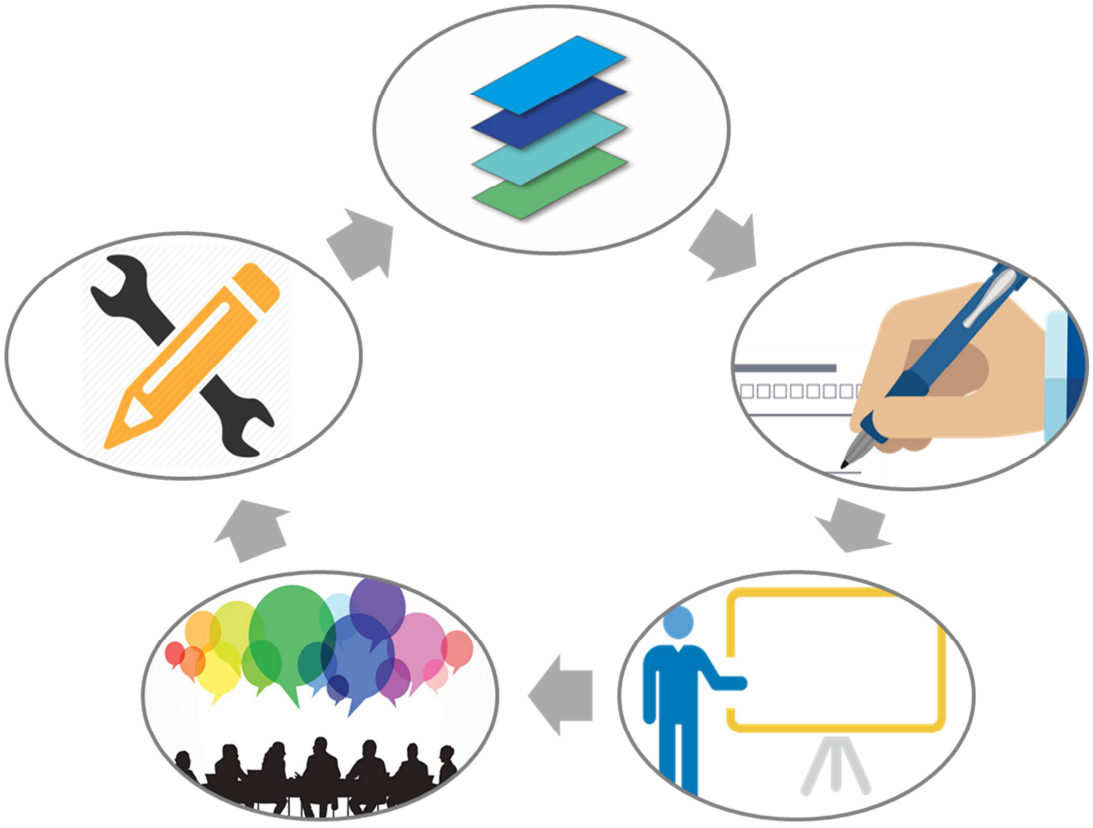
# STEP 6

### Categorization of areas for shipping

- ☑ Consider indication of different categories for shipping, e.g. priority areas, safety distances, leisure boat areas, potential areas for future shipping, areas of avoidance, etc.
- ☑ Set up clear definition and textual regulations for different categories (tolerance of other activities, temporal restrictions)

### Designation of shipping corridors

- ☑ Assign areas for shipping according to the scale/ resolution and planning horizon of your MSP
- ☑ Integrate the designations for shipping to your overall MSP for consultation
- ☑ Update designations after first round of consultation



***Step 6: First draft including categorization and textual regulation needs to be consulted and updated***

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