



**eMSP  
NBSR**

Emerging Ecosystem-based  
Maritime Spatial Planning  
Topics in the North and Baltic  
Sea Regions



**Co-funded by  
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# Optimising offshore Nature Inclusive Design in the North and Baltic Sea

eMSP NBSR project  
co-funded by the European Union



# Context

This document focuses on *Sustainable Blue Economy* (SBE) and especially on how we can make it happen by using Marine Spatial Planning (MSP) as a tool. Do we need to start a broader societal discussion? We divided the Sustainable Blue Economy in three components; food, nature and energy, linking with the current global transitions. In this document we zoom in on ‘nature’ under the form of Nature Inclusive Design (NID) opportunities from a multi-use point of view in the North and Baltic Sea. The ideas developed in this document are based on discussions in the community built within the [eMSP NBSR project](#). The project builds several interlinked *Communities of Practices (CoPs)*. The current document is based on the discussions during a fruitful community event in Helsinki, Finland on the 15th of June 2023. You will find the program of the day as an annex to this document, as well as a participation list.

The results that follow out of this CoP (as well as the previous CoP’s that dealt with energy and food) are written in this (the respective) report, as well as included in our policy letter towards the EC – a deliverable at the end of the project, which aims at supporting the use of MSP as a tool for a Sustainable Blue Economy.

## AUTHOR

Blue Cluster 2023 Kinnie De Beule, Marijn Rabaut.

## CONTRIBUTORS

Nico Buytendijk, Marjoleine Karper (Netherlands Enterprise Agency), Nathalie Scheidegger (Ministry of Agriculture, Nature and Food quality), Allahyar Valiyev (UGent).

Participants from the Community of Practice (cfr. Annex 2)

## DISCLAIMER

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# 1. Introduction

More than 50 participants with a governmental, NGO, industrial/business and/or scientific background have participated in our Community of Practice (CoP) on 'Nature Inclusive Design (NID) in the Baltic and North sea area' last 15<sup>th</sup> of June in Helsinki, Finland. Additionally, 60+ participants followed this CoP online.

This 5th CoP in a row of the Sustainable Blue Economy learning strand dealt with the scope of NID in offshore infrastructures or, a so called Maripark. The goal and aim of NID was discussed, as well as the preferred 'route to a Maripark' and the relevance of public acceptance within this more narrow topic and in general for large offshore infrastructure. What is the added value of multi-use and NID as a use? Nature inclusive design seeks to optimize both technical feasibility and environmental impact. The challenge is to find ways to stimulate and design new structures that have a positive impact on nature, boosting ecosystems while incorporating NID.

The Maripark concept is regarded to as a business park at sea, enrolled by a collaboration between the private and public sector, requiring a good collaboration between different authorities and sectors. It is regarded to as a sustainable and holistic business park, offering a framework to emerging SME's to easily gain information, request for permits, test, scale-up or plug in. Within the Maripark concept, safety and insurance is regarded as well, while data and more monitoring is crucial. While organizing those important aspects in a central way, more efficiency in a practical and economic way, can be obtained, as well as room for innovative solutions.

## 2. Multi-use at sea, Nature Inclusive Design and the effects of Climate Change? What is the ideal NID?

What is the real NID and which topics do we need to address? What is the role of climate change and will an altering sea temperature determine our species selection in NID? What umbrella species are important or should we look at it from an ecosystem level point of view. Are data for NID implementation present or are there gaps to address? And how can NID become a starting point for further design and planning instead of decelerating and even nuisance in the process for economic growth.

## Reflections from the North Sea

What is the ideal NID? Constructing commercial wind farms with nature inclusive design, can be beneficial for species- richness, which is a positive effect. However, we should carefully think about what we do, about a relatively 'new' (marine) environment and with which aim we do so. One should go for actual benefits and without imposing a risk to the ecological environment. In this session it was promoted that the ideal nature inclusive design aims to integrate suitable habitats into infrastructure projects, promoting native species and considering conservation objectives. It encompasses concepts such as optimising infrastructure, creating artificial habitats, and maximising positive impacts on biodiversity. It is stated that there are two types of NID, always created by human activity: restorative and creative design. Restorative NID aims to restore and maintain existing natural ecosystems, while creative NID focuses on artificially created ecosystem assets. Restorative design has long-term effects, while creative design is temporary and tied to the lifespan of the infrastructure. It is important to shift the focus from individual species to the overall ecosystem and its functions when considering NID, and determining well in advance what is required and what will be the infrastructure lifetime. Maybe one should shift away from species with commercial interest when really aiming to boost the restoration processes and focus on functional ecosystem assets like habitat creation, spawning, foraging or nursery grounds. Primary production mechanisms are affected differently by climate change in the Baltic Sea and the North Sea. In the North Sea, rising temperatures can lead to increased stratification and difficulty in retrieving nutrients from the bottom layer, potentially decreasing primary production. However, extreme weather events and storms can mix the water column, bringing nutrients to the surface and increasing primary production. Monitoring is crucial of course in the view of biodiversity improvement and in Belgium, monitoring is mandatory for industrial activities, and the industry is responsible for funding it. Policy obligation ensures that the data collected becomes publicly available, enabling transparency and accountability, which is of great value. In the North sea, and actually in general, it is also emphasized that the ecological risks should be taken into account, and the concerns of NGO's not neglected. For example, the discussion touched upon the positive effects of offshore wind energy, but also raises concerns about its potential impact on fish stocks and the need to consider the broader ecological implications. It is suggested that careful calculations and considerations should be made to evaluate the effects on nature and determine the spatial distribution of impacts. The lifetime of ID (Integrated Development) solutions is brought up as an important question. The expected lifetime of such solutions should be considered, especially with ongoing technological developments in various sectors. It is important to balance the need for decarbonization with the current technological capabilities and avoid rushing into less mature technologies.

## Reflections from the Baltic Sea

The projects Olamur and Marco were presented. The projects are part of a major political process, including initiatives like the European Green Deal. The projects involve various activities in the same area, contributing to energy and food security, taking ecosystem services into account. It is stated that restoring kelp forests increases the ecosystem services of the overarching area, while carbon is captured. One important starting point is that the areas of implementation should be mapped. Suggested areas for eg. offshore wind development and vulnerable or spawning areas can be given. Those could also be used in the approach and optimisation of NID. For aquaculture, it is stated that choosing for low trophic aquaculture potentially improves the water quality, which is beneficial for other species and the whole ecosystem. It is underlined that for areas with much competition for space, multi-use can reduce pressure on marine areas. Data collection and monitoring, as well as area mapping is regarded as key. Primary production mechanisms are affected differently by climate change in the Baltic Sea and the North Sea. In the Baltic Sea, rising temperatures lead to increased algal blooms, decomposition of cyanobacteria, and oxygen deficiency, resulting in phosphate release from sediments and increased primary production. Climate change affects prey-predator relationships and can disrupt synchronization between plankton blooms and herring hatching, impacting survival rates and cascading effects through the food web. Uncertainty exists regarding the spatial and temporal displacement of species and the overall impact on the marine spatial planning (MSP) and ecosystem. Nature-inclusive design should consider the environmental context and balance conservation, restoration, and creation of protected areas. Activities should be carefully planned to minimize negative impacts on natural assets and consider the holistic view of ecosystem health. The balance between human activities and protection of natural values is crucial in designing modifications in marine environments. When it comes to the important aspect of monitoring, the flexibility and productivity of monitoring programs are highlighted. It is mentioned that monitoring programs designed a decade ago may not be suitable for the current situation. By allowing the industry to transfer funds to governmental institutions and research institutes, an adaptive and flexible approach can be adopted to address the specific needs of the monitoring programs. The use of advanced technology and automated stations in marine monitoring is seen as a positive development, as it allows for more data collection at a more affordable cost. The importance of open access to data is emphasized. Having access to data from various sources enables society to learn and make informed decisions. Data should be accessible across borders in a coherent manner, allowing for comprehensive analyses and understanding of the impacts.

In general, decommissioning offshore structures is a vivid discussion. Regarding the reuse of offshore construction from the oil industry, there are differing opinions. While some argue for cleaning up and removing large structures, others suggest that reusing certain structures may be more environmentally and economically viable. It is most likely very case-specific. Collaboration with NGO's can be an added value in the decision-making process. Also, a clear cost-benefit

analysis is seen as essential for any marine project to ensure that the benefits outweigh the (nature) costs. Collaboration between different stakeholders is seen as crucial for achieving the balance between energy production, ecological conservation and societal interests.

### 3. Mapping a Maripark process and NID

#### Reflections from the North Sea

In the North sea, the process needed to develop a Maripark was investigated by E&Y. A comprehensive holistic infrastructure for the SBE activities at sea is clear, to facilitate the transition from single to multi-use, the Maripark is envisaged and expected to bring synergy and efficiency. While globally not much examples of multi – uses at sea or a Maripark are available, it seems clear that this will unlock possibilities for the booming offshore business. New value chains across nature food and energy are expected, and in the study the positive impact on economy is considered together with societal well-being, using criteria like job creation, GDP growth and innovation. The development of an offshore business park should be based on standard corporate governance frameworks, expert knowledge and stakeholder involvement from the beginning. Sizes vary from concept to concept, location based. The governmental involvement and the ratio between private and public investment is variable over time, the design will be a multi-year process requiring extensive planning, stakeholder engagement and adherence to sustainability principles to achieve the goals in line with the Green deal and several other EU strategies. Good cooperation between governments is a must, one location to achieve all info and permits is beneficial as well as alignment between regulations. Mariparks can be designed within an offshore wind farm, as well as new offshore infrastructure. The latter is considered the most practical. The selection of the uses within a Maripark done by E&Y is based on the analysis of business potential and technical and financial feasibility, including stakeholder management. It is important to sufficiently consider sustainability of the business and include nature. The uptake of offshore wind and renewable energy is done under the green taxonomy. More should be done by the government for providing stable and supportive financing of sustainability (offshore) because banks follow the traditional structures.

#### Reflections from the Baltic Sea

Making the comparison with determining the optimal locations for offshore wind farms, mapping and zoning are crucial. Enablers (infrastructure availability), economic profitability, societal

impacts, restrictions (eg polluted areas) and the environment should be mapped and taken into account while designing and offshore windfarm and as well a Maripark. The work done by SYKE in this case, is based on previous efforts to map and assess areas, considering both nature and societal aspects. The analysis incorporates the effects of climate change, including the impact on benthic life and the interaction with offshore wind farms, which can be done in an analogue way for a Maripark. The Baltic Sea model (rsp8.5) is used to understand the drastic changes in the Baltic Sea and the importance of species and substrate considerations. The analysis takes into account various data sets and optimizes OWF locations based on multiple categories. The profitability of OWFs is influenced by factors such as cost effectiveness and proximity to populated areas. Societal impacts, including visual and noise impacts, are considered when locating OWFs. Ecosystem-services and environmental impacts are also taken into account. The 30x30 target and climate change analysis are included in the updated version of the work. Restrictions include conservation areas and areas with conflicting uses. Commercial fishing and aquaculture areas are also taken into account. Climate change effects on habitat and species are considered in the analysis. An RCO model is used to analyse changes in temperature, salinity, and phosphorus distribution. The analysis shows significant changes in the Baltic Sea environment by the end of the century. SYKE confirms that changes in species distribution and environmental changes are some of the factors affect the optimal locations of OWFs. Currently analysis shows optimal locations are close to shore, but by the end of century, this will shift to offshore.

Important take-away, mapping is very important, incorporating climate change effects on species and ecosystem level where possible. Societal impacts (i.e. noise and pollution) must be considered and the effect of the infrastructure on the ecosystem and its services should be assessed taking the high pressure on oceans into account while minimizing impact.

## Priorities for multi-use energy parks in group discussions from our CoP members

It is clear that our CoP members are concerned about multi- stakeholder inclusion with all stakes and types of entrepreneurs represented from the beginning. Public-private collaboration and how to optimise it, sufficient and decent research and piloting and upscaling of initiatives (of e.g mariparks), sufficient and transparency in data sharing and optimally hosted by the government, understanding biodiversity and how to access the impact of activities, by collaboration with NGO's . The government is responsible for regulations, permits, and monitoring environmental impact. The data should ideally be available for all, data currently owned by NGO's can ideally be shared with the government and made publicly available for all businesses to consult.

It becomes also clear that the concept of a Maripark is not yet well understood, also amongst the CoP members. This is for our LS an important message to better communicate. The entrepreneurs can bring innovation and influence the MSP. Legal frameworks should in the end

be the key for a good SBE. Clear and tangible market good practices could support the transition towards SBE.

The political goals of a nation should be combined with clear biodiversity targets that can optimally be used by investors. Joint ownership seems crucial. To make a Maripark actually work, the inclusion of traditional entrepreneurs and local communities as fisherman are mentioned as important, as well as clear communication. While assessing suitable locations for offshore infrastructure like a maripark, potential conflicts with wind industry and current/traditional entrepreneurs will arise and should be tackled (ideally beforehand). A maripark is additionally envisaged as a mini MSP. However, an MSP with cumulative environmental impact assessment. More pilots are required and this will eventually involve the insurance and safety sector. The value of the involvement of a design company in the marine sector emphasizes ideally the collaboration between businesses, policy and science and was acknowledged.

## 4. Social acceptance of multi-use and NID

### Lessons of a design company and brand new offshore infrastructure

Nature inclusive design through co-creation, this should be introduced at the initial project stage through involving a mix of stakeholders and experts, aiming to create a rich and impactful energy island. Visualisation and adherence to a clear defined strategy throughout the whole process are key for success. Initially, the project targeted species selection, but due to the presence of relevant experts, it shifted to habitat creation on a larger scale and to add scientific value. The relevant experts for their topic were present and models aligned with different ambitions set for all criteria and goals. For the NID, several zones where a specific NID could be applied were selected by the experts, instead of the initially concrete island. The result involved breeding and resting areas as well as extended intertidal zones. Also, the ecological added value was assessed with the help of experts, however experts in business calculation lacked due to conflicts of interests with tenders.



## Offshore infrastructure, take aways from NGO perspective, North sea

In the scope of nature, sustainable food, nature friendly energy and clean sea, it is important to assess and consider the cumulative impact of the activities. One of recent realisations are to give back nature to land or sea, and focus on restoration. The good environmental state (GES) of major marine nature areas in the Netherlands is not good, there is also a lack of progress in improving, which is picked up by the public. The importance of high economical standards and multi-use to release pressure is highlighted and urgent. One of multi-uses can be aquaculture, beneficial for habitat creation and production of larvae. It should be carefully assessed to avoid competition for food sources and changes in water movement (turbines). There is an urgent need for scientific research and pilots of multi-use, availability of example business cases, defined ownership and responsibility and researched geo-hydrodynamic effects. Use of native species is emphasized, while providing consistent habitats. One should be careful with the ecosystem carrying capacity (monitoring!). For mariparks, oyster and mussel farming as well as seaweed cultivation can be beneficial.

## 5. Conclusions

To move towards a sustainable blue economy, incorporating nature inclusive design is key. The transitions of energy, food and nature should not be moving ahead sole, rather simultaneously and intertwined . NID is important here, and should also at the basis for MSP before further designing and planning.

Rather than focusing on specific commercial valuable species, the focus should lie on the ecosystem as a whole and the use on stepping stone species. Understanding the pressure points of the ecosystem, mapping vulnerable areas, areas for spawning etc, and obtaining knowledge of the limits of the ecosystem in order to carefully plan economic activities which are more in line with the overall bearing capacity.

In order to carefully plan based on a nature inclusive design, clear and transparent data are important for all stakeholders involved. The governments have a vital role here. Furthermore, monitoring and evaluation is of importance to obtain a better understanding of the impact of the economic activities on the environment. There is a need for integration of biodiversity and environmental knowledge since an early stage. Collaboration between governments, entrepreneurs, but also NGO's from the start is needed.

Nature inclusive Design should be incorporated into MSP as a tool for

- Understanding pressure points/spots in the ecosystem (related to the EBA workshops) to understand the limits of the ecosystem
  - o Pressure points , such as maping vulnerable areas
  - o Obtain the data on ecosystem changes due to CC and to understand the ecosystem limits for economic activities
- This in relation to habitat creation (spawning areas etc), and restoration as basis for planning, from there develop and design the roadmap for economic activiteis as a way for NID
- Mapping the pressure points, areas for restoration and protection and link them to economic activities.
- Collaborate with stakeholders from the beginning is key; involve NGO's for their ecosystem knowledge, and make use of data to understand the limits of the ecosystem before starting to design
- NID is not only related to a certain activity, it should be incorôrated in the design from the start and considers the environmental context to carefully plan restoration, protection and activities in time and space
- There is a need for communities to find the knowledge and share experience in order to have the right stakeholders from the start
- Need for balancing the energy transition more in line with the nature transition, to monitor the impact

- Need for monitoring of impact of activities and the possibility of incorporat flexibility in the process to adapt to future changes in the climate and ecosystem. But also to incorporatate future new knowledge

# Annex 1 - Program

<b>June 15, Thursday 9:00-17:00</b>	
<b>Session 4 – MSP for sustainable blue economy – A concept of Maripark, multi-use and NID for SBE</b>	
<b>9:00 - 09:10</b>	Welcome words on behalf the Finnish Ministry of the Environment ( <b>Tiina Tilman</b> , Finnish Ministry of the Environment)
<b>9:10 - 09:50</b>	LS SBE introduction & Maripark concept - 3 current global transitions and a concept of a Maripark. <b>Marijn Rabaut</b>
<b>Part I – Climate Change and NID in MSP</b>	
<b>09:50 - 10:10</b>	Ecological perspective, NID, multi-use & MSP? <b>Prof. Steven DeGraer</b>
<b>10:10 - 10:30</b>	Exploring future use and climate scenarios – OLAMUR project. <b>Prof. Oivind Bergh</b>
<b>10:30 - 11:00</b>	Break
<b>11:00 - 12:00</b>	<b>Interactive session – Panel discussion</b> Panel discussion on the data needed, climate change, species and ecosystems and NID.
<b>12:00 - 13:30</b>	Lunch
<b>Part II - mapping a Maripark process</b>	
“Designing the route to a maripark with NID”. What steps need to be taken from an ecological perspective?	
<b>13:30 - 13:50</b>	Approach to designing nature inclusive windfarm, mapping and NID. <b>Juva Katriina</b> , SYKE
<b>13:50 - 14:10</b>	Designing a maripark. <b>Rogier Steenis</b> , EY
<b>14:10 - 15:10</b>	<b>Interactive session</b> on how to incorporate NID in a Maripark?
<b>15:10 – 15:30</b>	Break
<b>Part III – Nature inclusive design in the broader society (societal acceptance)</b>	
Nature inclusive design (NID) is in full development. While some people perceive marine ecosystems as pristine, others consider active restoration indispensable. Adapting human constructions to improve/accelerate this restoration is promising but includes risks at the same time. Active restoration onshore is commonly accepted, but the relatively new idea of NID at sea makes that public acceptance is sometimes weak.	
<b>15:30 - 15:50</b>	How to include social acceptance in offshore infrastructure. <b>Timothy van Agt</b> , ORG
<b>15:50 – 16:10</b>	How to include social acceptance of a maripark from an NGO perspective. <b>Heleen Vollers</b> , Stichting de Noordzee.
<b>16:10 – 17:00</b>	<b>Interactive session</b>
<b>17:00 – 17:05</b>	<b>Part IV Closing remarks</b>
<b>Networking session with refreshments</b>	

