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Facilitating the ecosystem-based management transition in Aotearoa New Zealand

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ABSTRACT

In response to growing social and ecological pressures, ecosystem-based management (EBM) has been proffered as an alternative governance regime for marine and coastal systems in Aotearoa New Zealand. The challenge of how to engender a transition to EBM remains, however. This paper investigates the proposition that Marine Spatial Planning (MSP) can be a tool to drive the EBM transition by analysing the ocean and marine governance transition in Kaikōura over the past 20 years. The findings suggest that taking a top-down MSP approach to governance can crowd out some of the principles of EBM, but MSP can support the implementation of EBM principles if sufficient attention is given to developing institutions and processes that prioritise local decision-making and provide sufficient support for ongoing engagement and participation by local actors.

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Introduction

Aotearoa New Zealand (Aotearoa NZ) is struggling to halt the ecological decline of its marine and coastal systems. Pressure from climate change and human use is having run-on effects for system health and there is growing demand for new governance approaches that consider the needs of both the environment and communities in an integrated way (Peart et al. 2019; Ministry for the Environment and StatsNZ 2022; UNEP 2022). In 2021, the New Zealand Minister for Oceans and Fisheries released a ‘bold new vision’ that emphasised the need to take an ecosystem-based approach to ocean and coastal ecosystem research, monitoring, and management (Parker 2021).

In 2024, the new Minister for Oceans and Fisheries remains committed to ensuring the health of the marine environment, whilst simultaneously supporting the economic

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opportunities it offers (Jones 2024). Internationally, the literature on marine and coastal governance suggests that managing trade-offs within marine social-ecological systems requires an integrated approach to decision-making and a consideration of both the needs of the environment and the communities and sectors it supports. Ecosystem based management (EBM) is recognised as the gold-standard approach for addressing competing demands across the social and ecological systems (Haugen et al. 2024), although transition pathways remain poorly understood.

Unlike traditional marine management, which focuses on a single species or sector, EBM offers an integrated framework to guide decision-making in the marine space (Levin and Lubchenco 2008; Ehler and Douvère 2009; Long et al. 2015; Le Tissier 2020; Macpherson et al. 2021; Clark et al. 2022). In Aotearoa NZ, a set of principles have been used to capture the social-ecological governance settings necessary for EBM operation in the local Aotearoa NZ context (Hewitt et al. 2018). The principles emphasise the need to prioritise the cultural, social, and economic demands of the local context, particularly providing for Te Tiriti o Waitangi¹ and building and strengthening relationships with Māori, the need to recognise ecological stressors (including cumulative effects), the need to design systems that provide for intergenerational wellbeing across scales, and the importance of embedding a consideration of the many competing interests, uses, values, and activities within coastal and marine areas. The principles also capture the idea that any future application of EBM needs to be underpinned by an institutional arrangement that is dynamic, adaptable, can absorb shocks, and recover quickly (Grafton et al. 2019).

Nevertheless, as is the case globally, pathways for achieving deeper systematic reform are unclear in Aotearoa NZ. Part of the reason for this is that the institutional management landscape for marine and coastal systems is complex and overlapping (Macpherson et al. 2023). Aotearoa NZ's large coastline and Exclusive Economic Zone (EEZ) support a variety of sectors and marine and coastal environments over 4.2 million km². The diverse array of marine habitats and biodiversity and resources currently invoke joint regulation by government at the central and local levels, as well as a range of Māori entities that operate at the *iwi* (tribe), *hapū* (sub-tribe), *whānau* (extended family), individual and national levels (Reid et al. 2019).

In some Aotearoa NZ and international jurisdictions Marine Spatial Planning (MSP) has been used as a tool to drive an EBM transition (Ehler and Douvère 2009; Ogden 2010; Irish 2018). Defined as '[a] process of analysing and allocating parts of three-dimensional marine spaces to specific uses, to achieve ecological, economic, and social objectives that are usually specified through the political process' (Ehler and Douvère 2007, p. 11), the MSP process can lead to a new comprehensive plan or vision for a marine region. However, for coastal and marine systems, which are socially and ecologically complex, MSP's emphasis on changing the management rules or 'hooks' may be insufficient for shifting the direction of the multilevel governance regime towards EBM (Macpherson et al. 2021). Instead, a transition to EBM requires altering the governance regime, including shifting the institutional 'anchors' – values, relationships, power dynamics, and so on – to support the social-ecological system to transition from one state to another (Macpherson et al. 2021).

In this paper, we examine coastal and marine governance processes in Kaikōura between the early 2000s and 2022. Over this period, the evolution of Kaikōura's governance arrangements can be split into two distinct phases: the first is characterised by

bottom-up decision-making, from which an EBM approach to decision-making organically emerged; the second was characterised by top-down decision-making, which led to the implementation of an MSP-style of decision-making. The results of the analysis suggest that although benefits arising from legislative legitimacy can be gained from taking a top-down approach to marine and coastal governance, this can come at the cost of community engagement and community ownership over decision-making. It highlights the importance of community involvement for delivering EBM in Aotearoa NZ. The article concludes with some recommendations for future reform to ensure Aotearoa NZ's approach remains consistent with international best practice, whilst being appropriate for the local context.

MSP as a stepping-stone to EBM

The pressures being experienced by Aotearoa NZ's marine social-ecological system are not new or unique: globally, pressure on marine and coastal systems is increasing. Interaction effects from climate variations and ocean systems are having adverse impacts on biodiversity and ecosystem health (Stock et al. 2019), overfishing has caused fish stocks to decrease considerably in the past few decades (FAO 2022), and marine heat waves and cold spells are having devastating effects on marine biodiversity, at regional and global scales from the surface to the subsurface (Yao et al. 2022). Unless marine populations, habitats, and ecosystems are rebuilt at scale within a human generation, neither Aotearoa NZ or the world is likely to meet United Nations Sustainable Development Goal 14 (SDG14 'life below water'), which aims to 'conserve and sustainably use the oceans, seas, and marine resources for sustainable development' (Duarte et al. 2020; Penn and Deutsch 2022).

Traditional marine management approaches, which have taken a single-species or sectoral approach to managing subsectors of the marine system, are now widely recognised as insufficient to meet the complex demands of communities and the environment (Simberloff 1998; Lidström and Johnson 2020). Focusing on single-species or sectors marginalises the dynamics and trade-offs involved in sustaining a healthy, functional social-ecological system. For instance, supporting one species at the expense of another can lead to decision-makers missing critical interaction effects within the system that could help foster social-ecological system resilience. Likewise, single-species or sectoral management provides fewer opportunities to foster complex adaptive systems thinking, encourage participation, or promote polycentric governance arrangements that have been shown to help support decision-making in complex social-ecological systems (Biggs et al. 2012).

MSP advances on these single-species or sector approaches. MSP takes an explicit planning approach to the regulation, management, and protection of the ecosystem by addressing the multiple, cumulative, and potentially conflicting uses of the sea (MSSP 2006). The overall aim is to create a more efficient and effective use of space and interactions between its uses, to balance conflicting demands and values, and to achieve social and economic objectives in an open and planned way (Ansong et al. 2017). For this reason, MSP has been envisaged as a tool to operationalise EBM by integrating social needs and demands into ecosystem management processes. Indeed, a coupling of MSP

and EBM has been argued to represent a new emerging paradigm of sustainable ocean management (Domínguez-Tejo et al. 2016).

Nevertheless, MSP and EBM are not the same. MSP is an explicit planning approach that endeavours to manage a defined area and is often driven by sectoral needs and the inherent politics of its goal setting processes (Jones et al. 2016). It is a rules-based, prescriptive, politically influenced process that can lead to outcomes that do not always align with changing marine dynamics across time and space (Gilbert et al. 2015). In contrast, EBM aims to manage connections and dynamics across terrestrial and marine environments guided by core principles (Sarda et al. 2014). These principles aim to enhance social-ecological system resilience by: one, maintaining redundancy and diversity; two, managing connectivity within the system; three, managing slow variables and feedback; four, fostering complex adaptive systems thinking; five, encouraging learning; six, broadening participation; and seven, promoting polycentric governance systems (Biggs et al. 2012).

Although recognised as best-practice, EBM is frequently perceived as challenging, complex, and slow to implement (Haugen et al. 2024). Issues associated with governance, stakeholder participation, financial or resource support, and uncertainty can act as barriers to implementation and can limit decision-makers' enthusiasm for pursuing an EBM approach. In contrast, MSP is viewed as an approach or methodology that can be implemented with relatively quick political expedience through top-down processes in a rational and linear way (Jones et al. 2016). It also can operate without major disruption to existing decision-making structures or the balance of authority, which can be desirable in situations where an existing power imbalance benefits the current decision-maker (Flannery et al. 2018).

As Aotearoa NZ grapples with declining marine health, understanding how EBM implementation can be effectively supported is critical for addressing anthropogenic pressures. Although MSP can be a useful stepping-stone to EBM, it also has the potential to create tension in the delivery of EBM principles, particularly in terms of balancing top-down and bottom-up decision-making and facilitating community participation. There is also a risk that formalising decision-making through an MSP planning process can 'crowd-out' some of the more informal principles of the EBM process that rely on trust, co-production of ideas and knowledge, public participation, and so forth.

Below we explore how governance arrangements in Kaikōura have evolved over the last 20 years to understand how Aotearoa NZ can move towards EBM. Kaikōura's current governance arrangement was initially held up as a 'blueprint for community engagement and customary management of the marine environment' ('Kaikōura Marine Vision Realised,' n.d.). However, our results suggest that a formalisation of the community governance arrangement through law shifted the coastal and marine system further away from the EBM principles, rather than towards EBM. Our results and analysis lead to some recommendations for pathways forward for Aotearoa NZ to better support a transition towards EBM across different marine and coastal systems.

Methodology

To understand the usefulness of MSP as a tool to transition towards a more ecosystem-based approach in Aotearoa NZ an exploratory desk-based analysis of evolution of

coastal and marine system governance in Kaikōura on the east coast of Aotearoa NZ's South Island was conducted. Kaikōura offers a unique glimpse of how transitions in marine and coastal governance can evolve in Aotearoa NZ, and how future EBM transitions could be supported. Between the 1980s and today, the region moved through two governance transitions that essentially shifted the social-ecological system in Kaikōura towards EBM, and then further away as a version of MSP was formalised in law. Despite its long history of transition, little has been written about the Kaikōura experience, and this analysis offers a unique insight into how governance transitions towards EBM can be facilitated in Aotearoa NZ, and the challenges of formalising EBM principles in law.

To examine the transition towards a more ecosystem-based approach to management and understand whether MSP has helped or hindered the transition relevant legal documents (legislation, regulation and policies) were reviewed using socio-legal, contextual research methods (Cotterrell 1995). Primary legal documents and secondary literature were analysed to understand the operation of laws, policies and legal doctrine applicable to the Kaikōura governance arrangements in their social and cultural context. Data from the early 2000s through to 2022 were examined as this period covers the principal phases of transition. Because sources were limited, ethics approval was sought from the University of Canterbury to enable preliminary findings to be reviewed under conditions of confidentiality by institutional actors who were closely involved in the evolving governance transition (Ethics number HREC 2022/19). These discussions were used to triangulate findings in line with a contextual socio-legal research method (Cotterrell 2002). The discussions revealed no inconsistencies in our desk-based data collection process.

The evolution of Kaikōura's coastal and marine governance

Background

The proximity to the shore of the deep Kaikōura Canyon makes Kaikōura an area of significant marine biodiversity and an abundant fishery (Leduc et al. 2014). It is also of deep cultural value due to its longstanding Indigenous association as a settlement for the Ngāti Kuri hapū of Ngāi Tahu ('Kaikōura,' n.d.). In the 1980s, concerns about the health of the local coastal and marine system arose due to overfishing. In 1992, the Royal Forest and Bird Protection Society of New Zealand (an environmental advocacy group) advocated for the region to be recognised as a Marine Protected Area as a way to halt ecological decline. Local iwi and hapū, Government, and stakeholder interests struggled to reach agreement about the values and approach for marine protection at Kaikōura, however, and no institutional change eventuated. Nevertheless, the region's social and ecological significance meant that it was widely accepted that Kaikōura deserved some sort of protection (Dunnett 2019). The question was how to design an institutional arrangement that would support the community, the users, and the environment.

Phase one: bottom-up process characterised by EBM

In the early 2000s, marine and coastal system governance innovations in Fiordland² presented the Kaikōura community with a new, inspiring model for social-ecological system

management. Fiordland’s focus on sustainable management of the environment and its fisheries motivated iwi, government and various stakeholder groups in Kaikōura to form *Te Korowai o Te Tai o Marokura* (Kaikōura Coastal Marine Guardians or *Te Korowai*) in 2005 (Te Korowai o te Tai o Marokura n.d.; Lawless 2015). Te Korowai’s self-defined primary task was to develop a strategy for the future of the Kaikōura marine area. Its vision was, ‘by perpetuating the *mauri* [life force] and *wairua* [spirit] of *Te Tai o Marokura* [Kaikōura marine area], our community, as *kaitiaki* [guardians] of Tangaroa’s *tāonga* [the ocean’s treasures], are sustaining a flourishing, rich and healthy environment, where opportunities abound to sustain the needs of present and future generations’ (Baxter & Te Korowai o te Tai o Marokura (Organisation) 2008, p. 3).

To support its vision and clarify roles and responsibilities, Te Korowai adopted an organisational egg model (Te Korowai o Te Tai o Marokura 2012, p. 14) (Figure 1(a)). The outer circle (the white) consisted of members playing a support role and comprised of Te Rūnanga o Ngāi Tahu, the Ministry for Primary Industries, Department of Conservation, Environment Canterbury (local government) and others. The inner circle (the yolk) consisted of local members who were directly involved with the design and decision-making process and included Kaikōura Runanga and representatives from various stakeholder groups, such as commercial and recreational fishing, tourism, and the environment. Kaikōura District Council – another local government organisation – straddled both inner and outer circles.

Guided by the egg model and its vision, *Te Korowai* embarked on an extensive community engagement process to develop a shared strategy (Officer of the Auditor-General 2019). Like the Fiordland model, the 2011 strategy ‘applied a philosophy of gifts and gains where each party gifted concessions to sustain the integrity of the whole resource for the future’ (Te Korowai o te Tai o Marokura n.d.). Pursuant to this approach, the four outcomes sought for the Kaikōura marine area were ‘sustaining customary practices, protecting our treasures, fishing for abundance, and living sustainably’ (Te Korowai o te Tai o Marokura n.d.). The strategy suggested a range of marine protections and controls,

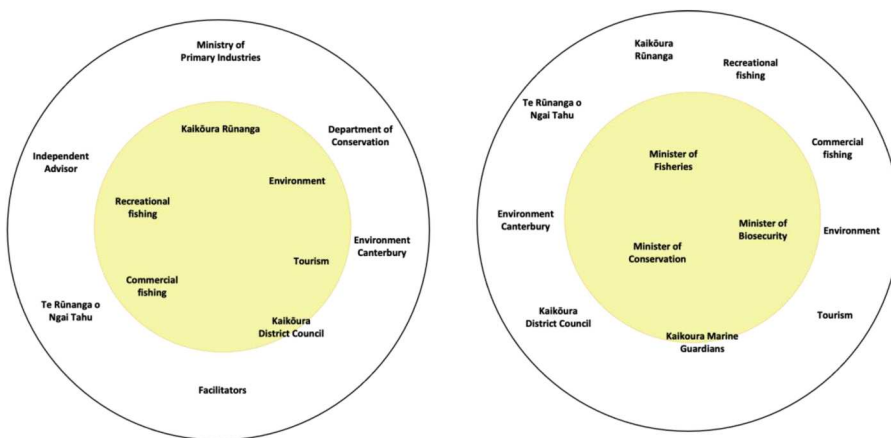


Figure 1. (a) Organisational egg model adopted by Te Korowai (Te Korowai o Te Tai o Marokura 2012, p. 14); (b) Interpretation of the current organisational egg model operating under the Kaikōura Te Tai o Marokura Marine Management Act (2014).

including a combination of area-based protections under various statutory tools, and recommended place-based legislation to integrate statutory approaches. Nevertheless, as a community initiative, the strategy lacked institutional legitimacy and it was recommended that a new arrangement be formalised in law at the national level (Ministry for Primary Industries and Department of Conservation 2013).

Phase two: top-down process characterised by MSP

In 2014, elements of the 2011 Strategy were embedded in legislation through the Kaikōura Te Tai o Marokura Marine Management Act 2014. The Act aimed to: ‘recognise the local, national, and international importance of the coast and sea around Kaikōura (Te Tai o Marokura) as a consequence of its unique coastal and marine environment and distinctive biological diversity and cultural heritage’ and ‘provide measures to assist the preservation, protection, and sustainable and integrated management of the coastal and marine environment and biological diversity of Te Tai o Marokura’. The purposes, outlined in Section 3, further acknowledged the importance of *kaitiakitanga* (the customary obligation to care) and local leadership.

Constrained by the legal tools in use and available to the Minister, the new Act adopted a rules-based approach to management that mimicked an MSP process. The Act established a marine reserve, a whale sanctuary, a New Zealand fur seal sanctuary and various mātaimai reserves and taiāpure-local (customary) fisheries and provided for specific regulation of amateur fishing in the marine management area (including reducing catch limits and increasing minimum species catch sizes) (Figure 2).

An eleven-member advisory committee (the Kaikōura Marine Guardians) was established to provide advice to Ministers and persons exercising statutory powers and performing statutory functions regarding biosecurity, conservation, and fisheries matters within the Kaikōura marine management area (Kaikōura Te Tai o Marokura Marine Management Act 2014, n.d. s 6). The Kaikōura Marine Guardians were appointed by the Ministers of Conservation and Oceans and Fisheries and represented the interests of Te Rūnanga o Ngāi Tahu, the Kaikōura community; and biosecurity, conservation, education, environment, fishing, marine science, and tourism (Kaikōura Te Tai o Marokura Marine Management Act 2014, n.d. s 6). The members of the Kaikōura Marine Guardians may or may not have been members of Te Korowai. It was noted that the Guardians’ advice was not binding and ‘must be taken into account’ only when relating solely to the Kaikōura Marine Area (Kaikōura Te Tai o Marokura Marine Management Act 2014, n.d. s 7). The Guardians received a small amount of initial funding (approximately \$300,000) from a combination of central and local government agencies.

At the time the legislation was developed, the MSP approach appeared a significant step towards integrating a holistic vision for marine management across sectors and scales, enhancing community participation (Davies et al., 2018, p. 124), and reflecting Indigenous relational cosmology with respect to the ocean in formal law (Peart 2019; Fisher et al. 2022). Indeed, in 2019, the Auditor-General described the community-led Te Korowai collaborative planning process as having been inclusive, well-informed, and transparent. This provided a notable contrast to the establishment of other marine protected areas, which were described as being ‘fraught with tension’ (Officer of the Auditor-General 2019). In the Kaikōura case, local community continuity and leadership

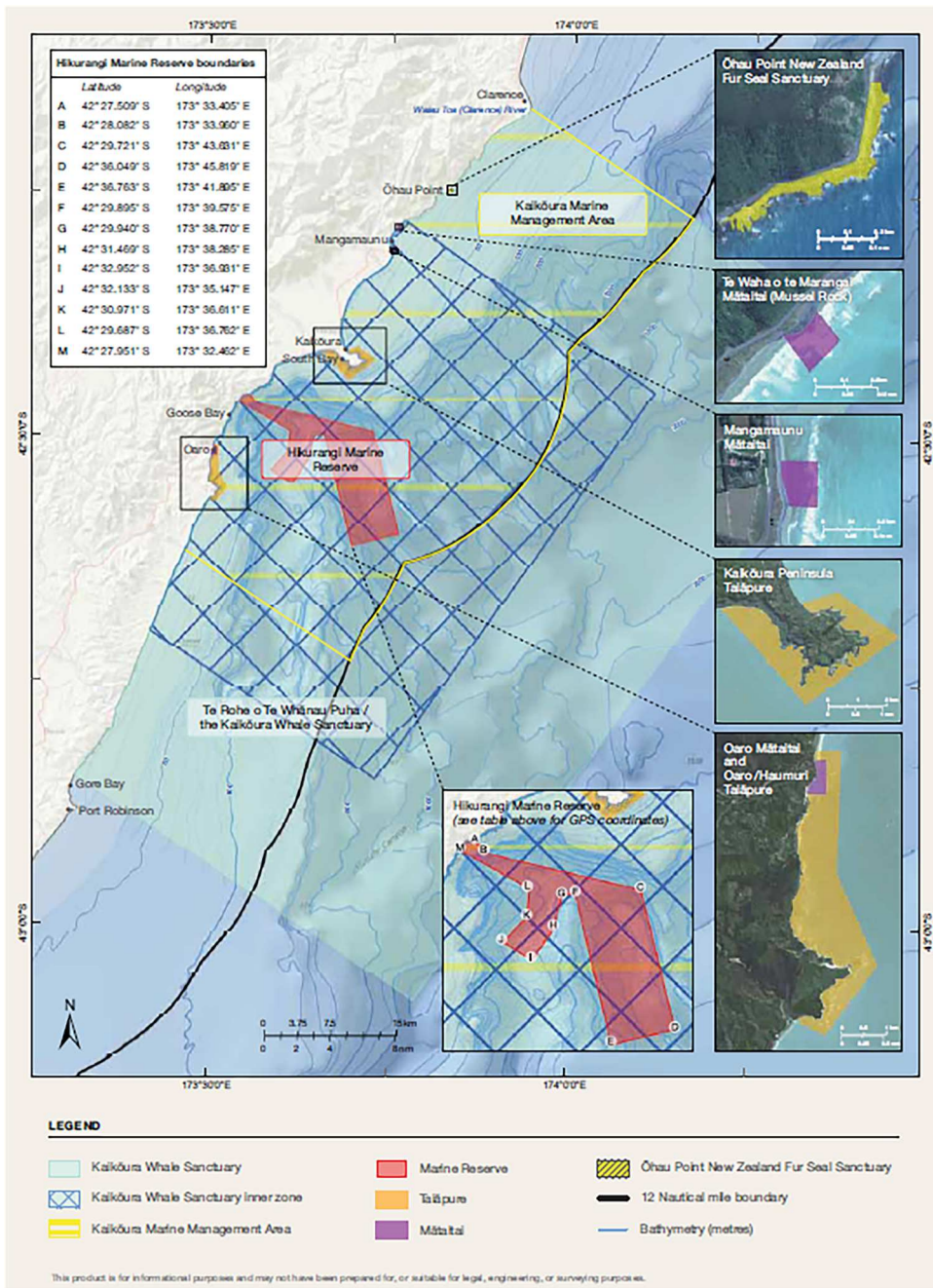


Figure 2. Details of the various management areas created by the *Kaikōura (Te Tai o Marokura) Marine Management Act 2014*. (Ministry for Primary Industries and Department of Conservation 2014, p. 4).

were critical to success, as was the engagement from external parties during the acceptance of the strategy and development of the legislation (Lawless 2015). This was particularly important given the range of intersecting national policies and issues affecting Kaikōura’s marine and coastal system.

Nevertheless, developing the strategy, agreeing to the protected areas, and progressing the Act took nine years of consultation with iwi, government, and stakeholder groups. Part of the reason for the protracted time frame was a deep-rooted doubt about the agility of MSP to respond to changing temporal and spatial dynamics, including climate change, and the fact that MSP did not fully capture what the Te Korowai strategy was trying to achieve through the integration of worldviews and community-driven decision-making (Magris et al. 2014). The new legislation also consolidated Ministerial power and reduced opportunities for local input into decision-making.

Some of these concerns were later shown to be warranted. For example, the 2016 Kaikōura earthquake caused land at the shoreline to rise by two metres and inflicted significant damage to the local pāua fishery. This led to closure of the fishery in 2016 (McCowan and Neubauer 2018). After several years of monitoring, the Kaikōura Marine Guardians drafted a set of recommendations in 2021 to support the reopening of the pāua fishery for three months under certain, strict conditions (New Zealand Fisheries 2021). Under pressure from users through the statutory public consultation process, the Minister ignored the Guardians' operating advice and instead approved bag limits, and accumulation limits, that far exceeded the Guardians' recommendations (RNZ, 2022b; Williams, 2022). The impacts of this decision for the community, the sector, and the environment were substantial: over the 2021 open period recreational fishers took approximately 40 tonnes of pāua from the fishery (Holdsworth 2022; Orchard et al. 2024) – eight times the five-tonne overall catch approved by the Minister (RNZ, 2022a) and more than the customary and commercial take combined (RNZ, 2022b; Holdsworth et al. 2023).

Although the immediate impacts were damaging, the experience revealed opportunities for learning and emphasised the value that can come from engaging deeply with communities, even within MSP. For example, when the pāua fishery reopened again in 2023, the Minister introduced many of the operating conditions originally recommended by the Kaikōura Marine Guardians to constrain recreational effort and catch and, in some cases, went even further (Parker 2023). For instance, the season was shifted from summer to autumn and shortened from four months to two months. This led to a 70% reduction in recreational catch to 12 tonnes, but still more than double the recreational catch allowance of 5 tonnes. The Guardians now form part of a 'reference group' that will be kept informed throughout the fishing period (Fisheries 2024).

Discussion

The demand for EBM transitions in Aotearoa NZ is mirrored by coastal and marine systems policy around the world. Regulatory tools, such as MSP, are widely recognised as conduits for achieving EBM; however, as the Kaikōura case in Aotearoa NZ highlights, maintaining and supporting a values shift across scales remains difficult to facilitate as rules are formalised through traditional, path-dependent processes. Some of these challenges have been mirrored internationally raising questions about the long-term benefits of transitioning to EBM through MSP pathways (Ehler and Douvère 2009; Portman 2011; Directorate-General for Maritime Affairs and Fisheries 2015; Jones et al. 2016; Scott 2016; Casimiro and Guerreiro 2019).

In the Kaikōura case, the establishment of Te Korowai and the development of the supporting strategy, which occurred through phase one of the governance transition,

reflected the seven principles of Aotearoa NZ place-based EBM (Table 1). First, the governance structures provided for Te Tiriti o Waitangi partnerships, *tikanga* (Māori customs and protocols), and *mātauranga Māori* (Māori knowledge systems). Second, place and time-specific ecological complexities were considered. Third, the gift and giving philosophy embedded in the Strategy meant that humans, along with their multiple uses and values for the marine environment, were considered as part of the ecosystem. Fourth, the sustainability timeline was intergenerational. Fifth, collaborative, co-designed and participatory decision-making processes were used. Sixth, decisions were based on science and *mātauranga Māori* and informed by community values, priorities, and relationships. And seventh, adaptive management, appropriate monitoring and acknowledgement of uncertainty were promoted. Combined, the new institutional arrangement developed a governance structure that reflected the local community's values and engaged in an embedded, 'bottom-up', and inclusive decision-making process.

The formalisation of rules in phase two led to the erosion of community participation processes and the weakening of EBM principles. The new MSP arrangement struggled to reconcile competing marine uses, interests, and values, and support flexible and adaptive decision-making leading to outcomes that did not deliver net benefits for the community or environment. Ultimately, institutional conditions, such as the Ministerial authority to appoint the Guardians, constrained funding, and the fact that the Guardians' advice was non-binding diluted the community's ability to influence decision-making. In the case of the reopening of the pāua fishery, this led to ecological outcomes that were not sustainable for the local environment or community.

Kaikōura's experience is not unique globally. For example, a recent analysis of multiple MSP case studies showed the frequent disconnect between theory and practice when it comes to stakeholder participation in MSP processes (Jones et al. 2016). The analysis revealed that although platforms for deliberations amongst stakeholders, such as the Marine Guardians, exist in many cases, the platforms are often excluded from actual decision-making arenas. In some cases, stakeholders have questioned the utility

Table 1. A summary table of EBM principles under Phase One and Phase Two of the evolving governance arrangements in Kaikōura. A plus sign (+) indicates that the EBM Principles are integrated in the methodology robustly; a circle indicates that the EBM Principles are partially integrated in the methodology; a minus sign (−) would indicate that EBM Principles are absent.

EBM Principles		Phase One	Phase Two
1	Governance structures provide for Treaty of Waitangi partnerships, <i>tikanga</i> and <i>mātauranga Māori</i> .	+	●
2	Place and time-specific ecological complexities and connectedness and present cumulative and multiple stressors, as well as those that might occur with new uses, are considered.	+	●
3	Humans, along with their multiple uses and values for the marine environment, are considered as part of the ecosystem	+	+
4	Healthy marine environments, and their values and uses, are safeguarded for future generations	+	+
5	Collaborative, co-designed and participatory decision-making processes are used, involving all interested parties from agencies, iwi, industries, whānau, hapū, and local communities.	+	●
6	Decisions are based on science and <i>mātauranga Māori</i> and are informed by community values, relationships and priorities.	+	●
7	Flexible, adaptive management, monitoring and acknowledgement of uncertainty are promoted.	+	●

of engaging with MSP processes due to decision-making asymmetries negating stakeholders' influence (Flannery and Ellis 2016).

Nevertheless, MSP processes do not necessarily preclude engagement with EBM principles, or community participation. Processes can be established that actively prioritise EBM principles, even within the confines of MSP (Ansong et al. 2017). For instance, planning boundaries can be established that reflect ecosystem patterns, functions, and connectivity and ecosystem services, values, and functions can be examined and understood with a view to informing decision-making processes. In addition, actors can ensure that any analysis is a future-oriented, co-production process that engages communities, expands participation, and empowers all interested parties from agencies, iwi, industries, whānau, hapū, and local citizenry. It should also provide management and planning measures that seek to reduce threats and pressure on the environment, address uncertainty and change, and enforce a knowledge-based decision-making process that prioritises ecosystem health. Finally, an iterative process and methodology that supports monitoring, evaluation, and learning should be built into the operations process. In Aotearoa NZ integrating EBM principles into MSP would require the establishment of dynamic planning process that closely embeds and engages Māori and other interested parties across scales, while placing social-ecosystem health and wellbeing at the heart of decision-making.

In Aotearoa NZ, mechanisms for this already exist in legislation. For example, the Resource Management Act 1991–Aotearoa NZ's main planning legislation - allows for the inclusion of bioregions that span from the mountains to the sea, consistent with *ki uta ki tai* (mountains to sea)³, and encourages (but does not require unless otherwise specified in legislation) engagement and consultation with Māori and local communities (Makgill and Rennie 2012). Nevertheless, to implement these processes the political will to apply the principles and methodology of EBM across scales is required. Our results suggest that for EBM to have been implemented as part of the Kaikōura Te Tai o Marokura Marine Management Act 2014, significant political commitment to a new management approach would have been necessary across multiple domains. First, the central government would have needed to relinquish some authority over decision-making and devolve it to the lower levels of the institutional arrangement.⁴ For Kaikōura, this would have changed who gets a seat at the table, the distribution of power, and institutional path dependency over time. Second, the Act would have needed to focus on managing connections and dynamics rather than on defining and managing a set of bounded areas. Third, it would need to have more firmly integrated a mountain-to-sea philosophy, thereby considering the linkages across social-ecological system boundaries, rather than just in the marine environment.

The outcomes observed from the two phases of Kaikōura's governance evolution suggest that positive outcomes can emerge from MSP that correlate with the outcomes anticipated by EBM, but they require close relationships between the top-down decision-maker and the local community. Legitimising Te Korowai through government legislation essentially flipped the original egg model consolidating decision-making authority in central government officials within the yolk, whilst shifting local decision-makers to the outer egg white (Figure 1(b)). This led to leadership decisions being made that imposed costs on the local environment, ecosystems, the

fishing sector, and communities. Future efforts to transition marine and coastal systems to EBM could learn from Kaikōura's experience, to ensure that principles and processes align to support the implementation of EBM, particularly in terms of enhancing local involvement in decision-making.

Conclusions

Demand for new governance approaches to address the declining social-ecological system health in coastal and marine areas is increasing. EBM, which considers a range of competing environmental and social demands in decision-making, is considered the gold-standard management approach. Nevertheless, it remains unclear how EBM principles can be operationalised and an EBM transition supported, both in Aotearoa NZ and globally. Although MSP is often viewed as a tool for implementing EBM, there is often a disconnect between theory and practice resulting in MSP failing to deliver the outcomes anticipated by EBM.

Our examination of the evolving governance arrangements in Kaikōura offers a glimpse into how MSP has been implemented and operationalised and the impacts for the delivery of EBM in an Aotearoa NZ context. The Kaikōura case reveals the challenge of implementing EBM using MSP, particularly in terms of supporting and formalising a values-shift that could emerge from legitimate partnerships with the local community and Māori under Te Tiriti o Waitangi. In the case of Kaikōura, formalising the community strategy in law led to the emergence of an MSP approach to social-ecological system management that struggled to adequately enable local community members to influence decision-making, reconcile competing marine uses, interests, and values, or support flexible and adaptive decision-making.

This suggests that, although MSP can lead to a more integrated approach to management than occurs under traditional single-species or sector management, without sufficiently embedding the EBM principles into decision-making processes, MSP leads to different outcomes than what would be anticipated under EBM. Our results indicate that policymakers interested in supporting an EBM transition for marine and coastal systems in Aotearoa NZ, should focus on delivering the seven EBM principles, rather than following a rules-based MSP process, unless the MSP process adequately situates EBM principles and elements into the methodology. Either way, addressing power and authority asymmetries and devolving sufficient decision-making responsibilities to the lower levels of an institutional arrangement, alongside providing adequate financial support, will help Aotearoa NZ transition to an EBM approach to management in situations where an EBM approach is desirable for improving marine and coastal ecosystem health.

Notes

1. Te Tiriti o Waitangi is one of Aotearoa NZ's founding documents. It was signed in 1840 by representatives of the British Crown and of Māori iwi (tribes) and hapū (sub-tribes). Conflicting translations of the three articles in te Tiriti means that core elements of the document remain a matter of debate although its underlying principles are given legal weight in many statutes. Debates over te Tiriti continue to shape governance discussions in Aotearoa NZ, particularly around lands, forests, freshwater, and fisheries.

2. See *Fiordland (Te Moana o Atawhenua) Marine Management Act 2005*, *Guardians of Fiordland's Fisheries & Marine Environment Inc. 2003: Fiordland Marine Conservation Strategy (138 Pages)* and Cameron (2006) for details.
3. *Ki uta ki tai* (mountains to sea) is a water management concept informed by mātauranga Māori that recognises that land and water form a complex, interconnected environment which must be sustainably managed in an integrated way to provide for the many values supported by the environment. Issues arising from institutional fragmentation has meant that *ki uta ki tai* has been poorly implemented in the Canterbury region, including in the Kaikōura district (Ulrich et al. 2022; Ulrich and Hodder-Swain 2022).
4. There are provisions under the Resource Management Act 1991 to transfer powers duties or functions under that Act to bodies such as the Guardians, but similar transferability is not enabled by the Fisheries Act 1996 or the Conservation Act 1987.

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