

Marine Spatial Planning Solutions in the Open Sea of Latvia

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Abstract

Latvia's Maritime Spatial Plan 2030 (MSPplan 2030) is the first-generation national planning instrument covering inland waters, the territorial sea, and the exclusive economic zone (EEZ), intended to coordinate sectoral interests and support sustainable “blue” development while reducing spatial conflicts. The first interim evaluation of MSPplan 2030 (covering 2019–2023) published in October 2024 highlights the need for more transparent, analytically robust methods to assess cross-sectoral conflicts and synergies and to strengthen the evidence base for plan amendments. This proposes a conceptual framework that applies a data-driven Framework for Conflict and Synergies (FOCS) to support decision-making in Latvia's open sea, with an application focus on the Kurzeme offshore area and its interfaces with the broader EEZ. Building on the EU Maritime Spatial Planning Directive's objectives of conflict reduction and synergy creation, FOCS evaluates spatial interactions through three indicator groups: distance (spatial proximity of uses), importance (economic, social, and environmental value), and governance (rights, restrictions, and management regimes). The approach integrates GIS-based mapping of sea uses and sensitive environmental features with mathematical modelling, multi-criteria decision analysis, and stakeholder/expert judgement, and further introduces a sequencing logic for priority uses to avoid incompatible overlaps of equal status. FOCS is designed to be implementable within MSPplan 2030's amendment cycle by providing repeatable, transparent diagnostics of conflict hotspots and synergy opportunities, and by linking spatial recommendations to governance in marine cadastre concepts for clearer management of marine rights and responsibilities.

Keywords: maritime spatial planning(MSP), framework for conflicts and synergies (FOCS), GIS, governance, marine cadastre

Introduction

Marine spatial planning (MSP) in the open sea of Latvia is an essential framework for sustainable marine resource management, balancing economic development and environmental protection (Kaminskis et al., 2022). It is significant in the Baltic Sea context, with its cultural and ecological diversity supporting human activities for centuries. MSP in Latvia addresses ecosystem management complexities and competing interests, exemplifying integrated coastal and marine governance in Europe. Formal MSP frameworks in Latvia are influenced by EU directives, notably Directive 2014/89/EU, mandating integrated management. Latvia's national plan focuses on sustainable resource use, incorporating ecological, economic, and social objectives. Public participation is key, involving stakeholders for ownership and accountability. A quote from Arthur Charles Clarke highlights ocean dominance: “How inappropriate to call this planet Earth when it is quite clearly Ocean” (CEC, 2006). Europe's coastline spans 70,000 km across two oceans and four seas (CEC, 2007a). The EU's Integrated Maritime Policy (IMP) addresses governance, legal, and spatial issues for marine cadastre development (Ng'ang'a et al., 2001; CEC, 2007a). IMP promotes cross-policy cooperation (EC, n.d.), with programs like Blue Growth, marine data, MSP, surveillance, and sea basin strategies relying on innovation (EC, n.d.). This aligns with UN SDG 14 for ocean conservation (UN, 2015). MSP in Latvia has evolved, reflecting maritime heritage and sustainable coastal needs (Kaminskis et al., 2022). The Baltic Sea's cultural tapestry underscores heritage and sustainability. EU directives promote integrated

management; Directive 2014/89/EU grounds MSP. Latvia's plan integrates objectives; public participation started in 2014 via working groups. The 2010 Marine Environment Law reinforces ecosystem approaches for balanced development. Baltic case studies highlight cultural-MSP interplay, emphasizing integration. MSP advances European Green Deal goals for sustainability (European Green Deal, 2019). Marine cadastre concept is known (Neimane et al., 2021a), developed in various countries. A 2020 survey shows low cadastre relevance to SDG 14 (PCC, 2020). We compare Latvia and Lithuania's marine cadastre policies through EU IMP (Kaminskis et al., 2022), focusing on Blue Growth and MSP. Geography and cooperation influence implementation. Focus on green development: wind farms, protected areas, fishing, tourism. Developments include fixed parameters, GIS, augmented reality, MSDI with high-precision measurements (Kaminskis et al., 2022). MSP in Latvia evolves for sustainable resources, harmonizing activities. Framework integrates environmental-economic policies. Collaboration ensures participation. Kurzeme pilot develops Coastal Plan, managing conflicts via stakeholder meetings. Challenges: regulatory complexities, coordination needs, equity for communities. Interim evaluation shows limited conflict analysis, unclear methods, outdated info (Interim Evaluation of MSPplan 2030, 2024). This study applies FOCS for cross-sectoral conflict resolution in open sea and Kurzeme. As shown in Fig. 1, Latvia's boundaries are cartographically presented.

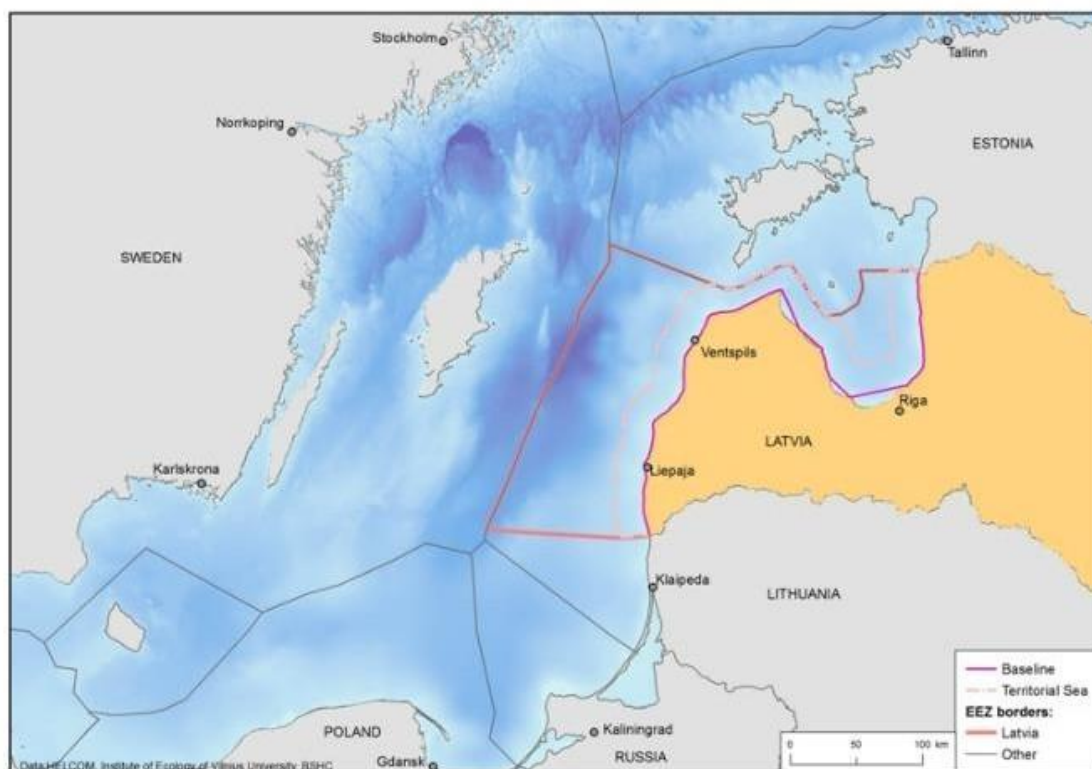


Fig. 1. Boundaries of Latvia – baseline, 2 km zone and the boundaries of territorial waters and the EEZ presented cartographically. Source: MSPplan 2030.

https://www.varam.gov.lv/sites/varam/files/inline-images/msp_area_latvia_06_05_2016_800_600.jpg

As illustrated in Fig. 2, MSP context includes land activities, policy, conflict management.

Land Management Activities



Fig. 2. Maritime Spatial Planning (MSP) Context. Diagram showing "Land" Management Activities, Policy Development, Land Information Management, Monitoring, Enforcement, Land Administration, Land Development Activities, Conflict Management. MSP as a tool for preventing and mitigating maritime conflicts. MSPplan 2030: First generation planning document for Latvian sea waters. Interim Evaluation: Published 1 October 2024, serving as the basis for amendments.

As depicted in Fig. 3, interim evaluation insights highlight limited analysis, methodological gaps, outdated info.

Limited Cross-Sector Analysis	Methodological Gaps	Outdated Information
Existing plans lack in-depth examination of conflicts and synergies.	Unclear methodology weakens the reliability of conflict/synergy identification.	Reliance on older literature can result in inaccurate real world analysis.

Fig. 3. Interim Evaluation Insights. Limited Cross-Sector Analysis: Existing plans lack in-depth examination of conflicts and synergies. Methodological Gaps: Unclear methodology weakens the reliability of conflict/synergy identification. Outdated Information: Reliance on older literature can result in inaccurate real world analysis.

Notwithstanding the existence of MSPplan 2030 and related planning instruments, the Interim Evaluation 2019–2023 identified methodological limitations regarding cross-sectoral conflict assessment, insufficient analytical transparency, and limited integration of governance-related indicators. Therefore, this study develops and conceptually demonstrates the Framework for Conflict and Synergies as a structured approach for evaluating maritime interactions in Latvian sea waters.

Data and Method

Area of interest: Latvia's open sea, Kurzeme offshore, EEZ interfaces in Baltic Sea. Data: MSPplan 2030 spatial data, GIS mappings, EU/national indicators, governance from laws (Marine Law 2010, Directive 2014/89/EU).

To address the methodological limitations identified in the Interim Evaluation of MSPplan 2030 (2024), the study develops the FOCS as a repeatable analytical structure for assessing

cross-sectoral maritime interactions. The framework combines GIS-based spatial analysis, mathematical modelling inspired by gravity and magnetic field theories, multi-criteria decision analysis (MCDA), stakeholder and expert judgement, and governance assessment principles linked to marine cadastre concepts (Ng'ang'a et al., 2001; Neimane et al., 2021a).

The analytical workflow integrates spatial data overlay analysis, identification of overlapping maritime uses and environmentally sensitive areas, and assessment of interactions using distance, importance, and governance indicators. Distance indicators evaluate the spatial overlap intensity between maritime uses, importance indicators assess environmental, economic, and strategic relevance, while governance indicators analyse the compatibility of legal frameworks, rights, restrictions, and responsibilities (3Rs).

The conceptual analytical structure of the framework is expressed as:

$$\text{FOCS} = w_1D + w_2I + w_3G \quad (1)$$

where

D represents distance-related interaction scores,

I reflects strategic and environmental importance,

G indicates governance compatibility, and w represents weighting coefficients assigned through stakeholder and expert evaluation.

The framework integrates Ecosystem Approach (EA) principles to balance maritime development and environmental protection (Ehler and Douvere, 2009). Additional support was obtained from Baltic Sea case studies, Sea2Land Navigator, and cumulative impact assessment approaches. Environmental assessment data were used to identify biodiversity-sensitive areas and support informed spatial planning decisions. The governance dimension is linked to marine cadastre principles, integrating maritime boundaries, legislation, environmental restrictions, and spatial uses within a multipurpose governance structure (Dale and McLaughlin, 1988).

Results

Our analysis shows a strong potential for the FOCS framework in identifying conflict hotspots and synergy opportunities in Latvia's open sea. The examination of maritime spatial planning (MSP) in Latvia includes various case studies that highlight the challenges and successes in community participation, land-sea interactions, and integrated coastal management. These case studies provide valuable insights into the application of theoretical frameworks and methodologies in real-world contexts, allowing for a better understanding of how MSP can be implemented effectively. One significant case study focuses on the challenges of community participation and representation within the Latvian MSP framework. It employs a case study approach using semi-structured interviews and an analysis of planning documents to reveal the specific barriers faced by local communities. This study applies six principles of equitable and just planning, assessing their effectiveness in enhancing participation in MSP processes. Another case study investigates land-sea interactions at the sub-national level in Latvia, particularly through the development of the Coastal Thematic Plan for the Kurzeme region. This region is recognized for its resource-rich coastal areas, which are crucial for integrated development. The study emphasizes the necessity of comprehensive solutions to manage conflicts arising from diverse stakeholder interests. It also evaluates how tools like the Sea2Land Navigator can guide existing planning documents and enhance multi-level governance in the area. A notable methodology developed in one of the case studies provides guidelines for municipalities and planning authorities to improve integrated coastal and marine planning processes. This methodology is informed by surveys targeting Latvian coastal municipalities and includes guidelines on incorporating land-sea interactions into local

planning efforts. The outputs aim to support local decision-makers and ensure that integrated approaches are adopted effectively. The development of open-source tools such as BSII-CAT (Baltic Sea Impact Index - Cumulative Impact Assessment Tool) and PlanWise4Blue is another crucial aspect of Latvia's MSP initiatives. These tools are designed for assessing cumulative impacts and economic effects, respectively. They facilitate transparency and accessibility in planning processes by allowing stakeholders to visualize planned sea uses and browse MSP designations by sectors, ultimately enhancing collaborative planning efforts. The Kurzeme region's pilot project demonstrates the potential of transboundary cooperation in MSP. The collaborative efforts led by the Kurzeme Planning Region emphasize the need for stakeholder engagement and knowledge co-creation to address complex maritime issues. This case study reflects on the importance of building trust among partners and highlights successful cross-border initiatives that have informed national planning solutions. Spatial Data: Mapping of maritime uses and environmental features. Model Application: Applying the FOCS model to spatial data. Insight Generation: Identifying potential conflicts and synergies. Boundaries of Latvia – baseline, 2 km zone and the boundaries of territorial waters and the EEZ presented cartographically. The conceptual application of the FOCS framework across selected Latvian MSP case studies enabled classification of key interaction types, governance challenges, and potential conflict or synergy outcomes. The results are summarized in Table 1.

Table 1. Conceptual application of the FOCS framework in Latvian MSP case studies.

MSP aspect / case study	Main analytical focus	FOCS application	Key identified challenge	Potential outcome
Community participation in MSP	Stakeholder representation and equitable planning	Governance indicator assessment	Limited inclusion of local communities	Improved stakeholder transparency
Kurzeme Coastal Thematic Plan	Land-sea interactions and integrated development	Distance and governance indicators	Overlapping stakeholder interests	Better coordination of maritime uses
Sea2Land Navigator application	Multi-level governance support	Spatial interaction analysis	Fragmented planning approaches	Improved planning integration
Municipal coastal planning methodology	Local coastal governance	Governance compatibility analysis	Weak integration of land-sea interactions	More effective local MSP implementation
BSII-CAT and PlanWise4Blue tools	Cumulative impact and economic assessment	Spatial and importance indicators	Limited analytical transparency in existing MSP	Improved decision-support capacity
Transboundary MSP cooperation in Kurzeme	Cross-border maritime governance	Governance and stakeholder analysis	Institutional coordination complexity	Enhanced Baltic Sea cooperation
Offshore wind and fisheries interactions	Spatial overlap assessment	Distance + governance indicators	Conflict between sea uses	Conflict hotspot identification
Offshore wind and Natura 2000 areas	Environmental compatibility assessment	Importance + governance indicators	Environmental restrictions and overlap	Identification of critical conflict zones

The results indicate that governance-related indicators substantially improve transparency in MSP conflict assessment compared to descriptive planning approaches currently used in MSPplan 2030 documentation.

Despite these advancements, the MSP process in Latvia faces challenges such as regulatory complexities, the need for improved inter-institutional coordination, and ensuring equitable stakeholder participation. Recent case studies have highlighted both the successes and barriers in community engagement, land-sea interactions, and integrated coastal management, emphasizing the necessity for collaborative approaches to address these challenges. The ongoing evolution of MSP in Latvia is expected to align with the goals of the European Green Deal, reinforcing commitments to sustainability and climate resilience while navigating the increasing pressures of climate change and resource depletion (European Green Deal, 2019).

Conclusion

We conclude that the FOCS framework enhances decision-making in Latvia's marine spatial planning by providing transparent diagnostics and linking spatial recommendations to marine cadastre governance. Marine spatial planning (MSP) in Latvia is poised to evolve significantly as it addresses the increasing complexities of sustainable ocean management. The integration of an ecosystem-based approach is anticipated to enhance the sustainable development and growth of maritime and coastal economies, while simultaneously ensuring the protection of marine biodiversity. This alignment is essential in navigating the future challenges posed by climate change, resource depletion, and competing marine uses. The conceptual application of the framework across selected Latvian MSP case studies enabled identification of conflict hotspots, governance-related incompatibilities, and potential coexistence opportunities between maritime sectors. The highest interaction intensity was identified in offshore wind development areas overlapping with fisheries and environmentally protected marine territories. Future MSP initiatives will focus on identifying various maritime spatial development options that can adapt to shifting environmental and socio-economic conditions. Scenarios under the Use of the Sea framework are crucial in this regard, as they allow stakeholders to explore strategic alternatives for maritime activities. The integration of distance, importance, and governance indicators improved analytical transparency compared to descriptive approaches currently used in MSPplan 2030 documentation. In particular, governance-related indicators and marine cadastre principles enabled a more comprehensive assessment of maritime interactions beyond purely spatial overlap analysis. By employing such frameworks, planners can facilitate informed decision-making and promote long-term sustainability in marine areas. An integral part of advancing MSP in Latvia involves fostering robust public participation mechanisms. Future planning efforts will emphasize inclusive and equitable participation among coastal communities and other stakeholders. Methods such as inter-institutional working groups, public consultations, and discussion forums will play a vital role in gathering diverse perspectives and fostering collaboration across sectors. This participatory approach is essential for ensuring that the multidimensional sustainability aims of MSP are met. The incorporation of innovative technological tools, such as the open-source applications BSII-CAT and PlanWise4Blue, will enhance the capacity for assessing cumulative impacts and economic implications of marine spatial planning. These tools will support planners in making data-driven decisions, thereby improving the effectiveness of MSP processes. Additionally, digital mapping services like BASEMAPS will provide comprehensive overviews of planned sea uses, enabling better stakeholder engagement and coordination. Looking ahead, there is a need to streamline regulatory frameworks to support the efficient implementation of MSP. Simplifying administrative processes and enhancing coordination among relevant institutions will be crucial in overcoming existing regulatory hurdles. These improvements will facilitate a more agile and responsive planning environment, capable of adapting to the dynamic nature of marine resource management. It should also be noted that in the case of Latvia, the authors of the article see the State Land

Service as a key player, specifically in the practical implementation of the maritime cadastre. Key Takeaways and Next Steps: 1. Refine FOCS: Improve the FOCS methodology based on initial results. 2. Engage Stakeholders: Involve stakeholders in the validation and refinement process. 3. Integrate into MSPplan: Incorporate FOCS into the MSPplan 2030 amendment process. Expected Outcomes and Policy Implications: 1. Sustainable Development 2. Informed Decisions 3. Improved MSP. Recommendations include refining FOCS based on stakeholder feedback, integrating it into MSPplan amendments, and exploring further applications in Baltic Sea transboundary cooperation.

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