

Beyond Digitalisation in Marine Spatial Planning

Integrating local and Indigenous
knowledge in the North Atlantic



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Executive summary

This report presents the outcomes of the writing workshop "Integrating Local Knowledge and Data into Marine Spatial Planning and Management in the North Atlantic", held in Tórshavn, Faroe Islands, in September 2025. The workshop brought together researchers and practitioners from across the North Atlantic region to explore how Indigenous and local knowledge (ILK) can be better integrated into increasingly digital marine spatial planning (MSP) processes. Through a collaborative writing process, participants developed case studies from their own contexts and worked together to identify key learnings.

The cases, spanning Norway, Iceland, the Faroe Islands, Shetland, Greenland and England, ground the discussion in the realities of planning practice across the region and inform a set of reflections on three interconnected challenges: how the design of MSP processes shapes opportunities for ILK integration; how responsibilities for knowledge integration are assigned; and how the complexity of defining who is local affects whose knowledge is recognised and incorporated.

The report concludes with key messages organised around three themes, aimed at supporting more just and equitable integration of ILK into increasingly digital MSP processes.

1. **FROM OUTPUT-FOCUSED TO PROCESS-ORIENTED PLANNING:** MSP should be reframed as a continuous, purpose-driven process with structures for inclusive and iterative engagement embedded throughout.
2. **STRENGTHENING INSTITUTIONAL CAPACITY:** Planning authorities need clearer guidance, stronger reflexivity around how digital tools and data shape planning outcomes and greater collaboration across the region.
3. **IDENTIFYING LOCAL ACTORS WHILE EMBRACING CHANGE AND CONTINUITY:** Improved ILK integration requires continuous efforts to understand who is local, balance local and national interests and monitor change over time.

1. Introduction

This report forms part of the project "[Local knowledge in marine spatial planning, green transition and digital transformation](#)" (2024–2026), which examined how Indigenous and local knowledge (ILK) and local data can be better included in marine spatial planning (MSP) processes. As these processes become increasingly reliant on digital tools and data, there is growing concern that knowledge held by Indigenous and local communities, often not captured in digital formats, may be overlooked. The project sought to address this challenge by exploring the opportunities and barriers to integrating ILK into more digital planning systems and identifying what it takes to create more equitable and just processes. The research focused on coastal areas across the North Atlantic region, including Iceland, the Faroe Islands, Greenland, Norway, Sweden, Denmark and Scotland. The project was funded by the Working Group for Fisheries (AG-Fisk) under the Nordic Council of Ministers.

Box 1:

This research project built on multiple outputs and activities:

- A **SYSTEMATIC LITERATURE REVIEW** examining existing research on MSP, ILK and digital transformation, which formed the basis of the report "[Integrating local knowledge and data in marine spatial planning and management - challenges and opportunities in the North Atlantic region](#)".
- A **TWO-DAY WORKSHOP HELD IN EDINBURGH**, Scotland, in January 2025, bringing together researchers, practitioners, planners and local community representatives from the North Atlantic region to examine current MSP approaches, practices of ILK integration and the use of digital tools.
- A **ONE-DAY ONLINE WORKSHOP** held in June 2025, involving experts from the region and focusing on evaluating project progress and shaping the direction of outputs.
- A **TWO-DAY HYBRID WRITING WORKSHOP** held in Tórshavn, Faroe Islands, in September 2025, gathering practitioners and researchers to collaboratively develop case studies and key learnings. This workshop forms the foundation of this report.
- A **POLICY BRIEF** summarising the key findings and messages from the project: "[Integrating Indigenous and local knowledge in marine spatial planning – seven messages from the North Atlantic](#)".
- Supporting this work, a **STAKEHOLDER ADVISORY BOARD** has been actively involved throughout the project.

1.1 Workshop background

In September 2025, a workshop was held in Tórshavn, Faroe Islands, serving as the culminating event of this research project. As the third in a series, the workshop was organised jointly by the University Centre of the Westfjords, Nordregio and the University of the Highlands and Islands and hosted by the University of the Faroe Islands. It brought together researchers and practitioners to reflect on how increasingly digital MSP processes can be designed to integrate local voices in more just and equitable ways.

Through a collaborative writing process, the workshop aimed to:

- develop a shared understanding of the challenges and opportunities of integrating ILK into increasingly digital MSP processes
- develop case stories and co-produce key messages from across the region
- exchange knowledge and experiences across the North Atlantic countries.

The workshop was conducted in a hybrid format on 4–5 September 2025, bringing together participants from across the North Atlantic region both in person and online. Participants were selected based on geographical location, expertise and engagement in a previous workshop held in Scotland, January 2025.

Both days combined presentations, group discussions and collaborative writing sessions, with moderated discussions and small-group work ensuring active participation across both in-person and online formats. Participants developed case studies from their own contexts and collaboratively developed key learnings, drawing on academic insights and practical experiences from across the region. The draft report was circulated for final edits by 30 September 2025. A full schedule and list of participants are provided in Appendices 1 and 2.

1.2 Target group

This report is intended for marine planning authorities and professionals working in and with coastal communities across the North Atlantic region that are seeking to navigate the increasing digitalisation of MSP. It will be of particular interest to those responsible for integrating Indigenous and local communities into planning and management processes, including local authorities tasked with implementing national decisions at the local level. The report will also be of relevance to researchers working on participation and justice in marine governance, as well as to Indigenous and local communities and their representatives engaged in and affected by these processes.

2. Background

This section provides the conceptual foundation for the report, introducing the key topics and discussions that shaped the workshop. It covers MSP and its digital transformation, the nature and diversity of ILK and the relationship between the two. It concludes with a set of justice and equity principles that were used as a framework to guide participants in developing and reflecting on their case studies.

2.1 Marine spatial planning

The marine areas in the North Atlantic have undergone a dramatic transformation over the past century. Where fishing vessels and shipping routes once dominated relatively open seas, coastal states now manage an increasingly crowded marine environment. Offshore wind farms, aquaculture installations, telecommunication cables, oil and gas platforms, marine protected areas and expanding tourism and marine traffic all compete for the same waters. Waters that have also sustained coastal communities for generations. (Jouffray et al., 2020)

In response to the increasing demands on marine space, marine or maritime spatial planning (MSP) has emerged, commonly defined as *"the public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process"* (Ehler & Douvère, 2009, p.18).

Across the North Atlantic, countries have taken different approaches to MSP. The EU Maritime Spatial Planning Directive (MSPD; Directive 2014/89/EU, 2014) requires Member States to establish formal planning frameworks. This has led Denmark and Sweden to form national plans in response to this requirement, while other countries in the region have pursued their own approaches. Scotland has developed both national and regional plans, with the latter explicitly designed to capture priorities at the local level. Iceland has adopted a more targeted approach, developing coastal zone plans in areas experiencing growing pressures, particularly from aquaculture and tourism. Norway's integrated management plans blend spatial planning with a broader marine strategy across three marine areas. The Faroe Islands and Greenland have maintained licensing-based marine management systems, managing activities on a case-by-case basis.^[1]

1. Further information on national MSP approaches can be found in earlier project work (Eriksson et al., 2026).

Box 2:

Countries have adopted varied governance approaches to managing marine spaces. For clarity, this report uses the term "MSP" as an umbrella term to encompass this diversity, while recognising that not all North Atlantic countries have developed formal MSP frameworks. Still, the insights and lessons presented in this report remain relevant to broader marine management processes.

2.2 Digital transformation of MSP

MSP processes in the North Atlantic region are becoming increasingly data-driven, reflecting a broader shift towards digital transformation (Kraus et al., 2021; Nadkarni & Prügl, 2021; Verhoef et al., 2021). Driven by the need for more efficient, adaptive and integrated marine governance, this shift responds to ambitious climate targets, strengthened conservation policies and increasing demand for ocean resources for both food and energy production (Blæsbjerg et al., 2009). Accordingly, advances in digital technologies support various stages of MSP, from baseline assessments and data analysis to stakeholder engagement and implementation. By generating and processing large volumes of data, digital technologies enable planners to streamline workflows and address growing pressures on marine ecosystems. Consequently, tools like Geographic Information Systems (GIS) and geospatial mapping tools (e.g., Koehn et al., 2013; Meaden, 2009; St. Martin & Hall-Arber, 2008), decision support systems (DSS; e.g., Bonnevie et al., 2022; Power & Sharda, 2009), online geoportals (Davret & Trouillet, 2024), visualisation tools, data infrastructures and, more recently, models utilising artificial intelligence (AI; Andrews et al., 2022) are central to efforts to synthesise various types of ecological and socio-economic data, model future scenarios and enhance transparency and collaboration throughout the planning process.

Within the field of MSP, there is growing recognition of the opportunities that digital tools offer. This is particularly evident in the evolution of mapping activities, with conventional, paper-based methods being replaced by advanced visualisation tools, GIS and interactive mapping platforms to support decision-making (Koehn et al., 2013; St. Martin & Hall-Arber, 2008). Beyond just visualisation, participatory mapping and online consultation platforms are frequently cited as mechanisms that can broaden stakeholder engagement, enhance transparency, improve access to planning processes and democratise information (Koehn et al., 2013). Similarly, decision support systems now enable improved scenario analysis and ex-ante

evaluations (Power & Sharda, 2009), while geoportals and data-sharing platforms enhance coordination across jurisdictions and institutional scales (Davret et al., 2024; Gutierrez et al., 2025). Digital twin technologies also show growing potential, offering dynamic, interactive models that integrate diverse data streams to simulate real-world environments (Miedtank et al., 2024; Tzachor et al., 2023). Additionally, although AI is not yet widely applied in MSP, it is gaining attention for its potential to support predictive modelling and long-term scenario planning, particularly through emerging tools such as GeoAI (Andrews et al., 2022; Bakker, 2022; Kitchin, 2014; Wang et al., 2024). In many contexts, these tools have enabled planners to work across local, national and transboundary levels, helping to manage and plan increasingly complex marine environments.

At the same time, digitalisation of MSP processes introduces new challenges and responsibilities. While research shows that digital tools offer new and powerful means for collecting, storing, analysing, visualising and sharing data (Andrews et al., 2022; Kitchin, 2014), findings suggest that the increasingly data-driven nature of planning raises important questions. These include what types of data are included, how they are interpreted, who owns them and whose perspectives they represent. The integration of digital tools therefore requires not only technical capacity but also awareness among planning authorities of how tools and data shape planning.

Moreover, as reliance on digital tools grows, concerns arise about what happens to forms of knowledge that are not typically digitalised, such as the perceptions, experiences and practices of Indigenous and local communities (Gandarillas & McCall, 2023; Pennino et al., 2021). Digitalisation may reinforce power imbalances by prioritising technical and measurable data, while simultaneously creating barriers for those without access to the necessary resources, competence or time to participate effectively in MSP processes (Saunders et al., 2020; Tafon et al., 2022). As such, without deliberate efforts to integrate ILK, these processes risk overlooking local perspectives that are essential for inclusive and context-sensitive planning (Gandarillas & McCall, 2023; Pennino et al., 2021; Said & Trouillet, 2020).

2.3 Indigenous and local knowledge

Local knowledge (LK) is diverse and does not have a single definition, varying in meaning across countries and contexts. Generally, LK is described as the wisdom, skills and understanding that people living in a specific location and community have developed over time through direct interaction with the environment around them. LK is therefore understood to include spatially specific information about the local context, including aspects such as the culture, local demands and needs, politics and functions of the local economy (Loch & Riechers, 2021). While much of the literature frames LK in relation to Indigenous communities, it is important to note that LK also encompasses local communities that do not fall under Indigenous

legal frameworks (UNESCO-IOC & UNESCO-LINKS, 2024). In a North Atlantic context, this report therefore recognises that LK includes both Indigenous peoples, such as the Sámi and Inuit, and communities that do not identify as Indigenous or assert Indigenous rights, but which possess specific knowledge of the local environment and practices (e.g. local fishers or citizens).

Over time, LK has been categorised in various ways to reflect differences across disciplines, countries and communities. Common terms include Indigenous and Local Knowledge (ILK), Traditional Ecological Knowledge (TEK), Local Ecological Knowledge (LEK), Fishers' or Farmers' Knowledge (FK) and Traditional Knowledge (TK) (see [Figure 1](#)). These share the characteristic of generational and cultural transmission of knowledge but differ in the type of knowledge transmitted. FK involves the transfer of experienced-based knowledge, while LEK and TEK focus specifically on local ecosystems and ecological knowledge. In contrast, ILK adopts a holistic approach, encompassing all practices, beliefs and knowledge. Reflecting this diversity, the UN and UNESCO recommend using "Indigenous and Local Knowledge" to acknowledge both Indigenous rights under the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the contributions of other local communities. ILK is described as *"holistic, territorialised, diversified and evolving knowledge (...) [that] can flourish within all kinds of long-established communities experiencing histories of interaction with their natural surroundings"* (UNESCO-IOC & UNESCO-LINKS, 2024, p.11). Thus, for the purposes of this workshop and report, the term ILK is used.

While this definition highlights ILK's holistic and evolving nature, it is also important to recognise that Indigenous and local communities continuously adapt to economic, environmental and social changes, including shifts in population through in- and out-migration, evolving job opportunities and changes in transport and accessibility (Bjarnason, 2021; Heleniak & Gassen, 2020; Hovgaard et al., 2024). Climate change further drives transformations that affect livelihoods, resource use and local practices. These dynamics are evident in specific groups such as fisheries, where many coastal communities have moved from small-scale, locally embedded operations to large-scale commercial practices (Nielsen et al., 2021), reshaping both local economies and the knowledge associated with them. Such ongoing changes continually influence collective understandings of a place, emphasising that ILK is not static but evolves in response to shifting conditions. Defining and applying ILK in MSP therefore necessitates reflection on how to account for these evolving circumstances and the dynamic context in which knowledge is produced (Beaty et al., 2024; Flannery et al., 2017).



FIGURE 1: Definitions of local knowledge adopted from Loch and Riechers (2021), illustrated by Eriksson et al. (2026).

2.4 Integrating Indigenous and local knowledge into MSP

While there is growing recognition of the value of involving Indigenous and local communities in MSP processes, concerns remain about whether these processes are just and equitable in practice (Flannery et al., 2017). Planning decisions, often taken through top-down approaches, shape who benefits, who bears the costs and whose voices are given weight in decision-making. Questions therefore arise not only from the distribution of outcomes, but also from the procedures through which decisions are made and the recognition (or lack thereof) of diverse knowledge systems. To address these challenges, scholars have applied various justice-related concepts, including procedural justice (fairness in decision-making processes), distributive justice (fairness in the distribution of benefits and burdens), recognitional justice (acknowledging and respecting different worldviews and knowledge systems), community acceptance and Social Licence to Operate (SLO), among others (Beatty et al., 2024; Rot et al., 2025; Schmitt & Weck, 2024; Smith, 2018; Stronge et al., 2023).

Drawing on these justice concepts, the workshop aimed to support reflection on how ILK can be better integrated into increasingly digital MSP processes. To provide a practical framework for discussion, seven guiding principles were developed based on the justice literature outlined above. These principles translate broader justice concepts into concrete considerations for assessing ILK integration into digital MSP processes. Additionally, these principles are intended to be adaptable across contexts. Participants were encouraged to interpret and discuss justice and equity in ways that resonate with their own experiences and realities, considering how the principles might be applied or adapted in their specific settings and how they could inform the development of cases from the region.

Accordingly, each principle has been interpreted for the purposes of this workshop as a practical guide, rather than as a universal definition, acknowledging that disciplines may define them differently.

TABLE 1: Principles of justice and equity. Author’s own elaboration.

PRINCIPLE:	DEFINITION FOR WORKSHOP:
Legitimacy	<i>Ensuring that more digital MSP processes are perceived as fair, justified and locally appropriate, thereby fostering acceptance.</i>
Credibility	<i>Ensuring that digital tools and datasets used in MSP processes are accurate, reliable and transparent, fostering confidence in the information and decisions derived from them.</i>
Trust	<i>Fostering conditions in which communities feel secure and confident sharing their knowledge.</i>
Ongoing dialogue	<i>Avoiding one-off consultations by maintaining continuous engagement throughout processes.</i>
Reciprocity	<i>Providing tangible benefits to communities in return for sharing their knowledge in MSP processes.</i>
Cultural integrity	<i>Ensuring that ILK is represented in ways that preserve its meaning, context and cultural grounding, rather than reducing or decontextualising it.</i>
Responsiveness	<i>Adapting tools and processes to local contexts, allowing for flexibility and responsiveness to specific community needs and environmental conditions rather than imposing a one-size-fits-all template.</i>

3. Challenges

This section reflects on the key challenges identified through the project's earlier work, further developed through the case studies presented in this report. Drawing on participants' experiences and insights from across the region, it identifies three interrelated challenges at the intersection of digitalisation and ILK integration in MSP processes: (1) the way digital systems shape the design and structure of planning processes; (2) the unclear assignment of responsibility for collecting, validating and incorporating ILK within increasingly data-driven processes; and (3) the ways in which digital tools influence how knowledge is identified, interpreted and valued.

3.1 Planning purpose shapes the use of digital tools

MSP serves multiple purposes. Authorities may aim to allocate space efficiently, mediate conflicts, promote economic growth, protect ecosystems or foster social equity, often combining these aims in varying ways. In turn, how countries interpret and operationalise these purposes differs significantly, shaped by political traditions, legal frameworks, institutional legacies and prevailing discourses. The role of ILK is therefore framed differently in each context, with governments communicating its purpose and involvement to varying degrees. For instance, workshop examples from the North Atlantic region showed that, in some countries, governments have communicated the purpose of planning transparently and inclusively, while in others, planning goals have been presented less clearly or more strategically, influencing stakeholder trust, perceptions of legitimacy and the sense of fairness.

During the early stages of MSP, governments and designated authorities shape the overall direction of planning by setting principles and timelines, securing funding and allocating responsibilities across relevant institutions. These foundational decisions determine the extent of early stakeholder and community involvement, ranging from contexts where participatory processes are used to define planning principles and the purpose of MSP itself, to cases where planning is more centrally led and top-down, often constrained by limited budgets, time and institutional capacity.

These early design decisions also determine how digital tools are subsequently introduced and used throughout the process. MSP initiatives focused primarily on spatial allocation, such as Denmark's MSP, differ considerably in their approach to data collection from more locally oriented coastal zoning plans, such as Iceland's. Similarly, decisions to integrate ILK through participatory mapping, as in the Shetland Islands, or to use decision support systems, as in Sweden, illustrate how

the framing of MSP at the outset directly shapes the role that ILK can play within it. Accordingly, confining Indigenous and local community input to stakeholder participation and consultation, which typically occur later in the MSP cycle, means that these groups rarely influence the foundational structure of the process itself. This limits their ability to shape planning objectives and priorities, as well as to contribute to decisions about how digital tools and methods are developed and applied in ways that are contextually appropriate for collecting and integrating ILK.

These limitations are further compounded once the direction and structure of MSP have been established and the process advances to data collection. At this point, the overarching objectives of the plan have already been determined and data gathering largely serves to support these predefined aims. As a result, this research finds that data collection often becomes an extractive process – a tendency that digital tools may reinforce. For instance, digital tools often require data to be formatted or structured according to predefined categories reflecting the values and assumptions of their developers, which may lead to distortion or exclusion of knowledge that does not conform to these formats. As digital tools are increasingly introduced into planning processes, decisions about which data are included, how they are weighted and how they are interpreted may become less transparent, reducing accountability and reinforcing existing biases. Efforts to integrate ILK into digital processes may also strip it of its relational and place-based dimensions, leading to generalisation or homogenisation of knowledge. These factors reflect the loss of control that Indigenous and local communities have over how their knowledge and input is used in digital processes, raising questions of ownership and autonomy in decision-making regarding local data. The extractive nature of this process may further lead communities to feel misrepresented or to opt out, as the exchange of knowledge is not mutually beneficial.

Indeed, disengagement and exclusion in MSP are often linked to its technocratic origins, in which MSP has historically been expert-driven and characterised by institutional authority, creating persistent power asymmetries, particularly reflected in stakeholder participation (Boucquey et al., 2016; Flannery et al., 2017). This reinforces a hierarchy of knowledge in which local and Indigenous perspectives are often seen as supplementary rather than foundational. As a result, more powerful actors tend to exert disproportionate influence over outcomes, while less vocal or organised groups are overlooked (Boucquey et al., 2016; Pennino et al., 2021). These patterns have led to tensions and a growing distrust in planning authorities, particularly when communication is limited and planning outputs fail to reflect the knowledge, values or priorities of affected communities. In contexts shaped by colonial pasts or historical marginalisation, such exclusion is felt even more acutely, further eroding trust and challenging the legitimacy of the process. Even when participation is formally offered, it may be perceived as symbolic, arriving too late to meaningfully influence decisions that have already been set in motion.

Recognising this, findings indicate that to move beyond tokenistic inclusion, local input should be integrated throughout the entire MSP cycle, from shaping its design and influencing the choice of methods and tools, to providing feedback on finalised plans that inform subsequent cycles. In this context, digital tools present important opportunities to enhance local engagement, particularly through participatory mapping and collaborative online platforms. These technologies can expand access, facilitate communication and improve the visibility of diverse perspectives. However, while digital tools could improve procedural transparency and responsiveness, they do not address the foundational power asymmetries that often lead to marginalisation. Achieving inclusive and context-sensitive MSP therefore requires not only the adoption of digital tools but also sustained, iterative engagement with communities throughout the entire planning process.

3.2 Responsibility for integrating the “local”

Findings suggest that while planning authorities recognise the value of integrating ILK into MSP, processes often unintentionally exclude communities or rely on non-inclusive methods due to time and budget constraints and limited capacity. Digital technologies, including mapping systems and participatory platforms, have expanded the capacity of planning authorities to collect, synthesise and analyse data more comprehensively and efficiently. In theory, these tools could address some capacity constraints and support more inclusive engagement. However, where tools have been introduced, implementation has not always led to more just and equitable outcomes.

This research suggests that this gap is attributed to both technological and capacity-related constraints but also reflects broader ambiguity around who is responsible for gathering local data and ensuring that tools are applied in ways that incorporate ILK. In contrast to single-sector management, where industries often have designated stakeholder coordinators or clear procedures for engagement, the responsibility for integrating ILK into MSP processes is more ambiguous. It frequently shifts between MSP planners, researchers and communities themselves and may vary depending on governance levels, approaches and methods. In turn, this ambiguity hampers efforts to distribute resources effectively – an issue that becomes more pressing as planning processes increasingly rely on digital technologies. Indeed, reliance on and frequent use of tools and data require strengthened specialised skills, technical competencies and an awareness of how decisions and biases affect outcomes. Accordingly, successfully adopting and deploying technologies in responsible ways demands stronger institutional support, whether by strengthening planners’ skills, bringing in external experts or strategically using digital tools to free up time and resources. In addition, given that data, maps and metrics are shaped by subjective choices, context and bias, the use of data-driven processes makes it even more important

to clarify institutional roles and responsibilities in how such information is interpreted and applied.

Furthermore, operating new technologies necessitates an understanding of their impact on Indigenous and local communities, as well as the fostering of relationships that avoid "parachute research", where information is extracted without engagement or benefit to those communities. This responsibility includes establishing trust, ensuring transparent communication about data use and developing sustainable methods to integrate ILK without diminishing its meaning or exposing communities to unjust planning procedures and outcomes.

3.3 Defining "local"

The ocean is a common-pool resource, holding diverse cultural, economic and ecological significance for coastal communities, Indigenous peoples, commercial sectors and ecosystems. At the same time, it is governed by overlapping and sometimes conflicting legal regimes and administrative jurisdictions, making it particularly challenging to define who should be involved in decision-making about ocean space (Rickels et al., 2016). According to Douvere and Ehler (2009), the integration of ILK is typically situated within public participation and stakeholder engagement procedures, where *"all individuals, groups or organisations that are in one way or another affected, involved or interested in MSP can be considered stakeholders"* (p. 43). However, defining who constitutes the "public" or has a legitimate "stake" in MSP is far from straightforward. The task of determining this often falls to planning authorities, placing additional responsibility on already resource-constrained institutions. As a result, planning authorities frequently struggle with inclusive engagement, due both to uncertainty about which actors to involve and a lack of clear institutional guidance or frameworks. This challenge is further compounded by shifting governance responsibilities and institutional ambiguity within the development of MSP itself.

Among those often regarded as the "public" or "locals" of the ocean, fisheries have historically maintained a strong presence at sea. Their longstanding relationship with marine space, combined with their economic and cultural importance in many coastal regions, often positions them as key stakeholders in MSP processes (Janßen et al., 2017; Lipsman, 2019). However, while historically the sector was among the first to occupy and utilise the oceans, it does not inherently grant it a greater or exclusive claim to marine space, especially as ocean use diversifies.

This research finds that determining where along the MSP development process "local knowledge holders" should be engaged, which sectors they represent and who qualifies as "local" quickly becomes a complex task. For instance, does "local" refer only to coastal residents or also to fishers, Indigenous communities, recreational users, local businesses or even future generations? Arguably, if marine environments

are regarded as common-pool resources, it follows that all users and non-users (e.g. marine ecosystem services and future generations) hold some degree of stake in their management. However, this raises critical questions regarding the extent to which such stakeholders should automatically have a direct influence over decision-making processes and how this diffuse and often elusive constituency can be identified and engaged.

As one might expect, when the boundaries of inclusion are unclear, applying digital tools to support equitable and just knowledge integration becomes particularly difficult. Digital tools rely on clearly defined user groups and structured data inputs. A lack of clarity about whose knowledge needs to be represented makes it challenging to design tools and methods that are appropriate for the local environment. Digitalisation further complicates this by reinforcing assumptions about what counts as relevant knowledge. For instance, the need to convert ILK into digital formats that align with existing procedures often means that such knowledge should first be translated, codified and standardised to be considered in planning processes. This risks privileging knowledge systems that are more easily digitalised and relies on the assumption that ILK should conform to digital processes to be considered and accounted for, rather than the processes adapting to accommodate ILK. This, in turn, reflects broader power dynamics and the differences in legitimacy attributed to Western scientific knowledge versus ILK.

This dynamic is also reflected in the language used throughout MSP processes, where stakeholders are expected to adapt to MSP jargon, invest time in learning how to translate their knowledge into digital formats and simultaneously ensure that their knowledge is accurately represented in the process. At the same time, MSP processes risk losing important aspects of ILK, as some elements may not translate well into digital formats. A limited understanding of how knowledge is transformed at each stage of digitalisation (or with each augmentation) can therefore lead to further distortions or loss of meaning. To mitigate this risk, planning authorities need a clear understanding of whom they aim to include, whom they consider local, what knowledge these communities possess and how digitalisation may transform it.

4. Cases from the North Atlantic region

This section presents seven case studies developed by workshop participants, drawing on their own experiences and contexts. Together, the cases ground the report's reflections in the realities of planning practice across the North Atlantic region. They illustrate both the diversity of challenges and the range of opportunities, with each case bringing its own characteristics and dynamics. While the workshop primarily focused on the North Atlantic region, a contribution from England was also included, reflecting the broader relevance of these challenges.

4.1 Local knowledge in Norwegian fisheries management

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Background

MSP in Norway is conducted through two main procedures. In coastal waters and in fjords, planning is regulated under the Planning and Building Act and implemented at the municipal and regional levels. All municipalities with coastlines have marine spatial plans. Offshore, different sectoral agencies are responsible for three management plans for the Barents Sea, the Norwegian Sea and the North Sea/Skagerrak, respectively. In addition, in the open ocean, sectoral agencies allocate licences within their respective sectors, such as energy (including oil and gas and offshore wind) and open ocean aquaculture.

Competition for marine space is big and growing. Different interests increase the demand for space, alongside heightened attention to the need for marine protection. In addition, new users and interests are emerging such as carbon storage, mineral exploitation, offshore wind and nature conservation.

Traditional use of the sea is characterised by informal practices and traditions. Ocean space has been shared among multiple users, for limited time periods, with their use leaving no visible traces. Provided there is sufficient marine space, this informal system functions effectively. However, over time, there has been a growing shift from multiple use to singular use. When this occurs, newly established rights gradually displace traditional access to the commons.

Traditionally, fishers have often been suspicious about giving out information about key fishing areas. Some still are, because they want to keep this information secret to prevent others from “poaching” in these locations. However, as vessel monitoring systems have become more openly accessible, along with increased competition for space, there is now wider acceptance for sharing such information.

Good and robust knowledge of how the sea is utilised is needed to allocate space, not only for static locations such as offshore installations, but also to ensure that more dynamic marine uses, such as important fishing areas and spawning/juvenile areas, are taken into account at an early stage in the planning process.

In Norway, the Directorate of Fisheries has been collecting fisheries data since the 1980s, through structured interviews with local informants. These data have been digitalised and are available through the Directorate’s mapping site “Yggdrasil”. The directorate is also invited to contribute to spatial plans at the local, regional and national level.

The tracking of fishing vessels has become an increasingly valuable tool, with both Vessel Monitoring Systems (VMS) and Automatic Identification System (AIS) data making data collection more robust. However, the mere tracking of vessel movements alone is not sufficient: there is also a need to understand and highlight the dynamics of fishing operations, and fluctuations in fish stocks, quotas and market demands. Both methods are currently being used by the Directorate of Fisheries.

Problem description

In contrast to energy installations, shipping corridors, aquaculture etc., fisheries represent interests that are not tied to specific locations. In MSP, interests that can be spatially defined through geographic polygons are digitalised and mapped. As more interest areas are incorporated, activities not bound to specific locations end up being excluded based on the argument that alternative areas are available for these interests. However, if these interests are continually displaced to new locations, there will ultimately be no place left for them. There is therefore a need to place particular emphasis on the spatial requirements of fisheries and living marine resources within MSP, including visualisation of these interests and making mapped data more robust.

In recent years, there has been a tendency for some fish stocks to increase in abundance due to climate change, while others have declined. We expect these changes to continue and likely intensify in the coming years. Those who work at sea are often among the first to observe such changes and can provide valuable insights. However, there is a risk that such knowledge may be mis-interpreted, leading to reluctance to share the information and resulting in knowledge remaining with those who hold it, only to be lost. For instance, if certain species

disappear from an area due to climate change and nutrient loading, it would be incorrect to conclude that overfishing is the culprit.

What was done

Conducting interviews with fishers is time-consuming. One lesson learned is that, in many cases, interview data from the 1980s remained valid when new interviews were carried out 20 years later. Tracking data from AIS and VMS have also shown comparable results, which means that the interview method is reliable. Today, interviews are therefore supplemented with other data sources, such as tracking data from VMS and AIS, as well as catch data from electronic logbooks (ERS).

A key advantage of tracking data is that they are numeric, enabling more accurate calculations, such as the number of fishing operations in a given area, volume of catch and species caught. Furthermore, it is worth noting that many seasonal fisheries take place in distant waters. Those who operate in these areas possess detailed, location-specific knowledge that is not captured by local interviews.

Reflections through a justice and equity lens

Lessons learned from Norway show that it matters who collects and communicates fisheries data. In the worst-case scenario, information can be misinterpreted and used against those who provided the data. Strong competence among the facilitators is therefore needed to build trust. Establishing and maintaining such trust requires time and specialist skills. It has taken many years to build up a methodology that is trusted by fishers and sufficiently robust to provide reliable numerical data.

However, there is ongoing discussion about what is the best way of communicating fishing interests. So far, fishing operations have been considered a useful indicator. If catch volumes or values of catch, for instance, were used instead, this would introduce bias towards large vessels, in particular towards pelagic fisheries, which typically catch large volumes. As a result, insufficient consideration might be given to small-scale, local fishers, who have limited access to secondary fishing grounds and depend on short distance to landing sites.

Lessons learned and recommendations

Interviews combined with tracking data have proven to be valuable and powerful tools for identifying and visualising local knowledge. The addition of VMS, AIS and ERS data enhances information on fishing operations, catch volumes and species, creating opportunities for more robust analyses. However, it is very important to ensure that those collecting and interpreting the data have a strong understanding of the users, as data can easily be misinterpreted and even misused.

A structured and systematic methodology should be created and tested prior to data collection. Without this, data cannot be compared, built upon or in an iterative process or replicated at a later stage. Weaknesses and gaps in data collection should be highlighted – for example, recreational fishing, which is poorly documented in Norway. AI is currently being used to support information gathering on planning processes, interests expressed by different users and reporting. Good GIS skills are also necessary. The "Yggdrasil" mapping platform of the Directorate of Fisheries illustrates how this is implemented in Norway.

Below are three maps presenting fisheries data: the first is based solely on interviews, the second shows tracking data only and the third illustrates the overlap between interviews and tracking data.^[2]

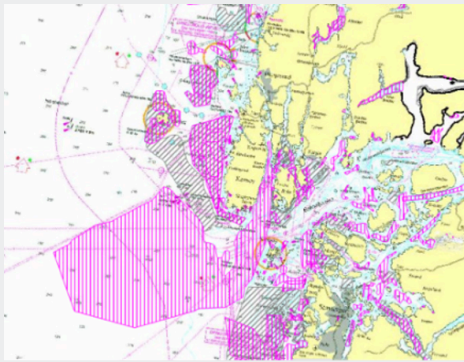


FIGURE 2: Mapping fishing activities based on interview data



FIGURE 3: Mapping fishing activities based on tracking data

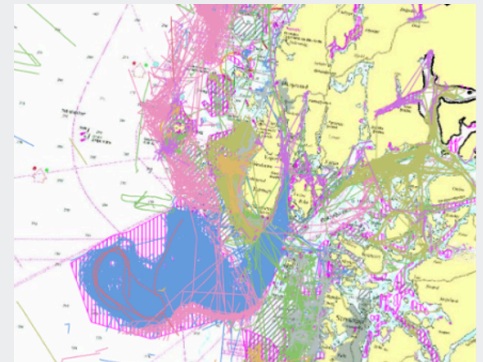


FIGURE 4: Overlap between interview and tracking data

2. All maps are from Yggdrasil, the Norwegian Directorate of Fisheries' visual mapping platform. For more information, see <https://open-data-fiskeridirektoratet-fiskeridir.hub.arcgis.com/>

4.2 Marine decision-making in Portsmouth, England

Authors: Dr Kat Fradera, University of Glasgow, Dr Rachel Shucksmith, University of Highlands and Islands, and Dr Lucy Greenhill, Howell Marine Consulting

Background

Southsea is located on the south coast of England and is a suburb of the City of Portsmouth. Portsmouth has a long maritime history, and its natural harbours are still used for transportation and military activities.

The Southsea Coastal Management Scheme was developed to address the policy decision to “hold the line” in response to coastal change in Southsea, Portsmouth, England. This decision, set out in the regional Shoreline Management Plan published in 2010, provided the basis for designing a new sea wall to protect the Southsea area from increasing sea levels and storm surges.

The main stakeholders in the case were local residents and business owners in Southsea. Local knowledge mattered in this case study due to the long cultural maritime heritage of the area, as well as the size of this coastal defence project, effectively changing the physical relationship between the suburb and the sea.

Problem description

The decision to develop a new sea defence for Southsea was made outside of the MSP/marine management decision-making process. While Southsea benefited from this decision, other areas along the UK coast did not, due to limited funding available and the practicalities of protecting the entire coastline.

The Shoreline Management Plan did not include public consultation. Consultation was therefore limited to the design of the sea defence rather than whether it was needed (or wanted).

The project was subject to “dual consenting”. It required both a marine licence and planning permission to be constructed. This led to some confusion between what consultation was taking place at which stage and the scope of the consultation.

What was done

The city council, district council and developer partnership undertook extemporary public engagement during the design stages pre-consent. Much of this engagement was “non-statutory” and aimed at providing local people with the opportunity to view and comment on the short list of coastal defence options. It was clear that the public were interested in the scheme due to the 378 public responses received during early consultations.

In the lead-up to submission of the planning application, the developer partnership ran an additional series of three non-statutory consultation exercises. The first reintroduced the scheme to local people. The second invited local input on elements of the design. The third was used to understand public opinion about the final design.

As noted above, this scheme required both planning permission and a marine licence, representing two separate regulatory decisions made by two separate organisations: (Portsmouth City Council (as the local planning authority) and the Marine Management Organisation (as the marine regulator for England). The English Coastal Concordat was used to allow Portsmouth City Council to “lead” the regulatory processes to avoid double working and to simplify the decision-making process for stakeholders. This approach was particularly relevant for the required Environmental Impact Assessment, for which Portsmouth City Council took regulatory lead and the Marine Management Organisation “deferred” to the Council’s decision.

Reflections through a justice and equity lens

At the local level, this example provides best practice in relation to trust, legitimacy and acceptance through the enhanced consultation process. However, the case also raises the challenge of balancing local and national needs. While Southsea benefitted from the Shoreline Management Plan process, other areas may need to be ‘sacrificed’ to direct funding towards areas assessed as most in need or of greatest value. How decisions about which areas of the coast to protect in a changing climate are made require careful consideration of justice. In the Southsea example, there is a clear need to protect the residential properties along the coast due to the number of people impacted. However, this utilitarian response to climate change induced by coastal change may not apply with longevity, and questions about cost also need to be considered.

The time between the original Shoreline Management Plan to the consent decision for this project spanned over ten years. In this time, the local population of Southsea would have inevitably changed. Many of the comments from earlier consultation exercises were seen as “final”, with a “shortlisting” approach taken in the design process. While this made pragmatic sense, it can be questioned as to the legitimacy of later consultations in which only the details of the scheme were discussed. What does this mean for new residents or new stakeholders?

Our case example followed the decision-making process up to the consenting of the Southsea scheme. It did not consider post-consent processes or the construction of the project. While engagement has continued between the developer and the local community post-consent, there is little incentive to maintain such engagement within the English marine regulatory framework.

Lessons learned and recommendations

This case provides a strong example of how to undertake local level pre-consent consultation and engagement. The enhanced engagement activities did allow for local residents to express their views. However, the duration of the design process raises challenging questions about how to include comments from "new" stakeholders later in the process. In the Southsea example, this was managed relatively well through a public-facing website designed to provide all background information on previous public engagement and the timeline of design development. Nonetheless, the long timescales involved in pre-consent project design raise wider questions of justice. There appears to be a tacit belief that stakeholder groups remain the same throughout project development – clearly not realistic given changing members of design teams. It could be argued that for "new locals" moving to areas where coastal projects are being developed, their personal due diligence prior to entering the local area should alert them to ongoing local developments. However, this does not appear realistic. While UK property conveyancing for a house purchase may flag ongoing planning matters impacting the property, this depends on the level of searches undertaken and a judgement call by the solicitor about what to include. Moreover, this also does not apply to rental properties, to which conveyancing law does not apply.

Key insights from Southsea are:

- Engage early, engage often and ensure that previous design decisions are publicly accessible through online records and local area advertising. This helps to inform "new locals" of developments in their area and mitigates the risk of settled design matters being "reopened" later in the process.
- Where appropriate, streamline complex decision-making processes through deferral agreements between consenting bodies.
- Consider the relationship between local and national interests and communicate this appropriately. Reflect on how decisions made to protect one locality may have impacts on other areas, sometimes located at a considerable distance from the decision area.

4.3 Sullom Voe Master Plan, Shetland Islands

Author: Dr Rachel Shucksmith, University of Highland and Islands, Shetland

Background

Sullom Voe Harbour, operated by Shetland Islands Council (SIC), is home to Europe's largest oil terminal, currently operated by the energy company EnQuest. It receives crude oil and natural gas from offshore fields via pipelines, processes it and then exports it globally by tanker. The terminal serves as a crucial processing and storage hub, connecting offshore production to the global market and playing a significant economic role in the region. Peak throughput at the terminal occurred in the mid-1980s and has been steadily declining since.

For navigation and safety reasons, the SIC has, as a matter of policy, restricted aquaculture development in Sullom Voe Harbour Area. This policy was to be reviewed when tanker movements dropped to less than 50% of peak levels. With a decline in tanker movements in 2018, the SIC initiated a review of this policy, with the aim of creating a master plan for the harbour area. Central to this process was the collection of information on development constraints and opportunities from the local community and stakeholders. The Master Planning process was led by the NAFC Marine Centre UHI (now called UHI Shetland).

The Sullom Voe Master Plan draws upon the data and policy framework provided by the Shetland Islands Regional Marine Plan (SIRMP). The SIRMP is a statutory sub-national plan, with marine planning in Scotland governed by the Marine (Scotland) Act 2011. The Sullom Voe Master Plan was intended to provide more detailed spatial guidance for licensing and leasing within the harbour area.

Problem description

Three options were presented for the Sullom Voe Harbour area: (1) retain restrictions relating to aquaculture, (2) expand restrictions to include all activities involving surface works (e.g. expand to include seaweed cultivation), (3) allow aquaculture development to occur in Sullom Voe and provide spatial guidance on where this would be appropriate. The aims of the public engagement process were to:

- test the existing policy landscape and assess if it is fit for purpose
- assess the level of interest in future development of the area
- ensure that the community and relevant stakeholders have a meaningful opportunity to contribute to the master plan
- gather fresh information about opportunities and constraints
- identify community priorities that should inform future development decisions.

The initial SIRMP provided a baseline data assessment. Local communities had previously been involved in checking the accuracy of national data sets, identifying gaps, providing information on community use and helping to prioritise data collection. While data collected to inform the SIRMP were substantially more detailed than national equivalents, the development of the master plan required further detailed fisheries data collection, understanding of community use and community views on the future use of the harbour.

Determining the relative weight to assign to different considerations was a particular challenge, with a number of international designations and navigational considerations, for which the Harbor Master held legal responsibility. These considerations made the area "legally congested" despite the expansive nature of the harbour.

What was done

A two-phase public engagement process was undertaken to gather community views, map important community features and existing data held within the SIRMP. Face-to-face orientation meetings were held with key stakeholders, alongside four public community events designed to capture views and knowledge held by the community. In addition, an online survey was made available to allow more people to engage in the process and for further insights to be gathered.

Feedback from the community indicated widespread support for exploring new potential uses within the harbour area, enhancing potential employment opportunities in a rural area. Subsequently, the mapped data were used to identify potential suitable locations for future development. Feedback from phase 1 also included additions to the initial maps and other suggested data. All data were then categorised into either "Excluded from Search" or "Potentially Excluded from Search", based on the level of policy or legal protection associated with the data type.

All data classified as "Excluded from Search" were combined to create Potential Development Zones. These data, along with the resulting zones, were presented during the second round of public engagement. Feedback from those events was then incorporated into the final version of the Potential Development Zones.

Data collected included information on recreation, community use and value. Dedicated meetings were held with the fisheries sector and fishers were contacted individually. Detailed inshore fisheries data were collected through a multi-stage mapping and verification process. Data ownership remained with the fishers, allowing them to quality check outputs, control how their data were used, agree on an appropriate level of granulation that retained a level of confidentiality while providing an informative data set, and withdraw consent if they wished. Different mapping approaches were used for each segment to reflect nuanced differences between them.

Reflections through a justice and equity lens

The master plan process did not have a predetermined outcome, and the capacity for the community and stakeholders to genuinely influence the outcome supported both procedural and recognitional justice. However, national considerations, such as Special Areas of Conservation (SACs), carried substantial legal weight and constrained where development could occur, predetermining a degree of distributive justice. As these designations were non-negotiable in this process, and as they covered large areas, it effectively meant that once the community agreed to explore development options, the capacity to influence where development could take place was limited.

Considerable attention was given to determining the appropriate weight to assign to fisher and community activities. Given the rural locality, recreational use may occur in areas used by one or two people, while fishing grounds may be associated with individual part-time fishers. This contrasted with the potential for a new aquaculture site to provide multiple high-value, full-time jobs. Balancing existing uses against future impacts and benefits is particularly challenging.

Lessons learned and recommendations

Despite the Sullom Voe Harbour area being expansive and relatively unused, navigation and natural heritage designations restrict future development opportunities and subsequently limit the capacity for local communities to meaningfully influence where development takes place, highlighting the trade-off between national and local interests. By sharing the available mapped data and information at the initial meetings it allowed for a degree of expectation management, ensuring communities were aware of the types of considerations that would inform spatial mapping.

Local communities may be reluctant to provide data where there is no trust established, leading to exclusion from processes. Mapping does not often allow for context, such as onshore dependency and the impacts of losing fishing grounds on local communities – including the sustainability of upstream and down-stream industries (e.g. ferries) and the potential impact on school enrolment. Decision-making detached from this context can therefore be problematic. In this case, these challenges were addressed by ensuring that these concerns were considered and shaped subsequent mapping and digitisation processes.

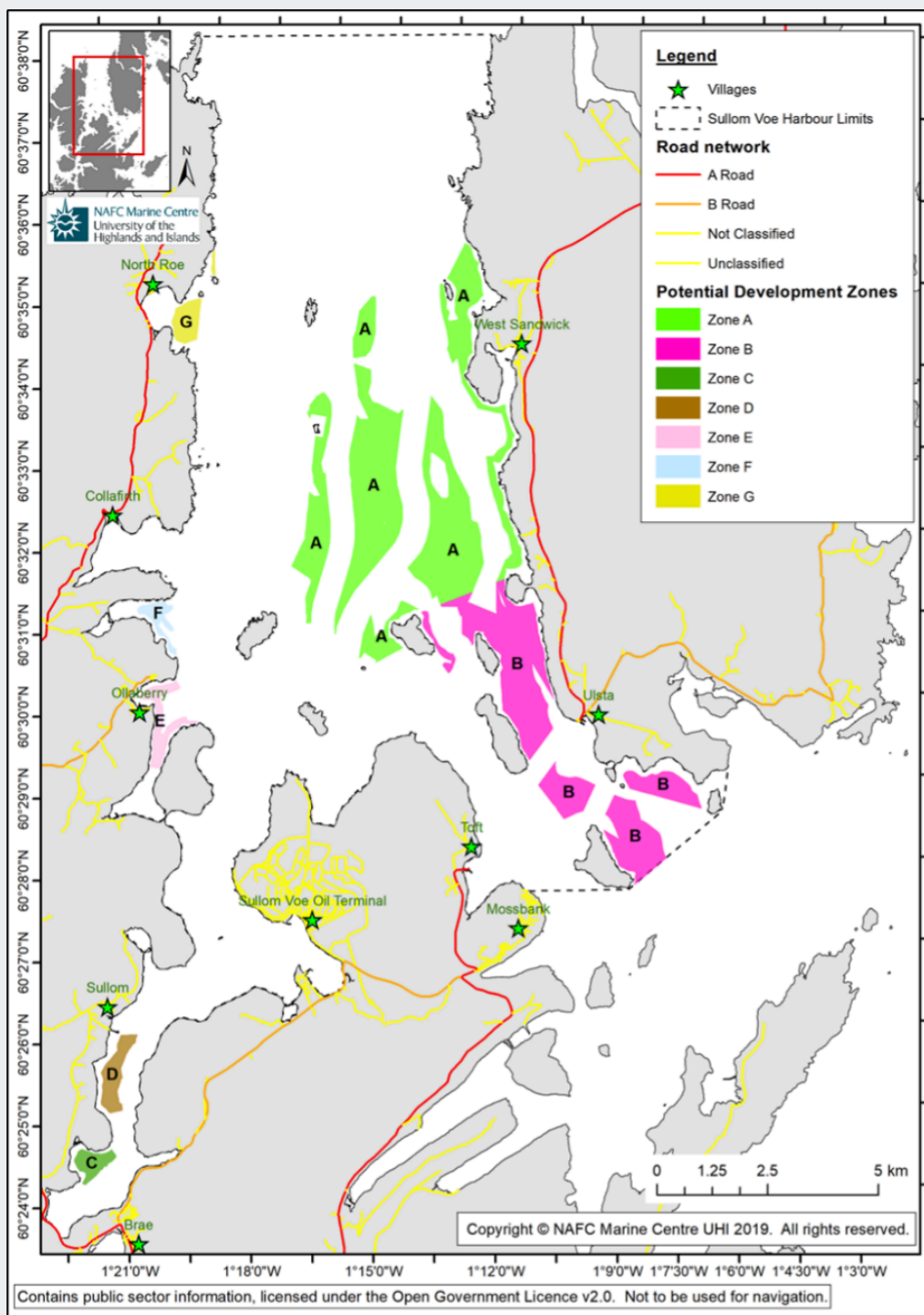


FIGURE 5: Potential Development Zones within the Sullom Voe Harbour Area (NAFC Marine Centre UHI, 2019).

4.4 Participatory mapping towards stricter protection in a Norwegian marine national park

Author: Dr. Aase J. Kvanneid, Norsk Institutt for Vannforskning

Background

This case study focuses on knowledge and participation in the process for stricter protection of the marine environment in Raet Marine National Park (MNP), established in 2016. Of the park's total area of 607 km², 98% of is marine and 2% is terrestrial (Raet Nasjonalpark, 2025). It is located on the south Norwegian Skagerrak coast, a densely populated region with a predominantly rocky shoreline interspersed with natural beaches, bays, inlets and urban sprawls. The seascape is characterised by characteristic skerries and small, dotted islands, shaped by end-moraine deposits from the last ice age (from which the name "Raet" is derived).

Access to the Skagerrak Sea has supported and sustained livelihoods far beyond its geography through centuries of marine harvesting, trade and communication between Norway and the European continent. The seascape is used in a wide variety of ways by numerous public, commercial and civil-sector actors. The combination of marine resource harvesting, built-up land expansion and climate change has however resulted in a deterioration of the marine ecosystems, with a deterioration of several species listed under the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), along with commercially and culturally valued species such as cod, lobster and shrimp (Frigstad et al., 2023; Kleiven & Moland, 2022; Moland et al., 2021; Moy & Christie, 2012). As national and regional policies are set on economic development through "blue growth" from fishing, tourism and shipping, as well as from the onshore and offshore energy sector (Norwegian Ministry of Regional Development, 2021; Norwegian Ministry of Trade, Industry and Fisheries, 2021), and below 5% of Norway's marine environment is currently managed through area-based conservation measures (Jørgensen et al., 2021), the government is urged to fulfil national and international commitments on effective and equitably managed marine protected areas by 2030 (Convention on Biological Diversity, 2022; Norwegian Ministry of Climate and Environment, 2021).

MSP context

The Norwegian seas are regulated by regional ocean management plans and do not follow the EU Marine Spatial Planning Directive. Commercial fishing is managed by the Directorate of Fisheries in line with the Marine Resources Act (2009).

Problem description

The process of achieving more effective and stricter conservation of the Norwegian coastal and marine environment is hampered by incoherent (and partly outdated) policy and governance frameworks, as well as knowledge gaps that together hinder effective conservation measures (Eilertsen et al., 2020; Forbé et al., 2024; Hauge & Stokke, 2021; Kvanneid & Sundnes, 2024). This has become acutely apparent in the MNPs. As they encompass both terrestrial and marine coastal environments, MNPs provide a weak tool for area-based management, as it is juxtaposed between multiple management regimes and sectors with conflicting goals and processes.

Effective conservation measures are also hampered by local conflict, both due to a strong cultural tradition of local self-governance, access to the commons, and especially regarding restrictions affecting local shrimp-trawling and the small-scale fishing fleet (Agderposten, 2021; Fædrelandsvennen, 2021; Iversen & Braathen, 2025).

What was done

Originating from local concern over the highly valued but rapidly diminishing coastal cod, a bottom-up initiative aimed at stricter protection was formalised as the project "Bevar Raet" (Protect Raet) in 2020. The project is hosted by the Agder County Council and led by a core working group consisting of Agder County Council, the MPA manager and the Marine Research Institute (IMR). There is also an established working group with key stakeholders and an advisory committee of marine experts. The groups meet regularly, with the intention of finding ways to protect Raet in collaboration with the local community and the key stakeholders. Towards this end, IMR initiated a co-definition mapping project together with Bevar Raet in 2024, testing the Public Participation GIS "SeaSketch" to co-define no-take areas within the park (Kleiven et al., 2024; Raet Nasjonalpark, 2023). SeaSketch is a software tool that allows users to draw and rank areas of value on a map, using predefined categories that indicate the activity providing the value, such as "commercial fishing", "diving" or "recreation". The map is online, shareable and open to all. Researchers can then import and layer this map with other GIS maps to identify conflict-prone areas and practices and test various trade-off scenarios.

Lessons learned and recommendations

The mapping initiative has attracted the attention of local politicians, as well as heightening awareness among local citizens. However, as this process is still ongoing at the time of writing, the following reflections and recommendations are only preliminary.

Distributional and restorative justice

Implementing regulations that restrict the use of resources belonging to the "commons" will inevitably create "winners" and "losers". In this case, the "losers" are the local, small-scale fishers. Commercial fishers are duly represented in the Bevar Raet working group, as well as in the PPGIS mapping effort, as fishing was pre-identified by IMR as one of the main pressures on the park's ecosystem. During the mapping process, IMR actively reached out via the working group and through individual contacts, offering guidance and helped to fill in the online maps. However, while fishers were asked to disclose information that could potentially disadvantage them in the future, there has been little discussion about what the fishers stand to lose, beyond its economic value, fishing is also a cultural tradition and lived experience, or discussions on how they could be compensated for that loss.

Procedural justice

While MNPs as an area-based management tool is subjected to a complex macro-structure (for reasons stated above), the composition and management structure of Bevar Raet is complex, and its mandate is unclear. With multiple levels of governance, a political steering group, a project group, a working group and a resource/advisory group, transparency in decision-making is limited. Considering that local fishers have low "process literacy", they cannot be expected to make demands on behalf of their own rights to information, collaboration or agency in the process. Additionally, Bevar Raet is a project and has no formal mandate to make decisions on behalf of the park. Regardless of the outcome of the PPGIS, fishers' risk having little impact on decisions regarding whether, how, when and if stricter conservation measures will be implemented in the park.

Epistemic and recognitional justice

The composition of stakeholders in Bevar Raet lean towards a preference for local public sector administrative bodies, academic experts and local fishers. This may exclude other voices and interests, such as local young people, local recreational users of the area, as well as important commercial stakeholders from sectors such as tourism, shipping/ports and aquaculture.

Additionally, the scientific knowledge underpinning decision-making has, until recently, been dominated by marine experts at IMR. As a state-funded institution closely affiliated with the Norwegian Directorate of Fisheries, its research is predominantly oriented towards the use and conservation of marine and coastal values as economic or ecological resources. The traditional maps (Naturbase) and scientific methods and systems (Natur i Norge – NiN) used to define and represent species or habitats of governable value draw on predefined, scientifically quantifiable parameters. Even though a PPGIS such as SeaSketch allows for

inclusion of a broader range of stakeholders (and values) in the mapping and zoning processes, a lack of local, practical or experiential knowledge can result in zoning measures that fail to protect areas rich in biodiversity or with high cultural or immaterial value, which is not easily quantified (Kvanneid & Sundnes, 2024; Pascual et al., 2023).

Recommendations

Participation in mapping or planning for use or conservation of areas under pressure require:

- attention to which and how marine values gain legitimacy in scientific knowledge production and decision-making processes
- transparency and clarity regarding roles, responsibilities and expectations related to the collaborative mapping process
- consideration of how to include or represent immaterial or cultural values in maps through the collection of empirical data via counter-mapping exercises.

4.5 Marine spatial planning in Iceland

Author: Dr. Maria Wilke, Scottish Association for Marine Science

Background

MSP is relatively new in Iceland, with the Law 88/2018 on Coastal and Marine Planning, adopted in 2018, making the national planning agency Skipulagstofnun responsible for MSP outside of municipal limits (beyond 115m from the shore). The Westfjords and Eastfjords were the first regions selected, due to their sheltered fjord coastlines, which support a rapidly expanding aquaculture industry (Wilke & Kristjánsdóttir, 2023).

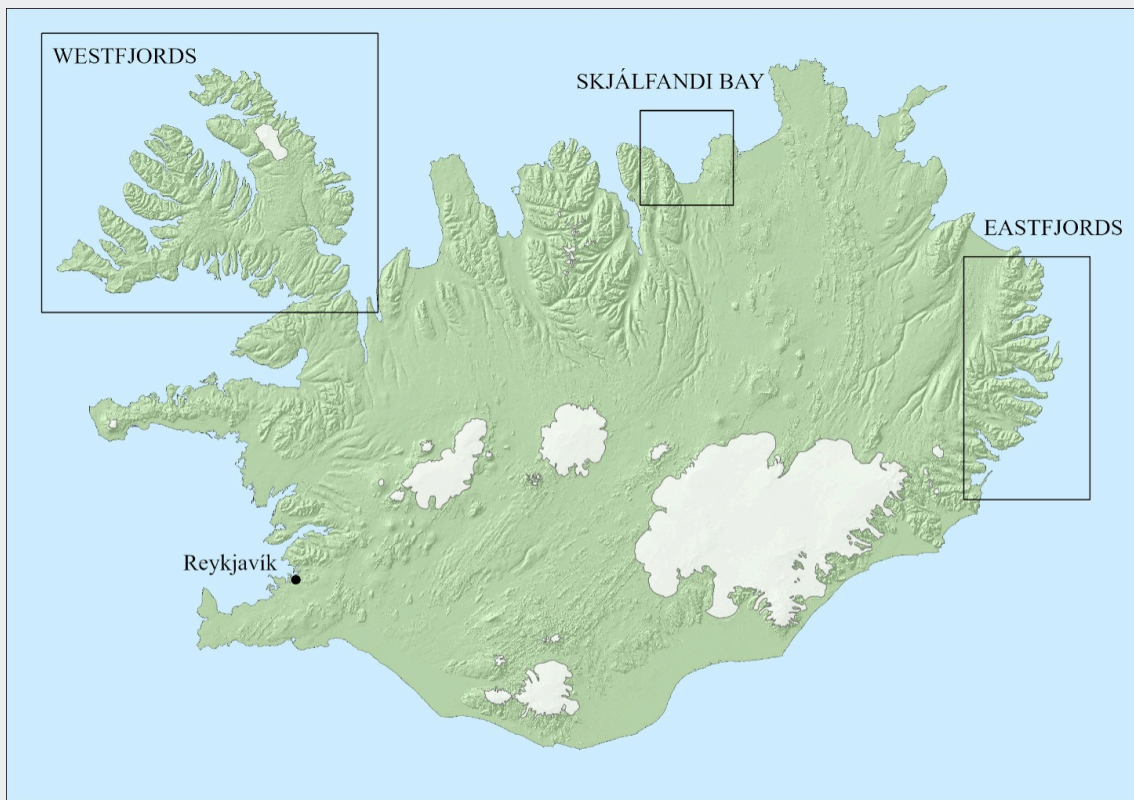


FIGURE 6: Map of areas for MSP in Iceland defined by the National Planning Agency. Initial plans were created for Westfjords and Eastfjords. At present, MSP is being planned for the central northern region, in Skjálfandi Bay (map: M. Wilke, based on (Húsnaðis- og mannvirkjastofnun, n.d.)

The Icelandic fjords are vulnerable environments that are already experiencing the effects of climate change. The Westfjords of Iceland have warmed significantly since 2001, with increased winter temperatures and higher precipitation. These changes have led to glacial retreat, shifts in fish stocks, pressure on seabirds and Arctic foxes, and higher risk of avalanches and landslides, which pose a threat to local communities (Bannan et al., 2022).

For the MSP process, regional councils and local consultative groups were appointed to draft the plans and stakeholders such as the Marine and Freshwater Research Institute (Hafro) were asked to provide expertise in the collection of spatial data (Wilke, 2023).

It is important to include local knowledge in processes like this because the communities in these places are small and remote and have made a living in a harsh corner of Iceland for centuries, all the while amassing valuable local knowledge about the coast, the sea and the surroundings that often lack baseline research data. Furthermore, MSP is likely to be more accepted by the public if they are involved early and meaningfully in the process (Pomeroy & Douvere, 2008).

Problem description

Local knowledge has been largely absent from the Icelandic MSP process. Members of the public and citizen groups were asked to comment on already established plans in few and unfortunately timed public meetings (overlapping with the summer holidays). There has been no sustained, iterative communication between planners and local communities. Rather than being invited to participate in the process itself, communities have been asked to comment after the main decisions had already been made. The process failed to recognise existing injustices and power imbalances. Stakeholder meetings served primarily as data collection exercises, rather than opportunities for future visioning, shared objective setting or discussion of conflicts of interest, and were held in separate sectoral groups (Wilke, 2023).

What was done

There are a variety of lessons to be learned from the Icelandic MSP process. In terms of data integration, care was taken to integrate different kinds of expertise into the planning process and to provide a spatial tool for citizens to identify areas they considered important. However, many members of the communities affected by the plans, as well as marine scientists and other experts, were completely unaware of the process until draft plans had already been developed by the planning agency, and the participation tool was only used in the pre-planning phase to gather initial input. Public meetings were held when a draft plan was presented for comments, rather than for visioning, objective setting or keeping locals engaged

throughout the process. Stakeholder engagement was limited to a single stage of the gathering of relevant information about the areas used by the relevant actors in the fjords and what they considered important. However, those meetings were held separately in sectoral groups of stakeholders, meaning that no discussion of conflicts took place.

Once the plans had been approved by the Minister for Infrastructure (ministerial jurisdiction over the process changed mid-way through the process after parliamentary elections), they became part of Icelandic law. Initially, the plans did not include an inbuilt clause for review or update, necessitating a ministerial decision to reopen the plans to alter them at a later stage. This has in the meantime been changed, and a less arduous process for updating the plans has been put in place.

At the same time as the plans came into force, a report by the National Audit Office on the lack of regulation of the aquaculture sector was published (Ríkisendurskoðun, 2023) and caused a public and media debate, with criticism directed at the relevant institutions for not having done enough to regulate and hold accountable this rapidly expanding industry (Guðlaugs Drífudóttir, 2023). By extension, the decisions made in the marine spatial plans were also criticised, as they were seen as enabling further expansion without much regulation in place.

Reflections through a justice and equity lens

The Icelandic MSP process presents multiple challenges. As interviews in coastal communities during the MSP process showed, members of the public in the Westfjords were largely unaware that MSP was taking place and voiced distrust towards some decision-makers, including those in their local municipalities, with several mentions of corruption being reported. In the Eastfjords, members of the public mounted a campaign against aquaculture, particularly in the fjord of Seyðisfjörður. Community members wanted their opposition to be acknowledged and reflected in the MSP process and resulting plans, but many felt that their views were ignored or actively dismissed (Wilke, 2023). The campaign to stop fish farming in Seyðisfjörður continue, including multiple social media campaigns and production of a film to highlight the community's resistance (Garen, 2025; Hannesdóttir, 2025).

The MSP process can be described as predominantly product-oriented, with limited attention to the process itself. There were no clearly articulated participation strategy or criteria as to how stakeholders were selected, and only sparse information on these topics was available on the MSP planning website (Hafskipulag, 2026) during the process.

Public participation in this process can be described as both late and tokenistic. Barriers to participation and to integrating local knowledge into this MSP process arose from both top-down and bottom-up dynamics. From a top-down perspective, these included an exclusionary process directed from the capital city as the centre of power, insufficient transparency, lack of information and a lack of open and explicit communication channels for citizens. From a bottom-up perspective, barriers included a lack of trust in institutions, including local municipalities, prior negative experiences with participation processes in terrestrial planning and a disbelief that community voices would be heard.

Lessons learned and recommendations

The Icelandic MSP process highlights the need for more meaningful involvement, while also pointing to wider challenges related to trust in institutions, power imbalances and limited participation that hinder effective decision-making beyond MSP.

Recommendations include:

- Building trust: Ensure transparency, accountability, shared decision-making and a long-term commitment of time and resources.
- Decentralisation: Share some of the decision-making power. Local actors could lead area-specific planning, later integrated into regional and national plans or other models of decentralisation.
- Process-orientation: Balance the priorities between the process and its outcomes, ensuring fair inclusion in decision-making.
- Participation strategy: Develop a clear engagement plan with objectives, tailored methods, schedules and early, continuous involvement of diverse interest groups and citizens.
- Education and information: Launch education and information campaigns, such as citizen science initiatives, to raise awareness of MSP benefits and marine resources both prior to and throughout the planning process.
- Adaptive management: Embed monitoring, assessment and iterative adaptation into legal MSP requirements.

4.6 Integrating local knowledge into emerging digital marine spatial planning in the Faroe Islands

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Background

The Faroe Islands are an autonomous territory within the Kingdom of Denmark, consisting of 18 islands in the North Atlantic and with a population of approximately 55,000. The Faroese economy is highly dependent on the sea, with fisheries and aquaculture industries accounting for more than 90% of goods exports and playing a central role in employment and cultural identity. Small-scale fishing and coastal traditions co-exist alongside industrial fleets and globally competitive aquaculture operations. ILK plays a significant role in Faroese marine life. Coastal fishers rely on generational knowledge of currents, spawning grounds and ecological shifts, while place-based traditions such as *grindadráp* (community whale drives) illustrate how marine use is embedded in socio-cultural realms (Joensen, 2009). The legitimacy of new governance tools, particularly digital MSP platforms, will depend on how well they reflect and respect this knowledge.

MSP context

The Faroe Islands do not currently have a national MSP. Land planning responsibilities rest with individual municipalities across the Faroe Islands, a situation complicated by the division of responsibility at a municipality level. With 29 municipalities of widely varying sizes, resources and budgets, each act as the local planning authority for its respective area. While statutory planning laws require land-use plans to be made for designated infield areas, this requirement does not extend to outfield or marine areas.

Marine space is increasingly contested. Alongside fisheries and aquaculture, emerging claims include subsea cables, oil and gas exploration, renewable energy projects (including tidal power and potentially offshore wind), tourism and environmental protection – claims which often conflict with local usage, including subsistence and alternative economic practices, and contribute to the increasing privatisation of commons areas (Bogadóttir, 2020).

Problem description

The main challenge in the Faroese case is reconciling existing sectoral marine governance with the need for integrated, digitalised MSP that incorporates ILK. At present, decisions are heavily centralised, with limited opportunities for early community input. Licenses for aquaculture or energy projects are granted based on scientific assessments and environmental standards, but experiential and cultural knowledge is not systematically incorporated, and decisions are often at odds with community interpretations (Hovgaard & Bogadóttir, 2018; Hytönen et al., 2020).

Digitalisation accentuates this gap. GIS platforms, such as *kort.foroyakort.fo* and online aquaculture maps, provide spatial data for planners and investors. However, these tools primarily rely on standardised datasets, which rarely capture qualitative, place-based insights of fishers and communities and the cultural significance of coastal and marine spaces. The risk is that as MSP becomes more digital, processes will prioritise technocratic efficiency at the expense of legitimacy, recognition and equity.

Furthermore, new industries such as marine renewables or subsea infrastructure will place additional pressure on limited marine space. Without formal MSP, conflicts between aquaculture, fisheries and traditional uses are likely to intensify. If ILK is not integrated, communities may perceive decisions as imposed, undermining trust in governance and reshaping relationships between people and the marine environment.

What was done

While the Faroe Islands do not yet have an MSP framework, several actions demonstrate foundational MSP principles and steps towards integrating ILK and preparing for digitalised planning. These include spatial zoning, ecosystem-based management and adaptive management practices:

- **SECTORAL REGULATION WITH SPATIAL DIMENSIONS:** Spatial zoning delimits exclusion zones of 12 nautical miles for trawling and six nautical miles for vessels other than small coastal vessels. Sixty percent of the Faroese plateau is permanently closed to trawling and seasonal closures are enforced to protect stock during spawning seasons. These measures, rooted in both scientific advice and fishers' knowledge, illustrate how local practices shape marine regulation.
- **AQUACULTURE LICENSING AND MAPPING:** The government allocates licences for aquaculture in designated fjords, guided by carrying capacity and environmental monitoring. The government and research institutions maintain online maps of aquaculture sites, providing transparency and clarity for both investors and communities.

- **DIGITAL MAPPING PORTALS:** Tools such as *kort.foroyakort.fo* provide layered geographic information on marine use. While currently focused on physical infrastructure and environmental parameters, these platforms provide opportunities to incorporate participatory mapping of cultural and fishing areas, similar to approaches used in land management (Nikula et al., 2020; Verbrugge et al., 2022).

Together, these examples highlight both achievements and limitations. Important spatial data are available, but the integration of ILK remains fragmented and non-institutionalised. Several notable gaps can be observed:

- **MULTI-SECTOR INTEGRATION:** Voices and narratives from fisheries and aquacultural industries are dominant, overshadowing alternative narratives, including community concerns.
- **AUTHORITY AND GOVERNANCE:** The absence of a dedicated cross-sectoral or national MSP planning authority has led to unclear responsibilities and authority in marine management.
- **STAKEHOLDER ENGAGEMENT:** Planning processes are often disjointed and lack clear authority and responsibility, leading to friction between planning authorities and local stakeholders. This is compounded by limited meaningful local stakeholder engagement, strong influence from private interests and a lack of integration of local knowledge.

Reflections through a justice and equity lens

Examining the Faroese case through an equity and justice framework highlights several key issues:

- **LEGITIMACY AND TRUST:** Communities place high value on transparency and fairness. However, concerns persist that digitalisation may privilege external actors or reduce local involvement to late-stage consultation. Participatory mapping may help demonstrate responsiveness, but trust will remain fragile without institutional guarantees.
- **RECOGNITION:** Scientific data dominate MSP discourse, while ILK often goes unrecognised. Incorporating ILK elements, such as Faroese place names, oral histories and communities' ecological knowledge, into digital portals would strengthen recognitional justice and affirm cultural identity.
- **PROCEDURAL JUSTICE:** At present, community engagement typically occurs after licensing proposals have been developed. Integrating participation and co-creation into earlier stages of planning could enhance procedural fairness.

- **DISTRIBUTIVE JUSTICE:** Expansion of aquaculture or energy projects may restrict access to marine spaces, including traditional fishing grounds, disproportionately affecting small-scale fishers. Without compensatory mechanisms or reciprocal benefits, distributive inequalities are likely to deepen.
- **RECIPROCITY AND CULTURAL CONTEXT:** ILK is often shared informally, based on trust. Digitalisation risks stripping it of context or exposing sensitive information. Ethical guidelines, reciprocity and ensuring that communities benefit directly from knowledge sharing are essential.

Lessons learned and recommendations

The case of the Faroe Islands presents a pivotal opportunity to establish MSP that is just, inclusive and resilient from the outset. Without a national MSP framework, conflicts over marine use between aquaculture, energy, shipping, fisheries and local users will likely intensify, while the absence of meaningful ILK inclusion risks leaving communities marginalised and distrustful. Marine governance that privileges industrial voices over local values undermines legitimacy and weakens trust in a society deeply dependent on the sea.

The Faroese experience demonstrates that the equity-oriented integration of ILK is not only desirable but essential in highly marine-dependent societies. Embedding ILK alongside scientific and sectoral expertise ensures that planning better reflects cultural ties, lived experiences and ecological subtleties overlooked in technical models. By prioritising participatory, transparent and adaptive governance, the Faroese Islands have an opportunity to build trust, legitimacy and long-term resilience from the outset, enabling the development of marine governance that truly reflects and serve the communities most connected to the ocean.

4.7 Blue Justice or just blue? – a case study on Greenlandic small-scale fisheries

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Background

This case study summarises a previously conducted research study in Greenland, which explored participatory approaches to marine governance and distributive justice in small-scale fisheries.

The study focuses on the contrasting contexts of Nuuk, the capital region, and the rural fishing community of Narsaq in South Greenland. It explores the ongoing transition in marine management, particularly the recent introduction of an Individual Transferable Quota (ITQ) system for small-scale and inshore fisheries. While ITQs have been used in industrial fisheries for some time, their extension to small-scale fisheries has sparked concerns related to spatial and distributive justice, as well as incorporation of the participatory process into decision-making.

The study critically examined how this policy shift affects price setting, access to fishing grounds, the role of the market and large fishing companies, and the communication of political decisions, especially to rural and Indigenous communities. Greenland does not currently have an MSP process, which further complicates sectoral coordination, for instance between fisheries and tourism.

Key stakeholders include policymakers (Ministry of Fisheries and Hunting), non-governmental organisations, researchers, the Greenland Institute of Natural Resources, fishing organisations such as Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat (KNAPK), local fishers, and both public and private fishing companies. New fisheries policies, often modelled on Western, particularly Danish standards, have created systemic barriers for Indigenous and local populations, influencing cultural practices, species access and generational continuity in fishing. Incorporating Indigenous and local knowledge is therefore essential, not only to improve species monitoring and policy relevance, but also to address the socio-cultural injustices created by top-down management approaches.

Problem description

Greenland lacks an MSP process, offering an opportunity to integrate Indigenous and local knowledge from the outset. However, existing marine management and policy decisions are deeply shaped by colonial legacies and Western governance models that have proven ill-suited to Indigenous contexts. These top-down approaches have already resulted in spatial, social and distributive injustices,

particularly for rural communities, which often feel excluded, unheard and marginalised in decision-making processes.

Despite their deep-rooted understanding of the marine environment, local communities are rarely engaged in decision-making in ways that are meaningful or reciprocal. Their knowledge is often reduced to logbook entries, which are rarely shared back with communities or made usable for local fishers, creating a one-sided flow of information. The absence of an MSP framework further exacerbates sectoral conflicts, such as between fisheries, tourism and shipping, leaving no platform for coordinated planning or protection.

Communities express the desire to contribute knowledge and to ensure that this knowledge is not lost or excluded by not being made accessible or integrated into digital planning tools. They seek greater autonomy and recognition of their contributions to sustainable marine stewardship. A growing divide between government institutions and local populations stems from a persistent lack of effective communication. If not actively addressed and reconciled, this may deepen distrust and further alienate communities from future marine governance processes.

What was done

This study employed a participatory, place-based approach to explore perceived issues of distributive and spatial justice for small-scale fisheries in Greenland. Additionally, the role of Indigenous and local knowledge in future marine governance in Greenland was examined. The project began with the stakeholder workshop "Future of Arctic Fisheries: Sustainability and Reform", which was held at the University of Greenland in Nuuk and included representatives from the Ministry of Fisheries and Hunting, the Greenland Institute of Natural Resources (GINR) and Royal Greenland, as well as academic researchers. The workshop introduced the study's objectives and provided a space for initial dialogue, followed by in-depth interviews with institutional actors.

To ground the research in local realities, extended fieldwork was conducted in the rural fishing community of Narsaq in South Greenland. In collaboration with the local community centre, the researcher participated in the annual Fishers and Hunters Festival (Ukiaanerani Pikialaarfik), organised by Innovation South Greenland, and conducted semi-structured interviews with residents in various settings, including their homes, the harbour and communal spaces, with the assistance of a local translator. These interactions helped capture community perspectives on justice and equity, marine governance, perceptions of government institutions, and desires for greater inclusion in decision-making processes.

Additionally, the study examined how past policies, colonial history and current land-based conflicts (e.g. mining) shape place attachment, identity and trust

towards authorities. It also explored where knowledge gaps exist, how local and Indigenous knowledge could be meaningfully integrated into marine planning, and whether institutional stakeholders would support such integration.

Digital tools were examined as a potential bridge, both for knowledge inclusion and for empowering disadvantaged communities such as Narsaq. The research explored how fishers could potentially access and use digital platforms and what support would be required for such tools to be useful in practice. Crucially, the study illuminated a growing disconnect between government institutions and local communities, rooted in differing understandings of marine stewardship and poor communication. If this divide is not addressed, it risks deepening distrust and undermining the long-term legitimacy and success of future marine planning processes.

Lessons learned and recommendations

The study highlights deep-rooted distrust between authorities and local communities, stemming from longstanding exclusion from decision-making processes. Local fishers, in particular, are often positioned as passive recipients of decisions, rather than active participants. This marginalisation is partly linked to colonial path-dependencies and narratives, where decisions are frequently made through an economic lens, sidelining social and cultural considerations. At the same time, many policymakers and researchers hold preconceived notions about the local population, such as viewing them as uncooperative or resistant to consensus, which further discourages meaningful engagement. This mutual distrust is compounded by a significant lack of communication and understanding between the groups. For example, during the implementation of the new ITQ system for inshore fisheries, many community members were unaware of the policy despite its introduction months earlier. Community frustration arises not only from exclusion but also stems from the (perceived) imposition of Danish models of governance that disregard local values and identities. Local politicians are described as "thinking Danish", highlighting the enduring effects of colonial governance structures. These dynamics raise serious concerns about democratic processes in general and the legitimacy and acceptance of marine governance decisions. Without inclusive, participatory processes that build trust and mutual respect, new policies risk rejection and may further alienate the communities they aim to support.

This case emphasises the critical importance of inclusive and participatory processes in MSP, especially in contexts with complex social and historical dynamics such as Greenland. Effective governance should go beyond economic priorities to recognise the lived experiences, identities and knowledge systems of local and Indigenous communities. In this case, mutual misunderstanding and a lack of communication prevented consensus, despite shared goals among government and community actors. Addressing this requires deliberate facilitation between

perspectives and an understanding of historical contexts, including colonial legacies and dominant narratives about Indigenous stakeholders. Indigenous culture should not only be preserved but actively integrated into governance processes as a valuable contribution. For Greenland, which currently lacks a formal MSP framework, this presents an opportunity: by embedding Indigenous voices and values from the outset, it can create a more just and effective model. Similar challenges have been observed in other Indigenous contexts, such as in New Zealand, suggesting that these lessons have wider relevance. Without structured participation, there is a risk of unregulated development prioritising short-term economic gain (e.g. tourism) over long-term cultural and environmental sustainability.

5. Reflections and key learnings

Grounded in the submitted cases, workshop discussions and findings from previous work in this project, this section presents reflections and key learnings aimed at supporting more just and equitable approaches to integrating ILK into increasingly digital MSP processes.

These learnings are organised across three sections:

1. [From output-focused to process-oriented planning](#)
2. [Strengthening institutional capacity](#)
3. [Identifying local actors while embracing change and continuity](#)

5.1 From output-focused to process-oriented planning

Approach, frame and institutionalise MSP as a continuous, purpose-driven process for long-term change

Historically, MSP emerged as a tool to allocate marine space, mediate competing claims and establish plans for defined areas (Ehler & Douvere, 2009). These plans have often been of a fixed nature, reflecting a focus on clearly delineated space and immediate conflicts. However, marine environments are dynamic, shaped by changing ecological conditions, land–sea interactions, and growing pressures from climate change and human activities. These dynamics highlight the limitations of static planning approaches and stress the need for MSP processes to be more adaptable to changing conditions and to better incorporate evolving knowledge over time.

MSP should therefore be positioned as a continuous, purpose-driven process that shifts the focus from outputs to long-term goals and adaptive learning, creating more space for participation and knowledge integration — elements that short-term approaches cannot sustain. Such framing provides a foundation for the integration of Indigenous and local communities, diverse forms of knowledge and data, and cross-scale collaboration, all of which require ongoing commitment rather than episodic engagement.

Institutionalising process-oriented approaches can further ensure that plans, strategies and policies are more consistent, traceable and revisable over time, enhancing transparency and enabling more grounded and informed decisions. Where process-oriented and inclusive planning has been better linked to legal frameworks, initiatives have also demonstrated higher stability and legitimacy, enabling a transition from short-term, project-based actions to sustained impact.

Embed structures for continuous, inclusive and iterative local engagement

Indigenous and local communities often perceive consultations as tokenistic and disconnected from decision-making, which erodes trust and creates barriers to participation, as observed in several of the cases presented. This problem stems partly from poorly timed consultation, with engagement occurring either too early before stakeholders have sufficient context, or too late, when plans feel predetermined.

Embedding structures for continuous, inclusive and iterative engagement can address these concerns by providing more predictable and transparent channels for input throughout the planning process. These structures should enable regular revision, feedback and adaptation based on monitoring results and local input, accounting for changing local dynamics. As communities evolve, allowing Indigenous and local communities to revise plans or retract input ensures that outcomes better reflect collective knowledge and values over time. One such mechanism could be the establishment of structured consultation "stepping stones" within MSP processes, where agreements and disagreements are systematically recorded, revisited and built upon, strengthening relationships between planning bodies and communities over time.

Digital tools can play a key role by making engagement more efficient, transparent and accountable. Online platforms and interactive maps allow stakeholders to track how input is incorporated, visualise outcomes, co-design plans and explore alternative scenarios. Combining digital formats with physical meetings ensures that engagement remains inclusive, accommodating participants with limited digital access or varying levels of process literacy.

5.2 Strengthening institutional capacity

Enhance capacity and awareness among authorities on how digital methods and various data affect planning

Conducting MSP in the current digital context places greater responsibility on authorities and planners. Adopting a "planning follows purpose" approach, where the design of planning processes and the selection of digital tools are guided by clearly defined goals, requires planners to develop greater awareness of how digital methods and different data influence planning outcomes. Without capacity-building, authorities risk relying on technical data and formal processes, while local actors may struggle to contribute due to a lack of resources or technical competencies, reinforcing existing inequalities.

National and regional bodies, municipalities and elected officials would benefit from strengthening organisational skills in facilitation, negotiation, coalition-building, participatory design and reflexive thinking alongside the use of digital tools. These capabilities enable planners to better interpret and integrate diverse knowledge systems, analyse complex data types, mediate between stakeholders and ensure that planning decisions respond to local needs, emerging evidence and legal obligations. Digital tools can support authorities and local actors alike by automating routine tasks and freeing up time for focused thinking and engagement. They enable efficient analysis, visualisation and collaboration in the development of planning proposals, while improving transparency and accountability throughout the planning process. However, realising these benefits requires deliberate investment in skills and institutional capacity at all levels.

Local actors, such as interest groups or fishing organisations, may need complementary skills, including communicating ILK and improving process literacy to engage with authorities. Where resource gaps exist, authorities could provide shared platforms, technical guidance or training opportunities to reduce disparities in participation and ensure that local voices influence planning processes and outcomes.

Establish clear institutional guidance and roles

Integrating ILK into MSP effectively requires clear institutional roles and practical guidance to strengthen accountability and minimise the risk of misinterpreting or misrepresenting ILK. This includes specifying who is responsible for engaging with communities, validating data and integrating local input into decision-making across all stages of the planning process.

While some elements already exist within current planning processes, roles and responsibilities require clearer definition. Importantly, authorities should assess and build foundational awareness of ILK, its role and its potential to inform the MSP process before embarking on implementation, rather than treating it as an afterthought. Clarity regarding institutional roles should also extend to communication, ensuring that authorities are transparent about how decisions are made and why at each stage of the process, from initial concepts through to final outcomes.

Planning authorities would therefore benefit from developing institutional guidance that delineates responsibilities across all stages of handling ILK, including its collection, management, application and interpretation. All proposals, discussions and decisions should be thoroughly documented and explicitly linked to planning outcomes to ensure transparency and traceability. Digital tools can streamline this documentation and enhance information accessibility, though their use should not impose an excessive administrative burden on stakeholders.

Strengthen collaboration through shared learning and open digital infrastructure

Integrating ILK alongside scientific data will ensure that MSP better reflects local contexts. Achieving this, however, requires not only individual effort but also collaboration across the region. Sharing lessons and methods could enable continuous improvement and adaptation of approaches, and North Atlantic countries would further benefit from jointly developing both institutional and technical foundations for such collaboration.

In particular, peer learning between regions and communities with shared characteristics, such as coastal and island communities in the Shetland Islands, Iceland and the Faroe Islands, could be more meaningful than national-level comparisons. Small or island communities face similar challenges, and learning at this scale could better support adaptation to specific local conditions and strengthen connections between communities with shared experiences. Such initiatives could include dialogue forums and workshops aimed at exchanging knowledge on the practical use of participatory tools such as PPGIS in MSP processes; sharing examples of how to integrate assessments of economic, social, environmental and cultural values; exchanging experiences on institutional requirements for continuous monitoring, transparent reporting and iterative plan adaptation; and sharing practical examples of how to communicate the purpose and value of engagement, including why local actors are involved, the benefits they bring and how their input informs MSP outcomes.

Complementing this type of peer learning, North Atlantic countries would benefit from collaborating on the development of shared, cross-border digital infrastructure, such as open-source, modular and continuously updated spatial data platforms that support transparent and inclusive decision-making. Building upon existing initiatives like the Nordic Spatial project,^[3] a regional data hub could serve as a repository for harmonised and locally sourced data, accessible to municipalities, regional authorities, national governments, community groups and other actors such as NGOs and universities across multiple governance levels.

3. For further details, see: <https://www.norden.org/en/publication/nordicspatial>

5.3 Identifying local actors while embracing change and continuity

Balance local and national interests through multi-level dialogue to support MSP decentralisation

Planning occurs on different scales throughout the North Atlantic region, with approaches ranging from planning that encompasses all national marine areas, as in Denmark, to fjord-specific planning in Iceland. MSP operates across multiple governance levels, with national objectives often interpreted and implemented at the local scale. Decentralising certain MSP responsibilities where appropriate could allow planning processes to tap into the expertise of those closest to the local environment, enabling a more effective response to the specific social, cultural, economic and ecological dimensions relevant at each scale. Recognising the value of established local groups, such as environmental boards, community associations and municipalities, grounds planning in existing structures and facilitates the integration of local perspectives, including ILK, into higher-level frameworks.

Decentralisation alone is insufficient without structured and continuous dialogue between local, regional and national planning levels to ensure coordination, align priorities and integrate ILK into broader MSP objectives. Strengthening multi-level dialogue supports the localisation of national objectives while enabling national authorities to better understand local priorities and needs. Institutionalising these dialogues through recurring forums, cross-scale advisory groups or shared digital collaboration platforms could make planning processes more coherent, transparent and adaptive. Digital tools can further support these processes by connecting fragmented dialogues, reducing duplication of stakeholder input and enhancing transparency and accessibility across governance scales.

Identify and understand evolving local environments and communities

Knowing "who we are planning for" requires identifying and understanding who constitutes the local community, including both residents and relevant user groups, and how this composition changes over time. Understanding evolving local environments requires continuous and context-specific analyses within MSP that examine economic, social, environmental and cultural dynamics. This includes identifying community actors and their roles, as well as recognising both use values (such as fisheries and aquaculture) and non-use values (such as ecosystem services). MSP processes need to recognise such knowledge as evidence alongside scientific data, ensuring that diverse values are accounted for.

Continuous and participatory assessments that capture all these aspects are important, ideally beginning with early assessments and updated regularly to reflect temporal and spatial changes while remaining responsive to evolving communities, shifting baselines and emerging environmental pressures. Developing and applying context-specific indicators to identify Indigenous and local communities and monitor change over time can support this process. Institutionalising adaptive MSP through regular monitoring, transparent reporting and iterative adaptation of plans can further ensure transparency about weaknesses and gaps in available data, and improve processes for updating information as technology, knowledge and stakeholder input evolve. Clearly communicating the purpose, format and benefits of engagement helps avoid participation fatigue while fostering trust as the foundation of effective governance.

This approach enables planning to be situated within a more forward-looking framework that accounts for shifting baselines driven by demographic, economic and environmental changes, supporting the development of future-driven scenarios for proactive, long-term decision-making that can ensure liveable and resilient coastal communities.

6. Concluding remarks

This report has shown that integrating ILK into increasingly digital MSP processes is not simply a technical challenge but a governance one. It requires attention to power dynamics, institutional conditions and the diverse values that shape how different forms of knowledge are recognised and used in decision-making. As planning processes across the North Atlantic become more data-driven, there is a risk that knowledge held by Indigenous and local communities is overlooked, not through deliberate exclusion, but because the systems and tools shaping these processes are not designed with it in mind.

The cases and reflections presented here highlight that digital tools can both support and complicate this work. They offer new opportunities for transparency and participation, but risk privileging standardised data over the place-based, experiential knowledge of Indigenous and local communities if applied without sufficient reflexivity. Addressing this requires not only better technical skills but stronger institutional capacity, clearer roles and responsibilities and a commitment to continuous engagement with the communities whose knowledge could enrich these processes.

The key messages offered in this report are not a blueprint. Given the considerable variation in institutional, ecological and cultural conditions across the North Atlantic region, no single solution will fit all contexts. Instead, the report offers a foundation for dialogue and adaptation, contributing to a broader effort to strengthen reflexive, inclusive and learning-oriented approaches to MSP. We hope it serves as a useful resource for those working towards more just and equitable marine governance across the region.

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Appendix 1

Writing workshop program

4th of September 9:00 – 16:30

9:00 – 9:10 WELCOME

9:10 – 10:00 Introduction to workshop & overview of the project

10:00 – 11:00 Group work: Reflections on the problem formulation

11:00 – 12:00 Writing sprint 1: Case story development

12:00 – 13:00 LUNCH

13:00 – 14:00 Writing sprint 2: Case story development

14:00 – 15:00 Group work: Review & feedback

15:00 – 15:30 COFFEE BREAK

15:30 – 16:30 Group work: Identifying emerging recommendations

16:30 End of day 1

5th of September 9:30 – 12:00

9:30 – 9:45 Introduction to day 2

9:45 – 10:30 Refining our outputs: From cases to recommendations

10:30 – 11:10 Synthesis of recommendations

11:10 – 11:30 What happens next?

11:30 – 12:00 COFFEE BREAK

12:00 End of day 2

Appendix 2

PROJECT TEAM	AFFILIATION
Rebecca Eriksson	University Centre of the Westfjords/Nordregio, Iceland/Sweden
Rachel Shucksmith	University of Highlands and Islands, Scotland
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