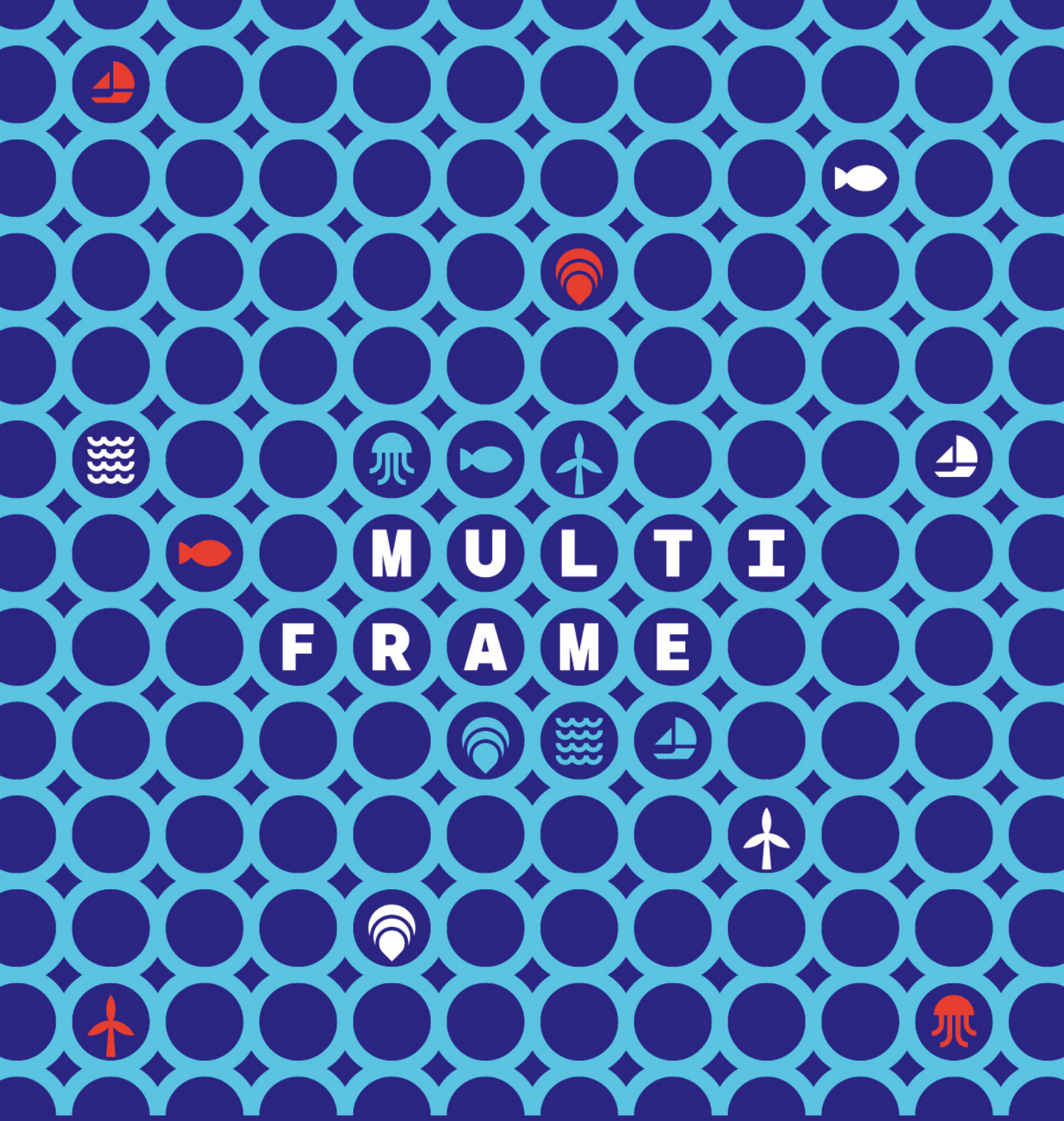

Transferability Report

A Comparison of Multi-Use Cases

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Abbreviations

CBOR – Costs, Benefits, Opportunities and Risks

MU – Multi-Use

MSP – Marine Spatial Planning

NIMBY – Not In My Back Yard

OMUAF - Ocean MU Assessment Framework

OMUA - Ocean MU Assessment

OWF – Ocean Wind Farm

Purpose of this report

For several years now, the MULTI-FRAME project has been closely following actors and stakeholders involved in Multi-Use (MU) in the following countries:

- Norway
- Sweden
- France
- Mozambique
- Brazil
- United States

Data has been collected about the implementation of each case study, notably from more than fifty interviews conducted with stakeholders. Various actors were consulted to investigate and understand how they perceive MU, the policy landscapes, and various challenges and opportunities relating to implementing MU.

Each case study also tested the Ocean MU Assessment Framework (OMUAF) (McCann et al., 2023) developed in the context of the MULTI-FRAME project.

The aim of this report is to highlight key similarities and differences experienced by case studies exploring similar MU scenarios under different contexts, and, to highlight the lessons that have been learnt from this project that may be transferable to future MU cases in development around the world.

Owing to unforeseeable delays in the data collection of the MU cases in Mozambique, those case studies have had to be excluded from the present transferability report. Further, both France and the USA included 2 cases each, a short-term scenario, and a long-term scenario.

The cases thus included are:

Brazil - Artisanal fishing and community-based tourism in conservation areas
Norway - Aquaculture with emerging types of aquacultures and/or tourism
France – Fishing and/or aquaculture based tourism
France – Offshore wind energy with fishing and/or aquaculture
USA – Offshore wind energy and tourism
USA – Offshore wind energy and commercial fishing
Sweden – Offshore wind energy with aquaculture in or near conservation areas

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WHO IS THIS REPORT WRITTEN FOR?

This report is intended to inform anyone interested in Marine Spatial Planning (MSP), marine policy, MU, or involved in developing MU at sea. The report will be particularly useful for those interested in specific lessons learnt from the ad-hoc use combinations covered by the project.

Methodology

Data collection as part of the MULTI-FRAME project has been conducted by means of a methodological framework. Steps 1- 5 below represent the common work undertaken as part of the MULTI-FRAME project by all project partners to date, while Step 6 is still ongoing and is more specific to this transferability report.

1. The method began with project partners leading each case study (henceforth: case study leader(s)) conducting literature reviews (both grey and scientific) about MU. Though each case study leader focused on the status of MU in their respective countries, the review was broad and sought to identify cases and include knowledge about MU from anywhere in the world (Lukic et al., 2023). In parallel, case study leaders also held informal preliminary discussions about MU during the recruitment of primary stakeholders for their cases.
2. Separately for each case, this information was used to identify opportunities/risks and benefits/constraints relating to MU, and then further organizing these into categories/themes using the PESTEL structure: political, economic, social, technological, environmental and legal. Following round table discussions to validate these case-based PESTEL tables, a Master PESTEL table was collectively produced by case study leaders as an overview of the state of the art and current status of MU across the cases.
3. This Master PESTEL then became the basis to define the structure and specific questions for a series of structured interviews to collect in depth information about each case study. The same structure and questions were applied to all interviews across all cases to ensure comparability of interview results.
4. Over fifty structured interviews were conducted in the Spring and Summer 2022 with stakeholders across all case studies. The interviews were conducting in native languages by case study leaders, then all interviews were then transcribed, and if necessary, translated to English.
5. Analysis of the interview transcripts is ongoing (Winter 2022/2023), notably a quantitative analysis using NVivo.
6. Transferability analysis - Costs, Benefits, Opportunities and Risks (CBOR) analysis
    a. To extract useful and relatable insights about transferability of lessons learnt regarding the implementation of paired cases, a CBOR (constraints, benefits, opportunities, and risks) analysis for each sector involved in paired cases was conducted.

b. CBOR tables for each case are then paired up and comparisons made to identify similarities and differences.
c. Case study leaders of paired cases then reviewed and discussed the findings for each of the paired cases in light of key context issues.

Critical Reflections on the Method

A few critical reflections should be made regarding the methodology that was used in the project, but also for the analysis of this report. Three important ones are outlined hereafter.

First, though the interview structures and processes were standardized for all cases, it was not possible for the same person to conduct all 50+ interviews in 5 languages. Some inevitable differences between data sets from each country must be attributed to differences in how case study leaders conducted interviews, e.g., how far tangential points or anecdotes were allowed to be explored before interrupting interviewees, and also owing to how transcripts were transcribed and translated prior to analysis.

Second, to process such a vast quantity of data, some methodological focal points for the analysis had to be selected. In the case of this report, a focus on "sectors" was determined to be of value, providing take homes for key sectors represented across the MU cases. However, it could be a disadvantage to have this approach. For instance, using the label "sector" to qualify nature conservation is peculiar – it is more of a property or function of the area, an area of special interest with added values/benefits for other sectors, and without necessarily having their own specific stakeholders. Similarly, it may not be entirely representative or fair to consider tourism as a sector per se, given the sheer breadth of professions that can be involved directly or in the support of tourism. It is hard to define what stakeholders of "tourism" activities may be, notably when these may play multiple roles (e.g., fishermen diversifying their own incomes with tourism, as seen in the Brazilian case study).

Third, cultural aspects and effects are not specifically considered in this report and indeed the methodological approach of the project as a whole. Though it is clear that multi-use is extremely context-dependent and affected by the cultures and practices of the places where MU is being enacted, the present project lacked a specific task to explore the cultural differences between countries and cases, for instance, the way people (culturally speaking) perceive the sea, or novel technologies, or resource exploitation, or the knowledge of first nations, or new ideas relating to marine space utilization. Indeed, Marine Spatial Planning (MSP) is a (Northern) European concept, which is being transposed worldwide, and the way MSP and MU are understood by different cultures is not the subject of a specific enquiry in this project. Future research efforts seeking to explore and compare MU implementation in different places around the world should include a specific focus on cultural dynamics.

Finally, as applied science researchers, we likely have influenced the content of the results, through our interactions with stakeholders. Though the interview guide and interviewee selection process were designed to minimize the risk of influence on results, e.g. not defining what the term MU means until a specific point in the interview guide, there may have been other influencing factors besides. In many of the cases, MU was not common or even recognized at all, and for some stakeholders their knowledge of MU has emerged as a result of involvement in the project. This should be considered when interpreting the results from the interviews and the project as a whole.

The Pairing of MU Cases

Of the many types of sea space use from different sectors that are common today, some sectors and use types are more likely to be paired with others in MU constellations. For instance, for nearly two decades there have been discussions around shared use of space and infrastructure by offshore wind and aquaculture along several crowded northern European coastlines, notably off the coast of the Netherlands, primarily driven by a need for aquaculture to develop in and amongst windfarms. Indeed the need for MU combinations is usually highlighted by one/two sector(s) or have existing users/sectors within which other sectors are proposing to develop MU. The case pairings have thus been organized across the five key sectors that reappear in the case studies of the MULTI-FRAME project, as presented in Table 1 below.

Country ▶ ▼ Sectors	France	USA	Sweden	Norway	Brazil
Offshore wind	✓	✓	✓		
Aquaculture	✓		✓	✓	
Tourism	✓	✓		✓	✓
Fishing	✓	✓			✓
Nature conservation			✓		✓

Table 1 – an overview of which sectors are included in the MU case studies of each country

Transferability of stakeholder insights: analysis of benefits, constraints, opportunities, and risks by sector

Offshore wind

Offshore wind energy (OWE) production is on the rise all over the world, driven by an urgent need to decarbonize the energy sector and increase the share of renewable energy production. A global race is on to build larger wind turbines faster and establish larger wind farms as quickly as possible. In some instances, wind farm developers have been allocated large swathes of offshore space, e.g. in the North Sea or off the coast of Rhode Island. In some cases, government targets for increased offshore wind energy production may not align with the availability of space along busy coastlines and offshore areas, as is the case on the Swedish West Coast. Either way, it is clear that OWE production is proving itself to hold a key role in future renewable energy mixes, and will likely occupy increasingly large areas of marine space in the coming decades. It should also be noted that OWE farms, like marine protected areas, lead to spatial enclosures or restrictions, as opposed to other activities which instead may generate the need for MU. MU that integrates OWE, or OWE sites that seek to enable MU, will be critical to efficient and sustainable development of coastal resources in the coming decades.

1. MU and coexistence open communication channels, bringing more actors to the table and offering up better chances of positive dialogue. It may induce better acceptance of OWE and its better integration in the local context/ with traditional uses.

2. Such dialogue is particularly necessary, as OWE developments can be the source of tensions & conflicts whether due to a hitherto lack of authentic inclusivity (i.e. involvement of parties of interest and transparent/accountable inclusion in decision-making processes) in OWE planning practices, competition with traditional sea space uses or NIMBY (Not In My Back Yard) attitudes.

3. Operating in and amongst wind turbines results in inherent safety and liability risks, the mitigation of which may require costly investments in training or additional equipment/infrastructure.

4. There is a lack of evidence for biodiversity or other ecological benefits through e.g. artificial reefs or using excess energy to oxygenate sea floors, with measurement of such benefits being challenging and limited, and likely highly variable from place to place. Pilot demonstration projects (e.g. Horizon 2020 UNITED, EU-SCORES, and Horizon Europe ULTFARMS) have an important role to test such solutions in a safe environment and collect evidence for future planning.

5. Stakeholders mention the possibility of both economic benefits (e.g. from shared resources, infrastructure or other maritime services) and of additional economic costs (e.g. adapting farm designs to reach compromises in the context of MU planning). OWE is also highlighted by some as being an energy sector for which profitability can be challenging, thus cost reduction is prioritized rather than developing technological innovation with, for instance, MU.

Tourism

Several of the MULTI-FRAME case studies feature tourism, though each in rather unique ways, motivated and driven by respective contexts and opportunities.

Brazilian case: local fishermen are organizing community-based tourism activities to promote their traditional fisheries, diversify local tourism business models and offer educational activities that increase awareness of local conservation efforts, local marine/coastal ecosystems, and human uses.

Norwegian case: aquaculture actors are developing tourism activities in an effort to reach out to the public (e.g. tourisms, scholars, professional from other sections), to raise knowledge levels about fish farming, and eventually create a vocation for scholars to work in the aquaculture sector. Tourism activities are also developed to educate the public about the ocean by increasing their collective understanding of seafood production, as well as their knowledge of the local historical practices. Further, offering the possibility to visit fish farms contributes with science/facts-based information to the debate about the environmental impact of the aquaculture as well as generating a vocation for young people to work in this sector.

United States case: While not in the project case study area, the Block Island Wind Farm (BIWF) located within a similar region has experienced increased tourism activity. For example, charter boats are offering wind farm tours to the BIWF which are also considered reliable fishing areas and can help to meet charter experience expectations. Individual recreational anglers are also frequenting these areas for fishing. It also offers the opportunity to educate anglers and charter guests to learn about renewable energy, increasing stewardship, and climate change literacy.

French case: there is a post-pandemic rebound in the demand for discovering and experiencing activities such as aquaculture and fishing, and these tourism activities at sea are seen as an

important opportunity to diversify local coastal economies and raise awareness about these traditional sea uses and to promote regional territories.

Despite each of these cases being unique compared to one another, they all involve tourism in some way or another. Furthermore, each case is subject to key contextual differences, for instance in terms of each country's environmental legislation, national/local priorities or marine spatial planning systems. Despite how different these cases and national contexts are, some key similarities were identified regarding the role played by Tourism in MU combinations.

1. Tourism offers a key opportunity or benefit by playing a critical role in increasing knowledge levels about the activities it is paired with, or more generally increasing ocean literacy, dispelling misconceptions or raising awareness about local cultures, traditional practices, ecologies or environmental challenges, seafood, etc. either as a discussion forum as part of the activity or indirectly by offering opportunities as educational tools for schools or citizen science projects.

2. Tourism is also seen to hold the potential opportunity/benefit of diversifying local economies, e.g. providing alternative incomes or new economic opportunities to the areas in question, which could also have positive rebound effects on associated sectors and their respective application processes.

3. Tourists can be given the opportunity to come into direct contact with coastal/marine stakeholders and get a sense of the traditional practices and communities in these areas, i.e. integrating tourism into MU can enhance community-based tourism, as opposed to reinforcing established mass tourism.

4. Some key challenges can also emerge from integrating tourism activities into MU, for instance relating to safety and risk management, potential regulatory issues with taking tourist groups to locations at sea, and additional investment costs and training of personnel to conduct the tourism activities safely and satisfactorily, to name a few.

5. Some of the cases also report potential challenges around the prioritization of activities, e.g. in Norway aquaculture would always need to be prioritized over tourism, whereas in Brazil it could be foreseeable that tourism could be more profitable than traditional fishing, leading to a decline in the latter.

Aquaculture

The MU cases that include aquaculture in the MULTI-FRAME project represent a range of different aquaculture activities. In Norway, the case is exploring the development of novel/emerging types of aquaculture (e.g. of seaweed) alongside established finfish aquaculture (and tourism), whereas in

Sweden the case is hypothetical and focused on seaweed farming (combined with OWE possibly within a conservation area), while in France the case is relating to established shellfish aquaculture (in combination with fishing and either tourism (short term) or offshore wind (long term). More so than for other sectors covered in this report, there are few overlaps in the transferability of lessons learnt. Similar issues are raised, however often from different perspectives.

1. In terms of the economic impacts, the cases have very different takes on the economic benefits or costs of aquaculture in MU constellations.
    a. In Norway, the integration of MU is seen as an economic constraint, a cost that is accepted as a form of hands-on marketing (e.g. increased awareness of aquaculture practices through tourism activities). Furthermore, there is the possibility of diversified production and additional positive economic rebound effects from secondary activities (e.g. linked to tourism, like hotels and restaurants) and tertiary activities (e.g. schools, public transport, and shops to support everyone living in these remote locations).
    b. In France there is an acknowledgment that integrating tourism can help to diversify revenues and strengthen the economy, however, it is also acknowledged that this can come at a higher cost if the activity is undertaken farther offshore where there is a lack of mature business models (e.g. due to the fuel and time spent on-board)
    c. In Sweden, perhaps due to the hypothetical nature of the case, interviewees were generally more optimistic about economic benefits, e.g. from sharing infrastructure and human resources.

2. In terms of permitting and licensing processes, MU constellations open the possibility of a more integrated and conflict-mitigating approach to MSP. In practice today, however, that potential is not yet realized although there is some political support for integrating e.g. OWE and aquaculture in offshore areas. Some local authorities support these types of activities, while others oppose them; much depends on the local context.

3. As is the case for other sectors, risks, and safety are highlighted as critical and in need of being addressed when integrating aquaculture with other use types. Higher risks are also key constraints of economic uncertainty.

4. Improved perception and increased acceptance of aquaculture –MU aquaculture can benefit from increased visibility (local, regional, national) by demonstrating these practices and developing clientele through tourism activities. The tourism activity is a form of marketing (Norway) to increase public knowledge about aquaculture and the Ocean/sea.

Fisheries

Perhaps the most established or long-running use of our ocean space is around the fisheries sectors, with fishing traditions at sea and fishers themselves going back generations and forming the basis of regional livelihoods, cultures, and identities. Across the MULTI-FRAME cases, fisheries stakeholders were interviewed regarding their roles as part of MU proposals, projects or ongoing activities. The importance of context from case to case cannot be sufficiently emphasized as key when it comes to MU involving fisheries. Both Brazil and France (short term) depict cases of smaller-scale fisheries differing greatly from the more industrial/commercial fishing scale described in the US and that surround the Swedish MU site. Furthermore, the fisher stakeholders in Brazil and France (short-term) cases play a double role: alongside their baseline fisher activities, they are also the ones conducting the tourism activities. Nevertheless, some key take homes emerged though may largely be context dependent.

1. Fisheries are in crisis around the world, from a combination of global pressures like rising fuel costs, environmental and climate changes, fish stock reduction, international competition and food prices, to regional ones like Brexit. Not all the MU cases from the MULTI-FRAME project include the fisheries sector as part of proposed MU, however, fishers are nonetheless inherent stakeholders in most cases (e.g. their fishing areas border proposed MU areas) and efforts should be directed toward their inclusion in any MU developments.

2. When undertaken in an inclusive and open manner, the process of developing coexistence or MU has been an opportunity for dialogue between sectors, notably with fishers. Negotiation and communication are key. Poor and non-inclusive planning practices have led to conflicts.

3. Combining fisheries with other sea uses offers up economic opportunities in the form of additional or diversified income streams, for instance, from the fishers, themselves offering up tours or carrying out services such as monitoring, crew transport, or providing other forms of maritime services.

4. Though MU can lead to socio-economic benefits in a number of ways, it is important also to recognize that direct economic benefits for each business or actor are not guaranteed, and some MU cases involving fisheries report economic tradeoffs.
    a. In France, for instance, pescatourism may, in fact, be less profitable than initially anticipated given the high costs associated with permits and equipment investments.
    b. Similarly in Brazil, there is a lack of financial resources to support pescatourism with necessary infrastructure (e.g. inland, docks, boat infrastructure), so the bigger picture of profitability is uncertain.

c. In Brazil, there is also a risk that tourism activity could end up being more profitable than fishery activities, which could discourage fishers from practicing fishing.

5. The combination of fisheries with offshore wind energy production is reported to be problematic in several case studies as a source of tension or conflict between these key stakeholder groups, as one is seeking to become a new user of sea space with permanently fixed activities, while the other is an established user with mobile and temporary activities. This highlights the need for transparent and authentically inclusive participation in MU processes, to account for all actors' needs and wishes, particularly in MU plans involving these sectors.
    a. Fishers express that they stand to gain little, and must give up large areas of sea space and economic gain to wind farm developers
    b. Effects on local ecosystems are unclear and highly uncertain, with both possible negative effects having been documented e.g. electromagnetic field emissions from subsea cables (Taormina et al., 2018), noise pollution (Kok et al., 2021), as well as positive effects such as possible biodiversity improvements from artificial reefs and infrastructure at sea (Fowler et al., 2018)
    c. Fishers acknowledge there are also a range of issues relating to safety, risk mitigation, and liability, e.g. increased vessel traffic, radars not picking up the turbines increasing the possibility of collision, or the use of certain types of fishing gear in proximity to wind farms

Nature conservation

Only the case in Brazil specifically involves nature conservation, though in Sweden there have been proposals to integrate OWE and seaweed farming within a nature conservation (Natura 2000) area. These cases are quite different, on the one hand, the Brazilian case uses the combination of fishers, tourism, and nature conservation to generate synergies between the three sectors, while in Sweden the established Natura 2000 area is the target area for a new MU project. As such the contexts and drivers of MU for these cases are quite different.

1. Combining nature conservation in MU clusters can enhance ocean literacy and the perceived value of protected areas by providing a platform for discussion about coastal/offshore impacts, ecosystem dynamics, and marine biodiversity as well as about local knowledge, traditions, cultures, and natural areas

2. There are regulatory or legal barriers to combining activities in protected areas like Natura 2000 or MPAs (Marine Protected Areas), where strict rules govern what can and cannot be permitted. In Brazil, the MU case was developed to adhere to the rules for Brazilian MPAs.

3. Stakeholders also expressed concern about how MU can promote or support conservation goals, and about how MU in conservation areas may be perceived by the public.

    a. The reef effect from some activities may have positive environmental effects (e.g. on biodiversity) though these are likely to be very localized, specific to that area, and are difficult to measure and verify, especially before the activity is given a permit. In some cases, it is thought that it could also take years for benefits to become established.

    b. It should also be acknowledged that some activities may also have negative environmental effects (e.g. from installing infrastructure, or from increased vessel traffic which can be particularly impactful in fragile ecosystems like mangroves)

    c. MU per se does not imply that environmental impacts will be less than those of two or more uses developed separately (i.e. in their own zones). The careful assessment of cumulative impacts in a combined MU setting is needed to come to an optimal set up of uses, deriving environmental synergies if and where possible (such as the case in integrated multitrophic aquaculture systems).

Take home messages: a global perspective on current MU development and implementation

Summary

- MU in theory is all about win-win however in practice MU is usually about trade-offs.
- Safety and risk mitigation are critical and are often overlooked in MU conceptualization.
- Authentic inclusion of parties of interest results in sustainable ocean planning solutions
- MU offers the potential for conflict management through inclusion, communication, and compromise.
- Flexibility and willingness to adapt or compromise by all parties are crucial for MU.
- The economic benefits of MU are not guaranteed for all parties.
- Environmental benefits are assumed in many cases and not guaranteed.
- Tourism can play an important enhancement role in support of marine activities and MU
- Every case of MU is different and context dependent.

MU in theory is all about win-win however in practice MU is usually about trade-offs. Maximizing possible synergies for all parties isn't always possible, some usually have to make sacrifices and lose out. Inclusivity and good communication about these situations are key.

Stakeholders of the **Swedish case** all acknowledge that MU proposals have the potential to lead to important societal gains and *win-win situations*. For instance, the proposed OWE combined with low trophic aquaculture developments would lead to more renewable energy production (in line with national targets), and there may also be possible reef effect benefits, regional job creation, the potential for negotiated local benefits (e.g., reduced energy costs for locals), to name some examples, if synergy with other uses is considered at the planning stage. However, fishers also express that some MU proposals are applying to be in areas that used to be important fisheries areas, which in turn detracts from their ability to meet government targets for sustainable seafood provision. This leads to a *trade-off between OWE production (even combined with low trophic aquaculture in this case) vs seafood production from fisheries*, in this case primarily resulting from conflicting government targets, poor marine governance, and a lack of a clear participative MU process.

The long-term scenario in **France** (i.e. fishing and/or aquaculture within offshore wind farms) also shows that synergies from MU planning require some trade-offs. Although some seafood producers are willing to take advantage of opportunities at offshore wind installations to expand offshore, they still have to overcome technical, economic, and social challenges as well as the lack of interest in and benefits for wind developers. Offshore wind development is and will increasingly be impacting commercial fishing which is already facing difficulties (environmental changes, increasing fuel costs, Brexit, etc.). However, agreements were reached between both sectors to minimize and compensate for the impacts of electricity production at sea on fishing activities, for instance by planning wind farms construction and connection to the grid together with fishers and making it possible for passive and sometimes active fishing gear to operate in those areas.

Safety and risk mitigation are critical and are often overlooked in MU conceptualization, only to become hindrances or barriers during implementation.

Taking tourist groups out to Sea to visit aquaculture fish cages in **Norway**, for instance, or simply receiving them in industrial aquaculture production facilities that were not originally designed to cater to tourist groups, can pose a *safety risk* and may require some degree of adaptation of local infrastructure or investments into new systems to ensure compliance with safety standards. Another example of risks resulting from tourists visiting aquaculture sites is that the heightened levels of activity due to the tourists' presence can cause elevated stress levels in the fish, and result in repercussions for productivity and fish welfare. In such situations, aquaculture companies would prioritize fish welfare, which poses *a risk to the stability/reliability of the tourism activity*, i.e. it could be temporarily closed to visitors with little warning.

Most interested and affected parties in **the US MU case**, specifically commercial fishermen, indicate that *safety and navigation risks* are some of the most significant barriers to successful MU between offshore wind and commercial fishing. Fishers have expressed fear and uncertainty about risks associated with towing gear and navigating through an offshore wind array and, while developers have compromised with a 1x1 nautical mile grid design, many fishers will choose not to fish in the wind farms because they either do not believe that this distance is enough for safe use or they are unable to get insurance coverage to fish in these areas.

In **Brazil**, safety was also identified as the main obstacle to promoting MU. There is a significant economic investment needed to adapt and construct infrastructure and safety equipment, which are deemed the responsibility of the tour operators. The limited *investment in safety and infrastructure* has directly impacted the number of tours as these can only happen in limited conditions and reduced the income generated. Support to overcome this hindrance would be strategically valuable.

Authentic inclusion is critical for sustainable ocean planning - i.e. early involvement of parties of interest, inclusion in decision processes at all levels and transparency about how decisions are made.

In the **US case** (and in the **French case**), many interested and affected parties expressed a lack of or declining trust in the offshore wind energy development process. They find it difficult to participate in opportunities for public engagement and, when they do, they often feel like their voices are not listened to or considered. For example, Rhode Island commercial and recreational fishermen engaging in the South Fork Wind development process explicitly said that the wind farm should not be developed on Cox's Ledge, a historically important fishing ground and essential fish habitat. Despite extensive engagement by these interested and affected parties, the wind farm was cited on Cox's Ledge, resulting in significant trust issues and a lack of willingness to engage in future projects. Interested and affected parties have called for *transparency in the process*, especially in how public comments are being incorporated into offshore wind energy design and development.

In the **Brazilian case** study the inclusion of stakeholders lies at the foundation of the management strategy. Since the MU site is a Marine Protected Area, the dialog and partnership with local fisheries has been necessary to deal with current issues and new proposals. The MU proposal and de-regulations aspects have been established in collaboration. Fishermen in particular have provided detailed knowledge about sites of potential interest for tourism, places to avoid, and how to include fishery practices into tours. Furthermore, transparency and accountability have been enhanced through participation in the process of evaluating rules, also allowing the inclusion of different perspectives and practices.

Stakeholders of the **Swedish case** report an urgent need for *better communication* between all marine activity parties, from regulators, authorities and politicians (national and local), to fishers, energy companies and citizens. The main reason for this need, it seems, is the lack of a clear, functional, inclusive, and fair process for offshore developments to follow. In the present system, OWF developers or any other marine space user are able to submit applications for licenses in sea space without prior consideration of existing activities in that space (e.g. fisheries), which has led to conflict with existing users, who find out that their activities are threatened through news articles, rather than through respectful dialogue. To facilitate the development of a sustainable blue economy in Sweden, notably through MU, all interviewed stakeholders agree that a streamlined, transparent, and fair process must urgently be developed with *authentic inclusion* at its core.

MU offers potential for conflict management through inclusion, communication, and compromise, but MU does not guarantee this systematically. If parties are left out in the early stages of MU conceptualization and their views aren't accounted for, it can be very difficult to overcome consequent rifts.

MU inherently requires the involvement and collaboration of all ocean users considered in the proposed synergies. In the **US case** study, this means that fishermen, recreational users, regulators, developers, marginalized communities, environmental organizations, etc., are all at the table working together to determine MU opportunities and the next steps. In order to ensure that every interested and affected party is part of the conversation, the US Case Study (CS) Leads continually asked the question: *who else should be at the table?* Through this iterative engagement, Environmental Justice organizations, aquaculture representatives, and others were included in the OMUAF process and the MU goals for both US cast study scenarios (offshore wind energy and commercial fishing, offshore wind energy and recreational fishing) were more holistic than CS leads originally hypothesized. When these conversations are inclusive, holistic and compromise-based, concerns and potential impacts of offshore wind development may be addressed before planning and design have been approved. With synergies in mind, this early collaboration may lead to the minimization or mitigation of conflict before a lack of trust inhibits sustainable and equitable ocean planning.

Stakeholders of the **French case** study expressed the view that readiness for discussion and fair negotiation frameworks were critical to MU developments. This is particularly true for sectors with conflicting interests like commercial fishing and offshore wind. National and local consultation processes were set up to minimize and compensate for the impacts of offshore wind development on fishing activities. Besides, fishers were involved in the mapping, design, and construction planning of wind farms. This is how trust and communication channels were established between both sectors.

Conflicts have emerged surrounding plans for OWF **in Sweden**, primarily because of the lack of a clear, fair, and inclusive process to apply for licenses and permits for activities at sea. The existing system is complex, uncertain, and costly, involving numerous applications to different authorities, and those applying do not have the ability also to identify let alone communicate with other parties of interest, who might be affected by or find opposition to their plans. The case in point, conflicts have arisen between OWF and fishers in Sweden as fishers have found out that their fishing grounds may be threatened through news articles about OWF developments. The government intervened in 2022 by issuing an assignment to one of the government authorities to mediate discussions/negotiations between OWF and fisheries to determine pathways of coexistence.

Stakeholders that were interviewed see that updating marine planning and permitting systems in Sweden in line with MU enabling practices offers an *opportunity to mitigate conflicts* and avoid future misunderstandings.

Flexibility and will to adapt and compromise are crucial amongst actors of MU – work routines, protocols and efficiencies, insurance policies, regulatory landscapes, and much more will need to change to integrate MUs at sea, which can have rebound effects on profitability in both the short and long term.

In the **Norwegian case**, the integration of tourism into aquaculture facilities meant that operational protocols needed to be revisited and adapted to some extent. Taking tourists into aquaculture facilities requires additional safety precautions, fish welfare precautions, and also new protocols to be developed to manage the potential increase in stress in the fish due to a heightened presence of people. However, in the Norwegian case, adaptation is also necessary in a broader sense as the aquaculture facility in question is in a relatively remote area. To cope with the increase in human activities linked to increased tourism in the area, the local municipality needs to adapt to new challenges ranging from increased waste management to a host of new facilities to support the tourism workers (e.g. local schools, shops, etc.). These adaptations are also essential to support MU in the area and exemplify how *adaptation can be required of parties who may not be directly involved in MU*.

Though the **Swedish case** does not offer specific examples of flexibility or adaptation by stakeholders during the implementation of MU, as the case is hypothetical and not yet implemented, some actors in Sweden have drawn strategies from abroad that demonstrate a *willingness to negotiate and adapt their plans*. When confronted by NIMBY (Not in My Back Yard) attitudes of local residents/municipalities who argue they will not benefit from OWF, as is done in other European countries, developers offered for instance to commit to hiring a certain number of locals for operations, while also offering lower energy rates.

In the **US case** study, many interested and affected parties viewed offshore wind and tourism as an organic synergy, meaning that recreation and tourism activities are likely to take place in the proximity of the wind turbines with or without collaboration with developers. These tourism activities include but are not limited to, individual recreational anglers and boaters, charter fishing operations, spearfishing, and sightseeing tours. For the purpose of the US Case Study, the scenario focused primarily on recreational anglers, both individuals and charter businesses. The research found that offshore wind arrays are beacons of good fishing, increasing the likelihood of catching for anglers and potentially saving a charter trip if the fish are not biting elsewhere. Additionally, offshore wind

may diversify charter and angler experience by offering the opportunity for recreators to view and learn more about offshore renewable energy/climate change. This ocean literacy fosters stewardship of the marine environment and a keen interest in engaging in MU conversations. For the US Case Study, recreational fishing synergies were first centered around the benefits of habitat creation and economic diversification, however, through the OMUA process, interested and affected parties began to engage in broader ecosystem impact conversations, bringing developers and regulators to the table to learn more about net-zero biodiversity goals aligned with this marine stewardship. Tourist and tourism operators drove MU conversations from organic win-wins to a conversation that considered the ecosystem as its own entity in the development of recommendations and next steps of MU implementation.

Economic benefits from MU are not guaranteed for all parties – but there can be other additional benefits (e.g. increased acceptance, favorable consideration in MSP/licensing for attempting to integrate uses), or secondary economic benefits (e.g. access to new offshore areas or new growth opportunities).

In the **Norwegian case**, the idea of introducing tourism into aquaculture facilities is more a result of the need to educate the public about aquaculture (and oppose disinformation), rather than a result of a profit motive. The aquaculture sector is in a situation where outreach in view of informing the public has become a necessity. In the long term, it could result in positive economic rebound effects too, perhaps increasing the interest in seafood, though such benefits are hard to quantify. It should also be noted that there is also a need for additional infrastructural investments in the local community to support tourism activities, e.g. schools, shops, waste management, etc.

Stakeholders of the **French case** study are aware that MU may not generate direct economic benefits. Fishers and shellfish farmers diversifying through tourism need to adapt their boats to safely accommodate visitors. Allowing fishing within offshore wind farms represents a constraint for developers and integrating seafood production may lead to additional costs or even undermine profitability. However, combining these activities together can secure their future in a changing world. Taking tourists onboard is a way to promote fishing and aquaculture and thereby expand the clientele. It also can attract workers in these sectors that may be not so visible and attractive to younger generations. Opening offshore wind farms to fishing and aquaculture can foster offshore wind farms' social acceptance and minimize the impact or even create new opportunities for traditional activities.

For the **Brazilian case**, the inclusion of MU did not bring any economic benefit to the PMER (the marine protected area). Even so, other benefits have generated the interest of the representatives of this institution, such as environmental education, better training and communication of fishermen,

and dissemination and knowledge sharing it's their natural areas. Thus, the MU has contributed to the approximation and diffusion of the historic uses present in the area, and also valuing nature conservation.

Environmental benefits are also assumed in many cases, often based on assumptions about biodiversity benefits from the reef effect from infrastructure at sea or synergies from increased efficiency. It should be noted that in some cases MU enables a net increase in human activity (relative to single-use (s)) which in turn can increase anthropogenic pressures (e.g. noise, pollution, local wastes emissions, energy use) resulting in environmental impacts which are easily overlooked.

Stakeholders of the **Swedish case** often mention the potential benefits of introducing seaweed farms or other structures in the marine environment, notably in terms of the so-called 'reef effect', whereby the installation of nearly any physical infrastructure at sea can lead to the generation of new habitats for species to colonize and may eventually lead to increases in biodiversity. The assumption is also quite common that introducing seaweed farms will likely benefit any offshore wind energy proposals, as seaweed farming is a hot topic and could improve the perceived value of these proposals, not least through synergies from an environmental point of view. It should be noted however that measuring and verifying such environmental benefits is difficult in practice.

The challenge of monitoring and quantifying the reef effect benefits was also commonly discussed in the **US case**, notably in terms of the offshore wind sites and their potential benefits for local fishermen.

As aforementioned relating to the **Norwegian case**, the aquaculture facility located in a relatively remote area had to cope with the increased environmental pressures owing to the increase in human activities linked to tourism in the area. The host fish farm and the local municipality have had to increase their waste management and invest to offer tourists the adapted infrastructures. This exemplifies the point that though we often assume multi-use to have environmental benefits, we should not forget also to assess potential impacts resulting from multi-use activities.

Tourism has a particularly important role in support of marine activities and MU: enhancing ocean literacy, supporting local communities and traditional activities, and diversifying economies.

In the **Brazilian case,** for instance, tourism was formulated as a community proposal and so the whole design of the activity and business model aimed to include the characteristic of the CS and

the needs of the local fishermen. From a more stable income to the promotion of the uses and natural spaces, these represented challenges in the effectiveness of the fishing activity and the fishermen's way of life. This case indicates that tourism based on local interests can make a great social and economic contribution to the coastal communities.

Tourism is considered a main MU driver by stakeholders of the **French case** study, especially in the short-term scenario (fishing and/or aquaculture-based tourism). Fishers and shellfish farmers take tourists onboard to promote fishing and aquaculture's places, traditions, and products. They also try to raise awareness and address challenges they are facing (tarnished image, environmental changes, difficulties in attracting workers, etc.). Finally, taking advantage of tourism is often part of broader strategies aiming at diversifying fishers' and shellfish farmers' revenues, supporting local communities, and promoting territories. Offshore wind developers are also interested in exploring opportunities offered by tourism to foster marine renewable energies' social acceptance.

MU development is extremely context-dependent. Every case of MU is different and specific to the country's regulatory landscape, local geographies, and culture.

- Management of feasible space? Coastlines with more demand or overlapping user pressure and less total marine space may have greater incentives for OWE to work in MU constellations. Specifically, countries such as the Netherlands or Belgium with relatively small coastlines with a long history of maritime activity and that are now industrialized, geographically limited by the UK's marine territories, and with numerous overlapping and competing needs for marine space, are faced with a much greater urgency to enable MU than countries with much larger coastlines. Such differences in context can affect the political will, facilitate overcoming key hurdles, and catalyze MU implementation.

- Questions of the scale of activity? Profitable, large scale and powerful industries like salmon aquaculture in Norway or OWE in the North Sea do not have the same challenges or concerns as less profitable, small-scale ventures like seaweed farmers, community-based tourism initiatives, or traditional fisheries. Thus scale is a key factor to consider when planning or implementing MU activities.

- Political influence? Political factors can drive or hinder MU or specific sectors, e.g. through national targets for seafood production or offshore wind energy production. The political and geopolitical landscape, as well as national priorities, all have an effect on the planning and implementation of MU.

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TRANSFERABILITY REPORT

Title: Transferability Report – a comparison of Multi Use cases

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