



Broadening environmental governance ontologies to enhance ecosystem-based management in Aotearoa New Zealand

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Abstract

Ecosystem-based management (EBM) is a holistic approach to managing marine environments that can potentially reconcile cross-sectoral conflicts, scale mismatches, and fulfil sustainability objectives. In Aotearoa New Zealand (Aotearoa NZ), the operationalisation of EBM has been uneven; however, a set of principles to guide EBM in Aotearoa NZ provides a useful foundation to enable and enhance its uptake and to support governance approaches that attend to the rights, values, interests, and knowledges of Māori, the Indigenous peoples of Aotearoa. In acknowledging the need to give attention to the governance of marine environments, we apply insights from the ‘relational turn’ in social sciences and sustainability science to explore the ontological and epistemological broadening of ‘governance’ to identify opportunities for alternative forms of governance that accommodate Indigenous ways of knowing. We propose four *pou* (or enabling conditions) that generate alternatives to governance models underpinned by a ‘modernist’ (dualistic, technocratic) ontology: (i) *enacting interactive administrative arrangements*; (ii) *diversifying knowledge production*; (iii) *prioritising equity, justice, and social difference*; and (iv) *recognising interconnections and interconnectedness*. Our analysis of seven governance examples exposes evidence of radical and progressive transformations occurring within Aotearoa NZ regarding conceptions of the environment and the role of people in it that could support the wider uptake of EBM. Rather than advocating a ‘perfect model’ of governance for EBM, we find potential in EBM as a strategic approach to managing marine environments because of the synergies with Indigenous and relational ontologies, which lie in the emphasis on interconnectedness, inclusivity, diversity, and relationality.

Keywords Ecosystem-based management · Aotearoa New Zealand · Governance · Relational ontologies · Indigenous ontologies · Māori

Introduction

Ecosystem-based management (EBM) is an approach to managing marine environments that emerged due to declining biodiversity, fish stocks, habitats, and species, and concerns over the failure of sector-based governance

arrangements to prevent or reduce environmental degradation. EBM is an evolving concept with varying interpretations (Alexander and Haward 2019; Gonçalves et al. 2020). However, EBM researchers and practitioners agree on a number of key aspects, namely EBM promotes an ecosystem rather than sectoral and/or species focus; seeks to sustain ecosystem health, integrity, and resilience; requires integration of social, ecological, cultural, and economic dimensions; and provides a holistic and integrated approach to address social-environmental challenges associated with multiple-uses, multiple stressors, and fragmented management (Alexander and Haward 2019; Leslie et al. 2015; Wondolleck and Yaffee 2017).

In Aotearoa New Zealand (hereafter Aotearoa NZ), the focus of our study, the operationalisation of EBM has been uneven (Macpherson et al. 2021b); however, a set of principles to guide EBM in Aotearoa NZ provides a useful

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foundation to enable uptake more broadly and to enhance current practices. The principles developed by Hewitt et al. (2018) acknowledge the need for governance structures to provide for Treaty of Waitangi/*Te Tiriti o Waitangi*¹ partnerships between Māori (the Indigenous peoples of Aotearoa) and the Crown, *tikanga* (Māori customs and protocols) and *mātauranga* Māori (Māori knowledge systems). Collaborative, co-designed, and participatory decision-making processes involving all interested parties (including *iwi* (tribe), *hapū* (sub-tribe), *whānau* (family, extended family), along with stakeholders and local communities) and ensuring decisions are made based on science and *mātauranga* Māori are additional principles that distinguish EBM principles in Aotearoa NZ from those developed elsewhere, but which have relevance to a range of other contexts (Hewitt et al. 2018).

Given the myriad (and often competing) interests, uses, values, and activities within coastal and marine areas, researchers emphasise the importance of giving explicit attention to how marine and coastal areas are governed and protected (Alexander and Haward 2019; Eger et al. 2021; Wondolleck and Yaffee 2017). Country-, place-based, and comparative research has examined efforts to operationalise EBM via a range of institutional mechanisms over different scales to identify enabling conditions to support EBM (Macpherson et al. 2021b; Stephenson et al. 2019; Wondolleck and Yaffee 2017). Thus, implementation requires addressing matters of scale and potential scale mismatches between ecosystems and human-political systems, as well as finding ways to resolve cross-scale and cross-sectoral conflicts within specific institutional contexts (Alexander and Haward 2019; Gonçalves et al. 2020). The means for achieving this vary from broad-sweeping reforms to create a singular governance body to the identification of ‘hooks’ (detailed rules, processes, and institutions) and ‘anchors’ (high-level, overarching, or constitutional norms, values, or objectives that are consistent across regulatory frameworks) within existing arrangements that can be leveraged to bring about progressive changes (Macpherson et al. 2021b).

While there has been attention given to improving the operationalisation of EBM including creating governance arrangements to support EBM (Alexander and Haward 2019; Leslie et al. 2015; Stephenson et al. 2019), there has been less attention given to how governance approaches are conceptualised, constituted, and enacted — the ontological dimensions of governance — and how this shapes power relations and dynamics among different (human and non-human) actors (DePuy et al. 2021; Foggin et al.

2021; Makey 2021; Makey et al. 2021; Ntona and Schröder 2020). Researchers such as DePuy et al. (2021), Ntona and Schröder (2020), Makey (2021), and Brennan (2022) show how much of the research focused on environmental governance, including for EBM, conceptualises ‘governance’ within a western, ‘modernist’ ontology that actively shapes the world in particular ways (DePuy et al. 2021; Foggin et al. 2021). A modernist ontology is informed by enlightenment thinking and characterised by a separation of nature from culture, a hierarchical conceptualisation of cultural difference, and a linear (teleological) understanding of time (Blaser 2009, 2014; Chandler and Reid 2018). Modernist governance arrangements, therefore, tend to simplify the natural world and the myriad socio-natural relationships that exist in relation to places, to conceive of participation, rights, and property in constrained terms and rely on prescriptive or technocratic solutions to address environmental problems (DePuy et al. 2021; Makey et al. 2021). Increasingly, researchers challenge the ontological and epistemological assumptions underpinning modernist governance theories, models, and practice, particularly in the context of colonisation and the ongoing deleterious effects on Indigenous peoples (Chandler and Reid 2018; Howitt and Suchet-Pearson 2006; Makey 2021; Muller et al. 2019; Ntona and Schröder 2020; Tiakiwai et al. 2017).

In this paper, we draw on this emerging research to identify conditions to enable and enhance governance for EBM that can accommodate both Indigenous and non-Indigenous ontologies, epistemologies, practices, and aspirations (Makey 2021; Makey et al. 2021; Reid and Rout 2020; Tiakiwai et al. 2017). Our research is grounded in governance innovations occurring in Aotearoa NZ that have been at least partly shaped by the political resurgence among Māori, and the growing influence of Te Ao Māori (Māori ontology) and *mātauranga* in shaping governance and institutional arrangements (Harmsworth et al. 2016; Makey and Awatere 2018; Parsons et al. 2021a). Along with DePuy et al. (2021), Joseph et al. (2021), Makey (2021) and others, we argue the need for governance researchers to give greater attention to the ontological and epistemological underpinnings of governance theories and practices to avoid the (inadvertent) perpetuation of social and environmental injustices and epistemological and ontological violence arising from ongoing processes of colonisation. We see potential in aligning EBM and relational ontologies since relational approaches ‘offer a productive way of questioning and deconstructing prevailing ideas around nature and culture’ (Döring et al. 2021: 225) and relational ontologies emphasise connections and relationships as the key to thriving social and ecological systems (Foggin et al. 2021). Rather than advocating a ‘perfect model’ of governance for EBM, we emphasise the strategic potential of an EBM approach to align or coordinate

¹ *Te Tiriti o Waitangi* is the Māori version of the Treaty of Waitangi. The two versions are not direct translations. See, for example, Jones (2016) for more information.

diverse and pluralistic governance arrangements towards a common purpose.

We explore how the ontological and epistemological broadening of governance creates opportunities for alternative forms of governance to be (re)imagined and (re)enacted that redress power imbalances and inequities, and which better accommodate Indigenous ways of knowing (DePuy et al. 2021). We apply insights from the ‘relational turn’ in social sciences and sustainability sciences to theorise EBM governance from the ground up (DePuy et al. 2021; Döring et al. 2021; Foggini et al. 2021; West et al. 2020). We show how Indigenous relational ontologies, with their emphasis on the interweaving of human and more-than-human/nonhuman beings and connections between the biophysical, social, and spiritual, provide insights to inform governance arrangements for EBM that are inclusive, pluralistic, and just.

We adopted a weak theory approach (Wright 2015) to explore the possibilities, multiplicities, and situated understandings of seven governance examples from Aotearoa NZ. Our analysis focused on secondary data sources (see ‘Methodology’) and was informed by the transdisciplinary expertise of the research team from geography, law, ecology, planning, political studies, Indigenous rights, and environmental management. By focusing on secondary data, we were able to examine a range of governance models for marine and other environments to identify insights to usefully inform the operationalisation of EBM.

We propose four *pou* (translated from *te reo* Māori (Māori language) to mean post, support, sustenance, and symbol of support and which we use to mean enabling conditions) that generate alternatives to modernist ways of governing (Chandler and Reid 2018; DePuy et al. 2021) and foster relationality. These *pou* are (i) *enacting interactive administrative arrangements* to engage multiple actors across multiple levels (from decision-making through to implementation and management actions), (ii) *diversifying knowledge production* to recognise epistemological and ontological inclusion (to prompt thinking and action towards possibility), (iii) *prioritising equity, justice, and social difference* to undo the inequities and injustices perpetuated against Māori peoples and knowledge; and (iv) *recognising interconnections and interconnectedness* that both position humans within ecosystems and environments and recognise the myriad relationships that entangle humans and more-than-human/nonhumans.

The rest of the paper is organised as follows. First, we review governance research and scholarship relevant to the operationalisation of EBM to trace how modernist governance assumptions are being challenged by relational ontologies, including Indigenous ontologies. Second, we provide an overview of marine governance in Aotearoa NZ and include a brief account of Māori cosmology to show how it continues to influence contemporary practices. Third, we outline the methodological approach used to identify and

analyse data sources for this paper. Fourth, we present the analysis and discussion of each of the governance examples. Finally, we conclude by emphasising the synergies and possibilities afforded by EBM that embraces relational (Indigenous) ontologies and by looking to broader institutional contexts for opportunities to leverage changes that enhance the operationalisation of EBM.

From modernist to relational governance approaches

EBM ostensibly provides a means to reconcile cross-sectoral conflicts, scale mismatches, and fulfil sustainability objectives; however, there are potential limitations because EBM emerges from a modernist ontology, as do governance theories applied to investigate options for its implementation. The bases for the different claims to the strengths and limitations of EBM in settler- and post-colonial societies are ontological and reflect conflicts and contestations over multiple worlds and realities, which must be attended to (Blaser 2009, 2014; Chandler and Reid 2018; DePuy et al. 2021; Parsons and Fisher 2020). In this section, we review environmental governance literature and literature related to EBM (and marine governance) to trace changes in governance ontologies and to identify possibilities for enhancing EBM that account for onto-epistemological difference.

Environmental governance refers to the processes involved in managing, controlling, and organising activities, people, resources, and spaces and includes regulatory processes and institutions through which multiple actors influence actions and outcomes (Eger et al. 2021; Lemos and Agrawal 2006). Research focused on environmental governance has tended to emphasise the role of agents — the state, the market, or community-based actors and organisations — in steering or coordinating society in accordance with common goals and norms and identifying ways to overcome inefficiencies and failures that could lead to unsustainable outcomes (Bodin 2017; Lemos and Agrawal 2006).

Investigations of place-specific governance arrangements and their interactions with regional, national, and international governance regimes exemplify the challenges of governance across multiple scales and multiple (often conflicting) interests (Lemos and Agrawal 2006; van der Molen 2018). Questions of how governance scales and the scalar processes that constitute scales of governance (including what an ‘appropriate’ scale is) have informed research focused on hybrid, polycentric, network, and multi-level governance, with researchers delineating interactions and relationships among organisations, actors, and institutions to determine how governance arrangements are shaped by social and political systems and dynamics and how they operate across scales (Bodin 2017; Kooiman 2003; Nunan

2018; Ostrom 2012; Sørensen et al. 2015). The challenges of governing across multiple scales are amplified in multi-use marine environments, which are often characterised as giving rise to fragmentation as well as governance gaps (Alexander and Haward 2019; Stephenson et al. 2019).

The emergence of hybrid governance configurations, such as co-governance arrangements to regulate people, places, and activities, represents a shift away from models that assume the state as the primary actor capable of regulating outcomes to achieve management or conservation objectives (Lemos and Agrawal 2006; Parsons and Fisher 2020; van der Molen 2018). Interest in understanding collaborative forms of governance, including power asymmetries and where collaboration has not lived up to expectations (Parsons et al. 2021a), has led to efforts to define and characterise the relationships and interactions between different organisations or groups, for example, as cooperation (where ideas, knowledge and skills are exchanged), coordination (where synergies are emphasised and efforts are taken to reduce unintended consequences), and collaboration (institutionalised interaction among actors working towards shared goals) (Sørensen et al. 2015).

In addition to acknowledging the multiplicity of actors involved in governance functions, researchers also identify different governance forms (such as national policies, legislation, decentralisation, devolution, and locally embedded decision-making structures), and the administrative arrangements that determine how decisions are made and by whom (Lemos and Agrawal 2006). By distinguishing organisations and actors from institutions and practices, attention is given to the tools and technologies that are mobilised to govern different spaces. In recognising the world as complex, authors such as Peters (2020) emphasise that governance should reflect this complexity; however, administrative arrangements as they relate to environmental governance frequently seek to simplify and stabilise complexity to achieve objectives such as efficiency or sustainability (Ahlborg and Nightingale 2022). As such, the way in which ‘the environment’ is categorised or constituted — as ‘resources’, ‘nature’ or as reflecting complex socio-natural relations — reflects fundamentally different understandings of the world and ultimately shapes the administrative arrangements established to govern the environment and specifically who is involved and whose knowledge counts. Thus, the dominant modernist framing of the environment (and ‘resources’ therein) as disaggregated, decontextualised, and categorised according to use (or activity) has resulted in fragmented and dispersed administration along sectoral lines and a reliance on techno-managerialist tools and technologies (Ahlborg and Nightingale 2022; DePuy et al. 2021; Peters 2020). Indeed, a key criticism levelled at environmental governance is how reductive framings of complex socio-natural relations lead to the privileging of some knowledges and values (and people)

over others and generate governance frameworks and tools that may be ill-equipped to protect or enhance the environment or fail to acknowledge the relationships between people and nature (Ahlborg and Nightingale 2022; Hikuroa 2016).

An example in the context of marine governance is marine spatial planning, which is an area-based management tool that has been advocated as an effective approach to reduce conflicts, enhance environmental protection, to facilitate ecosystem-based (and more integrated) management approaches, and to enhance economic opportunities by clearly demarcating areas within which certain activities occur (Boucquey et al. 2016; Flannery et al. 2020). Recently, however, social scientists have questioned the rationalities and logics underpinning marine governance and the adoption of tools such as MSP on the grounds that MSP resembles (and enables) enclosure and exploitation, the neoliberalisation of ocean commons, and de-politicises the process of establishing and maintaining MSPs, among other things (Boucquey et al. 2016; Flannery et al. 2020; Ntona and Schröder 2020). Ntona et al. (2020: 246) discuss the limitations a ‘scientific and managerial-technological rationality’ approach to marine spatial planning (and marine governance more broadly) has for coastal communities as it neglects social values, power dynamics, and the multiple ways in which people interact with marine spaces. Moreover, Peters (2020) identifies the persistence of a ‘land-based ontology’ and land-b(i)ased conceptualisations of territory and territorialisation in marine governance (as evident in tools and approaches such as area-based management and zoning), which may not be sufficient given the materiality of marine spaces and their status as commons. A counter proposed by Steinberg and Peters (2015) is a ‘wet ontology’, which proposes a better way of attending to the materiality of oceans and to ‘reimagine and reenlive’ a way of thinking about the world that emphasises ‘flows, connections, liquidities and becomings’ (Steinberg and Peters 2015: 248). This kind of thinking emphasises the need to attend to the materiality of the ‘things’ being governed (including how they are enrolled into and are co-constituted by complex socio-natural interactions), and in particular, the need to recognise distinctiveness of marine spaces (Ahlborg and Nightingale 2022; Peters 2020; Steinberg and Peters 2015).

The ‘relational turn’ in the social sciences and sustainability sciences re-focuses attention on how ‘nature’ is produced, enacted, or performed through interactions and interconnections that entangle human and more-than-human/nonhuman actors (Makey 2021; West et al. 2020). In contrast to a modernist or ‘substantialist’ paradigm, which assumes dualisms between humans and nature based on essentialist thinking that supposes the existence of foundational substances constituting objects, entities, and things, relational thinking is argued to better ‘captur[e] the complexity of human-nature connectedness’ (West et al. 2020: 305). Such

an approach makes visible the myriad connections between human and more-than-human/nonhuman actors and regards human-nature relations as co-constitutive and co-emergent; humans are de-centred within these socio-natural entanglements and the agency of more-than-human/nonhumans is acknowledged (Ahlborg and Nightingale 2022; Makey 2021). Researchers such as West et al. (2020) and Neilson et al. (2019) further assert the potential of relational thinking to generate ethical practices of care premised on reciprocity, collective action, and activities involving humans and nonhumans. In the context of settler colonial societies, one of the potentially transformative aspects of relational thinking — and relational ethics and practices of care — lies in the prospect of redressing some of the power imbalances that perpetuate ongoing social and environmental injustices and epistemological and ontological violence (Bawaka Country et al. 2013; Makey 2021; Muller et al. 2019).

The hegemony of governance theories, practices, and institutional arrangements grounded in a western modern ontology has been challenged by Indigenous researchers and others researching Indigenous peoples' involvement in, for example, local government (Bargh 2020; Thompson-Fawcett et al. 2017), freshwater (Macpherson 2019; Parsons et al. 2021a; Ruru 2018; Wilson 2019), and marine environments (Ban et al. 2019; Maxwell et al. 2020; Parsons et al. 2021b; Tiakiwai et al. 2017), and who emphasise plurality, multiplicity, and diversity (of ontologies, epistemologies, and laws) (Blaser 2014; Chandler and Reid 2018; DePuy et al. 2021). Since a key tenet or principle of EBM is to take seriously the social, cultural, historical, and ecological specificity of places to enable tailored and place-specific governance arrangements (Joseph et al. 2020; Reid and Rout 2020), failure to confront ontological and epistemological differences or acknowledge how power shapes relations among different actors will further perpetuate the systematic exclusion of diverse ways of knowing, being, and doing (Maxwell et al. 2020).

Globally, the importance of Indigenous norms, institutions, and practice in relation to marine governance and management is recognised, at least in principle, as a means by which to achieve sustainable use and conservation of marine resources while also ensuring Indigenous rights are upheld (Ban and Frid 2018; Ban et al. 2019; Parsons et al. 2021b; von der Porten et al. 2019). Thus, there is a growing body of scholarship focused on documenting how colonialism has undermined Indigenous marine governance and authority in specific locations, efforts by Indigenous peoples to (re)assert their rights to govern and manage marine environments in settler-colonial contexts, the emergence of hybrid forms of governance, and which recognises the longstanding relationship between Indigenous peoples, their territories, their practices, and their knowledges as expressions of self-determination and autonomy (Ban and

Frid 2018; Ban et al. 2019; Maxwell et al. 2020; Reid and Rout 2020; Tiakiwai et al. 2017; von der Porten et al. 2019). Such accounts are particularly pertinent in settler-colonial contexts, where Indigenous ontologies and epistemologies have been subjugated and institutional arrangements reflect the political-economic organisation of the colonisers at the expense of Indigenous peoples (Bacon 2019; von der Porten et al. 2019).

Ban et al. (2019) showcase the resilience and adaptability of Indigenous governance practices and institutions of Kitasoo/Xai'xais First Nation peoples in the northeast Pacific Ocean (British Columbia, Canada) despite being actively undermined by the Canadian government's colonial legacy including the failure of the federal government to fully recognise their marine governance rights. In Australia, Godden (2019) and Schnierer and Egan (2016) explain how colonisation by the British caused millennia of holistic natural resource management of marine and connected coastal ecosystems to be ignored, disregarded, and overridden. They also claim Indigenous rights and interests in marine areas continue to be incompletely and inadequately recognised in Australia, disappointing Indigenous expectations.

In Chile, Outeiro et al. (2015: 360) explain how diverse knowledge and rights of Indigenous communities, who have been excluded from post-colonial marine governance despite being longstanding artisanal fishers, are embedded in an Indigenous cosmology that conceptualises the environment and natural resources within 'a "community of beings" world view in which humans are part of an interacting set of living things'. Since the early 2000s, Indigenous peoples in Chile have voiced increasing concerns about the enclosure of traditional fisheries under the evolving regulatory model for fisheries (Araos et al. 2017), which failed to recognise or acknowledge ancestral marine uses and interests of Indigenous peoples. In 2008, the Government passed *Law 20.249 Espacios Costeros Marinos de Pueblos Originarios* (Indigenous Marine and Coastal Areas Law, known as the *Lafkenche Law*), which allows Indigenous communities to obtain certain traditional fishing and access rights in relation to the 'marine and coastal area' and to develop collaborative management plans approved by an inter-sectorial committee. While some researchers suggest deficiencies in *Lafkenche Law* in terms of procedural and substantive fairness and support for Indigenous development (Hiriart-Bertrand et al. 2020), the law at least partly reflects Indigenous cultural perspectives and cosmologies around natural resource use (González-Poblete et al. 2020; Outeiro et al. 2015).

In emphasising multiplicity and diversity in ways of knowing and being, researchers have exposed the ontological (and epistemological) politics of enacting multiple worlds, and the conflicts that arise when multiple worlds come into contact (Blaser 2014) while exploring possibilities for enacting the world(s) otherwise (DePuy et al. 2021). Such

research ‘delineate[s] a picture of socio-material worlds as always-emergent heterogeneous assemblages of humans and more-than-humans’ (Blaser 2014: 50). In the context of environmental governance, this has prompted calls for a ‘deepened sensitivity to ontological diversity’ (DePuy et al. 2021: 949) and ‘ontological disobedience’ in confronting onto-epistemological injustices linked to European colonial expansion (Burman 2017). The emergence of Indigenous practices and enrolment of a variety of ‘earth beings’ (de la Cadena 2015), more-than-human/nonhuman actors (Blaser 2014; Parsons et al. 2021a), and other cosmopolitical symbols and figures (Blaser 2016; Tola 2018) are, thus, evidence of the destabilisation of dominant (Western) knowledge systems and models of governance (Blaser 2014; Chandler and Reid 2018; Makey and Awatere 2018; Parsons et al. 2021a). These acts of ontological disobedience present opportunities for re-worlding and re-imagining environmental (including marine) governance in ways that accord with (more) relational ways of knowing (Burman 2017; Chandler and Reid 2018).

For Indigenous scholars motivated by a desire to enact institutional arrangements that better accord with Indigenous models of governance, research focused on Indigenous self-determination and Indigenous resurgence beyond recognition by (settler) states provides a useful starting point (Coulthard 2014; Simpson 2017). For instance, research from North America highlights limitations in water governance models where Indigenous peoples assume state-like roles and function as quasi-state entities (Diver et al. 2019; Wilson 2019). Rather than enabling Indigenous forms of self-governance, such arrangements are limited because they are nested within a larger settler-colonial context, they are more likely to resemble settler rather than Indigenous models, and they function to deliver on settler interests (for example, policies and laws) (Coulthard 2014; Diver et al. 2019; Wilson 2019). In Aotearoa NZ, Joseph et al. (2021) assemble numerous examples of Māori governance — both past and present — that provide lessons for (re)imagining and broadening governance ontologies and that give effect to Māori authority, and which align with aspirations articulated by Reid and Rout (2020), Tiakiwai et al. (2017), and Parsons et al. (2021b) for more culturally (and ontologically) appropriate and just governance for EBM. The next section considers marine governance in Aotearoa NZ and includes a discussion of how Māori relational ontologies are shaping governance and institutional arrangements.

Marine governance in Aotearoa NZ

Aotearoa NZ is an island nation in the southwestern Pacific Ocean. The political system is unicameral, with a decentralised governance structure and hierarchical environmental

planning system that regulates activities, effects, and natural resource use. Marine governance in Aotearoa NZ is characterised by fragmentation, whereby sectoral interests are regulated through myriad formal (and informal) institutional arrangements. Responsibility for management is shared among at least 14 agencies operating under more than 25 different statutes across seven spatial jurisdictions (Scott 2021).

Key among these statutes are the Resource Management Act 1991 (RMA, which established an effects-based planning system with jurisdiction to 12 nautical miles) (Makgill and Rennie 2012), the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (which regulates the environmental effects of activities in the exclusive economic zone), and the Fisheries Act 1996 (which provides for the utilisation of fisheries resources while ensuring sustainability) (Scott 2021). In essence, the RMA provides an integrated coastal and marine planning approach that addresses the environmental effects of all activities within the 12 nautical mile territorial sea and land without necessarily allocating space to specific activities. Other statutes relating to marine mammals, marine reserves, maritime safety, minerals, and transport, along with Indigenous claims (and their individual settlements), address the allocation of space and rights to resources in a fragmented way. In relation to Treaty of Waitangi breaches and marine customary title and interests, these individual Treaty Settlement statutes represent or create other, sometimes novel, formal institutions of significance to marine governance (Makgill and Rennie 2011). The functions of these governance arrangements range from regulating the effects of activities and access to resources to ensure sustainable use, to conserving and protecting species or areas of significance.

In February 2021, the Government announced its intention to repeal the RMA and replace it with a new environmental and planning law framework. The proposed new legislation would provide greater recognition of Te Ao Māori, including *mātauranga* Māori (Office of the Minister for the Environment 2021: [28]) and reaffirm the significance of *Te Mana o Te Wai* (the *mana* of freshwater), and the related concept *Te Mana o Te Taiao* (the *mana* of the environment, referred to in the New Zealand Biodiversity Strategy (discussed further below).

The reforms also create an opportunity for enhanced application of EBM to the marine environment. EBM has been identified as an approach that could address the limitations in Aotearoa NZ’s current governance framework and enable a new way of conceptualising resource management and people’s relations with the marine and coastal environment (Joseph et al. 2020). Research by Peart et al. (2019) and Macpherson et al. (2021b) concluded that the implementation of EBM in Aotearoa NZ is possible within the existing governance framework without the need for radical reform; however, the need to rationalise and modernise the legal

framework to enable EBM is noted, along with the need to respect and provide for Māori rights and exercise of Māori knowledge and values in the marine area (Joseph et al. 2020; Macpherson et al. 2021b; Peart et al. 2019).

A fundamental feature of environmental governance and management in Aotearoa NZ, including the coastal marine environment, is the role of Māori as *Te Tiriti o Waitangi* Treaty of Waitangi partners (Macpherson et al. 2021a). The Treaty of Waitangi was signed in 1840 by the British Crown and a confederation of Māori chiefs; almost immediately upon signing, the Crown breached the terms of the Treaty, which subsequently led to the dispossession of land as well as limited opportunities for Māori to participate formally in environmental decision-making processes and management until the 1990s (Parsons et al. 2021a). Since 1975, there have been numerous claims brought by Māori alleging Crown breaches of the Treaty, which have been heard by the Waitangi Tribunal, a permanent commission of inquiry (Jones 2016; Wheen and Hayward 2012). These claims have led to numerous settlements to redress Treaty grievances as well as changes in legislation and policy that strengthen the position of Māori as Treaty partners with the Crown (Jones 2016).

The need to recognise and provide for the rights of Māori is increasingly recognised in law (Makgill et al. 2020; see *Trans-Tasman Resources Limited v The Taranaki-Whanganui Conservation Board* 2021: [150]–[151]), policy, and practice, particularly with respect to the exercise of *kaitiakitanga* (Māori stewardship according to their own aspirations and practices) and the inclusion of Māori in planning and decision making processes related to natural and physical resources (Thompson-Fawcett et al. 2017). There is also an increasing emphasis given to the significance of *mātauranga* for sustainable management. *Mātauranga* offers at least two key contributions to EBM governance and the knowledge needed to support just, equitable, and sustainable management: a place-based understanding of environmental change derived from inter-generational observations and transmission of knowledge and a holistic understanding of ecosystems that emphasises relationality and interconnectedness (Hikuroa 2016).

Māori ways of knowing emphasise relationality and connectivity between humans, the environment, and the spiritual realm (Kawharu 2000). While there is no singular or universal Māori worldview, in Māori cosmological accounts, at the beginning of the world earth and sky existed as a single ancestor, locked in embrace so tight that no light could get through, with their children trapped between them (Parsons et al. 2021a; Salmond 2012). The children, unhappy living in a space without light, conspired to separate their parents, Ranginui (Sky Father) and Papatūānuku (Earth Mother). Tāne separated his parents by lying on his back and pushing earth and sky apart, letting light into the world (Salmond 2012). The children themselves became *atua* (gods,

ancestors) of Māori and the progenitors of every part of the world (Parsons et al. 2021a; Salmond 2012). Tāne became the *atua* of forests and people, while the *atua* of the ocean is Tangaroa.² Tāne made Hineahuone (female element) out of the red clay of Papatūānuku and, with the union of Tāne and Hineahuone, the first human, Hinetitama, came into being. The deep relationship Māori maintain with the environment connects them to the *whakapapa* (genealogy, lineage, descent) of Ranginui, Papatūānuku, and their *atua* sons (Kawharu 2000; Parsons et al. 2021a; Salmond 2012). This is the *whakapapa* that Māori relate to when they speak about the environment from a holistic perspective. Through *whakapapa*, all oral traditions from every *hapū* are held and expressed in their own way. These oral traditions or narratives are used when *mana whenua* (those with territorial rights, authority over territory) groups make their cultural legal arguments in the Environment Court/Māori Land Court, Waitangi Tribunal, High Court, Court of Appeal and Supreme Court.³

Methodology

This research was designed as a qualitative inquiry informed by critical theories (especially feminist) and Indigenous research methodologies (Makey 2021; Smith 1999; Wright 2015). Our aim was to analyse the ontological and epistemological bases for environmental governance arrangements in Aotearoa NZ and to identify if, how, and in what ways Māori ways of knowing, being, and doing have destabilised modernist ontological assumptions and generated new governance possibilities that could inform and enhance EBM practice.

Our approach to data analysis followed the phases identified by Braun and Clarke (2021) in conducting reflexive thematic analysis. Data were collated, organised, and analysed using QSR International NVivo version 11. Data included peer reviewed documents, grey or unpublished literature, social media feeds, organisation/institutional legislation, and meeting minutes and reports relating to each of the governance examples. The first phase, data familiarisation, entailed immersive and critical engagement with the dataset accompanied by extensive notetaking, annotations, and discussion among the researchers. We then employed a deductive coding process to the dataset informed by theories and concepts presented in the literature review above. Through this

² There are numerous *atua*, which we have not named here. See, for example, Salmond (2012), Parsons et al. (2021a), among others.

³ See, for example, *Te Awa Tupua (Whanganui River Claims Settlement) Act 2017*, *Te Urewera Act 2014*, Waitangi Tribunal (1999), *Trans-Tasman Resources Limited v The Taranaki-Whanganui Conservation Board* (2021).

process, we identified and coded latent as well as manifest meanings in the data related to governance, ecosystem-based management, relationality, Māori/Indigenous ontologies and epistemologies, equity, collaboration, and scale (Cope 2005). The next phases — theme generation, development, review, and refining — occurred iteratively and reflexively (Braun and Clarke 2021). The themes generated through this process form the *pou* of our analytical framework, which we applied to seven governance examples in Aotearoa NZ (Table 1).

The *pou* we identified emphasise the transformative potential of Māori ontologies and epistemologies to enhance environmental governance in Aotearoa NZ, including to enhance the operationalisation of EBM while also redressing onto-epistemological violence and environmental injustices associated with settler colonialism (Bacon 2019; Parsons et al. 2021a). The four *pou* are (1) enacting interactive administrative arrangements, (2) diversifying knowledge production, (3) prioritising *equity, justice, and social difference*, and (4) *recognising interconnections and interconnectedness*. These are summarised in Fig. 1 below.

The governance arrangements analysed span different environmental domains and ontological and epistemological bases. Our analysis extends beyond marine examples to reflect the changes occurring more broadly in Aotearoa NZ that evince an ontological and epistemological broadening of environmental governance (evidence of ontological disobedience), and to position marine governance into a larger governance context. We wanted to show what might be possible (to enhance the implementation of EBM in Aotearoa NZ), by emphasising what is already being done in other environments. Other than Ōhiwa Harbour and Integrated Kaipara Harbour Management Group (both of which are marine-based examples), our examples relate to rivers, freshwater, forests, land (soil), and biodiversity. Two of our examples relate to the establishment of legal personhood — Te Urewera and Te Awa Tupua (Whanganui River) — which are both regarded as ground-breaking legislation (Ruru 2018).

The examples were also chosen because they represent different forms of governance: place-based non-statutory models, place-based statutory models, and decentralised models that are national in orientation but implemented locally and which range from formal (statutory) to voluntary arrangements (see Fig. 2 for locations of the place-based examples). In addition, each of the examples seeks to engage multiple actors (both state and non-state) across multiple levels, they identify the contribution Indigenous knowledge can make to environmental governance and advocate for its use, they are underpinned by values and principles emphasising inclusion and just processes in achieving environmental outcomes, and they exhibit a sensitivity to ontological diversity as evident in the incorporation of Māori language, concepts, and values.

Generating alternatives to modernist ways (and forms) of governing

This section is organised according to the four *pou* and provides details from each of the governance examples that demonstrate the intention of the *pou*. By focusing our analysis on the ontological dimensions of these governance examples, we expose evidence of radical and progressive transformations occurring within Aotearoa NZ regarding conceptions of the environment and the role of people that disobey modernist ontology and ways of governing. In each of the examples, there are clear rules regarding the functions and responsibilities of those who are party to the collaborative arrangement, as well as attempts to articulate how specific administrative arrangements connect with other laws, policies, and plans (Macpherson et al. 2021b). *Te Mana o Te Taiao* (TMoT) and *Te Mana o te Wai* (TMoW) also provide overarching policy objectives ('anchors') that apply across their respective regulatory regimes and reflect a normative shift consistent with holistic, integrated, and intergenerational modes of governance that recognise the importance of Indigenous rights and interests (Macpherson et al. 2021b).

Enacting interactive administrative arrangements

The *enacting interactive administrative arrangements pou* emphasises the inclusion of multiple actors without prescribing a single 'perfect' governance model. Implicit to this *pou* is recognising the need for complex governance arrangements to govern complex settings (Peters 2020). This *pou* emphasises the potential of collaborative forms of environmental governance, where collaboration may resemble coordination, cooperation, interaction, or some other hybrid form. While collaborative models are promising (especially in terms of fitting with local social and environmental conditions), EBM requires ensuring arrangements are effectively 'joined-up'. Identifying how existing legislation and policies can be leveraged is therefore crucial to provide for Indigenous ontologies and attendant rights, values, and practices (Macpherson et al. 2021b).

The place-based examples (OHIF, IKHMG, Te Awa Tupua and Te Urewera, Fig. 2 and Table 1) involve collaboration between *iwi/hapū*, government agencies (both local and national), and local communities. IKHMG is an *iwi*-led co-management platform that assembles *iwi/hapū*, local and central government agencies, and other stakeholders for the purpose of managing the Kaipara *moana* (sea, ocean).⁴ The Kaipara *moana* transcends jurisdictional boundaries; thus, IKHMG is an attempt to fit institutional arrangements to the ecosystem by centring the Kaipara *moana* (Makey and

⁴ Kaipara *moana* refers to the entire Kaipara Harbour ecosystem (land and sea).

Table 1 Summary of governance examples analysed

Governance example	Description
Integrated Kaipara Harbour Management Group (IKHMG)	Place-based, <i>iwi</i> -led collaborative entity involving <i>iwi/hapū</i> , local government authorities and national government agencies. The Kaipara Harbour, located on the west coast of the North Island, is the largest estuarine ecosystem in Aotearoa NZ, the largest harbour in the southern hemisphere, and one of the largest harbours in the world (Haggitt et al. 2008). The catchment area is approximately 640,000 hectares (IKHMG 2011). IKHMG is an <i>iwi</i> -led co-management platform established in 2005 by Ngā Kaitiaki Taiao o Kaipara (comprising Te Uri o Hau and Ngāti Whātua o Kaipara, two <i>iwi</i> with interests in the Kaipara) and Te Uri o Hau Settlement Trust (the post-settlement entity created following the 2002 Treaty settlement leading to Te Uri o Hau Claims Settlement Act 2002 (IKHMG 2011). Its purpose is 'to promote integrated and co-ordinated interagency management and <i>kaitiakitanga</i> of the Kaipara harbour and its catchment' (IKHMG 2011: 10).
Ōhiwa Harbour Implementation Forum (OHIF)	Place-based, non-statutory collaborative forum involving local <i>iwi</i> , local government authorities, and national agencies. Ōhiwa Harbour is a shallow estuarine system located on the east coast of the North Island in the Bay of Plenty region. OHIF was formed in 2008 and comprises representatives from local government (Ōpōtiki District Council, Whakatāne District Council, Bay of Plenty Regional Council) and <i>iwi</i> (Whakatōhea, Ūpokorehe, Ngāti Awa, and Ngāi Tūhoe (Te Waimana Kaaku)). These groups were signatories to the 2008 Ōhiwa Harbour Strategy, which was initiated by Bay of Plenty Regional Council in 2002 and involved an extensive consultation process (Bay of Plenty Regional Council et al. 2014; Lowry 2012). The purpose of the Strategy is to 'oversee and monitor the implementation of the Ōhiwa Harbour strategy' (Ōhiwa Strategy 2014). OHIF is responsible for implementing the Strategy, which promotes integrated resource management along with the need to integrate plans, processes and practices used by councils, government departments, <i>iwi</i> , <i>hapū</i> and communities (Environment Bay of Plenty 2008).
Te Awa Tupua (Whanganui River Claims Settlement) Act 2017	Place-based governance arrangements resulting from Treaty settlement legislation: Te Awa Tupua (Whanganui River Claims Settlement) Act 2017. The Act declares Te Awa Tupua 'an indivisible and living whole' and encompasses the river from its headwaters in the mountains to the Tasman Sea (s 12) and establishes the River as a legal person with 'all the rights, powers, duties, and liabilities of a legal person' (s 14). <i>Te Pou Tupua</i> is the 'human face of the river', which is charged with acting in the River's interests (ss 18–19).
Te Urewera Act 2014	Place-based governance arrangements resulting from Treaty settlement legislation: Te Urewera Act 2014. The Act establishes Te Urewera as a legal entity, with rights, powers, duties, and liabilities of a legal person (s 11(1), which are exercised and performed on behalf of, and in the name of, Te Urewera, by the Te Urewera Board (s 11(2)). The Act removes the national park status of the land, and vests ownership of the land in the legal entity 'Te Urewera', under the governance of the Te Urewera Board (s 12(2)(c)).
<i>Te Mana o te Wai</i> /National Policy Statement on Freshwater Management 2020	A national-scale policy established under the Resource Management Act and Local Government Act and implemented through a decentralised and hierarchical governance model. <i>Te Mana o te Wai</i> is a fundamental concept in the National Policy Statement on Freshwater Management (NPSFM) 2020. National Policy Statements are issued under the Resource Management Act 1991 (administered by the Ministry for the Environment) and provide national direction to local governments for matters of national significance, and which are relevant to achieving the purpose of the Act (Ministry for the Environment 2020).

Table 1 (continued)

Governance example	Description
<i>Te Mana o te Taiao</i> /NZ Biodiversity Strategy	A national-scale strategy implemented by government agencies as well as other actors across multiple scales. The strategy sets the 'direction for the protection, restoration and sustainable use of biodiversity, particularly indigenous biodiversity, in Aotearoa New Zealand' (Department of Conservation 2020: 13). TMoTW applies to land, freshwater, estuaries and wetlands, and the marine environment (to the outer edge of the Exclusive Economic Zone and extended continental shelf) and encompasses public lands, private land and Māori-owned land. All species are covered (indigenous and non-indigenous species, as well as migratory species) (Department of Conservation 2020).
<i>Hua Parakore</i>	<i>Hua Parakore</i> is a <i>Kaupapa</i> Māori (Māori-led, Māori-centric) approach to managing soil ecosystems in line with Te Ao Māori worldviews (Te Waka Kai Ora 2011). <i>Hua Parakore</i> was initiated and driven by Te Waka Kai Ora (National Māori Organics Authority of Aotearoa), who are in partnership with Organics Aotearoa NZ. It is based on <i>mātauranga</i> , <i>tikanga</i> and <i>te reo</i> and draws upon the wisdom of <i>tūpuna</i> (ancestors). Growers seeking verification embark on a 3-stage process: <i>Kākano</i> , <i>Tipu Ranga</i> and <i>Hua Parakore</i> (Te Waka Kai Ora 2011). <i>Hua Parakore</i> was developed through a <i>Kaupapa</i> Māori research programme and is understood as <i>Kai Atua</i> or a pure product (Hutchings et al. 2018). <i>Hua Parakore</i> aligns with the NZ Standard for Organic Production NZSA 8410.2003 (Hutchings et al. 2012).

Fig. 1 *Pou* to enhance the implementation of EBM

1. Enacting interactive administrative arrangements

Recognising the potential of collaborative and engaging multiple actors across multiple levels (from decision-making through to implementation and management actions). Rather than advocating for a 'perfect' model of governance, this *pou* emphasises interactive, dynamic, and inclusive arrangements.

2. Diversifying knowledge production

Recognising epistemological and ontological pluralism and the processes supporting knowledge production (including who produces, disseminates, and 'controls' knowledge). This *pou* prompts thinking and action towards the politics of possibility by emphasising diversity and by seeking to expose and upend knowledge-based assumptions embedded in settler-colonial thinking.

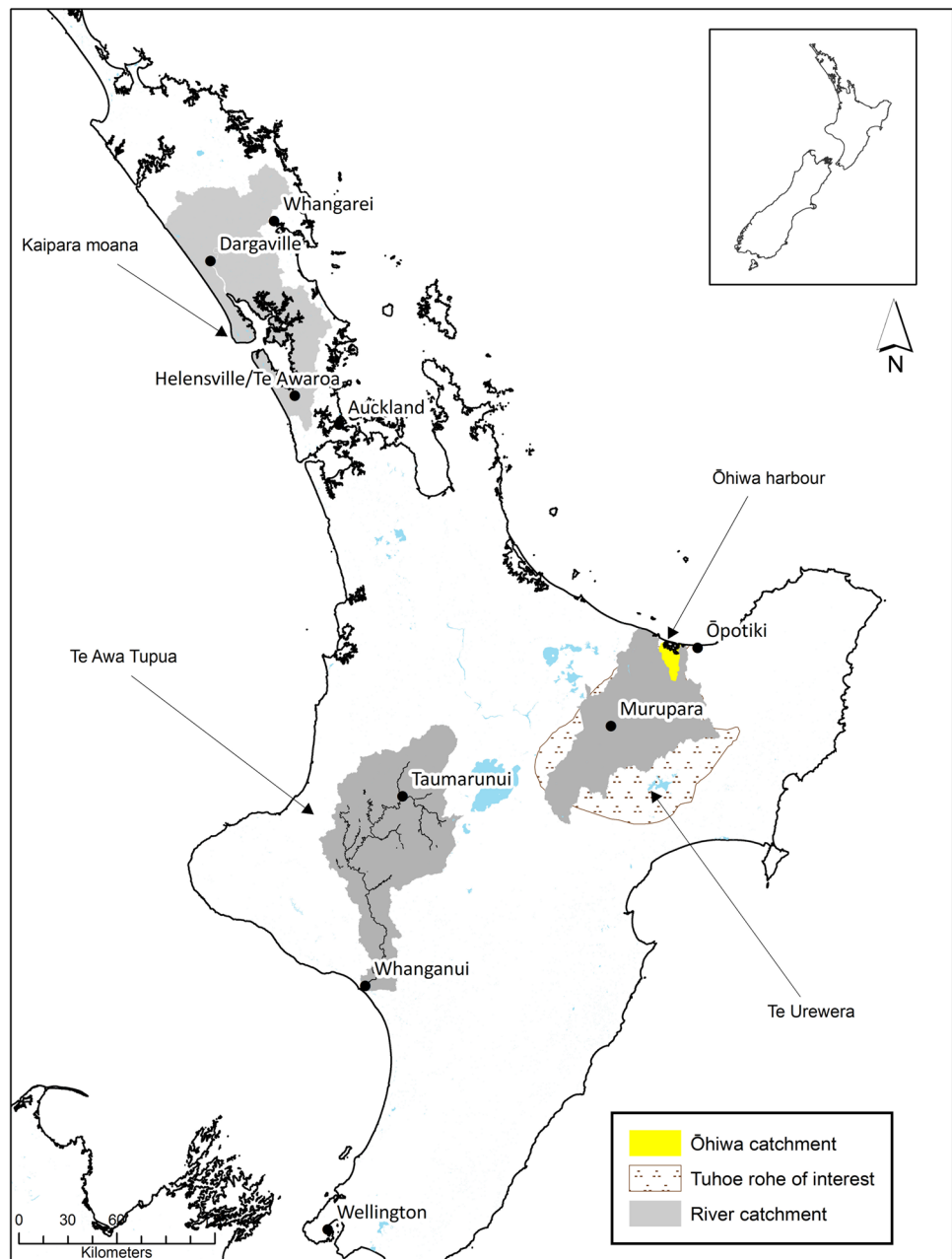
3. Prioritising equity, justice, and social difference

Undoing the inequities and injustices perpetuated against Māori peoples and knowledges through into the present. This *pou* emphasises Māori inclusion in decision-making processes as well as recognising and providing for Māori relationships with the environment as a way of undoing injustices. In so doing, the potential benefits will accrue to Māori and non-Māori alike.

4. Recognising interconnections and interconnectedness

Positioning humans within ecosystems and environments and recognising the myriad relationships that entangle humans and more-than-human/nonhumans. This *pou* prompts a shift away from governance arrangements premised on dualistic conceptions of humans and nature towards arrangements that foster inclusive and ontologically plural spaces.

Fig. 2 Map showing location of place-based governance examples



Awatere 2018). This also centres the myriad socio-natural entanglements between the Kaipara *moana* and its more-than-human/nonhuman actors, as well as the ways of knowing, being, and doing of Kaipara *hapū* and *iwi* (who view the *moana* as an ancestor) (Makey and Awatere 2018).

OHIF comprises representatives from local government and *iwi* to oversee the implementation of the Ōhiwa Harbour Strategy (first developed in 2008 and refreshed in 2014) (Bay of Plenty Regional Council et al. 2014; Rother 2016). The Strategy outlines areas of concern in relation to the harbour, values associated with the harbour (including the significance of the longstanding relationships between *iwi/hapū* and the harbour), proposed actions to address ecosystem

health, access to resources and to support *kaitiakitanga* (Bay of Plenty Regional Council et al. 2014; Environment Bay of Plenty 2008). The Strategy works within the framework provided by policy documents such as the New Zealand Coastal Policy Statement and the Council's Regional Policy Statement (Bay of Plenty Regional Council et al. 2014). OHIF meets twice a year and works with other organisations as needed (for example, Department of Conservation, Ministry of Primary Industries, local care groups) (Bay of Plenty Regional Council et al. 2014). The Ōhiwa Harbour Strategy Coordination Group (OHSCG) was formed at the same time as OHIF and comprises the same members of OHIF along with additional members from partner organisations (such

as Department of Conservation). OHSCG is responsible to OHIF in seeking to deliver the Strategy actions (Bay of Plenty Regional Council et al. 2014).

Te Urewera Act 2014 and Te Awa Tupua (Whanganui River Claims Settlement Act) 2017 are both acts arising from Treaty settlements that establish legal personhood (Table 1). The ‘human face’ of Te Awa Tupua is Te Pou Tupua, which is constituted by one representative nominated by the Crown and the other by the *iwi*, who are required to make decisions by consensus (Te Awa Tupua Act 2017, ss 18–19). The Act also establishes a complex collaborative governance regime comprising: ‘Te Karewao’, an advisory group to Te Pou Tupua consisting of representatives of Māori river communities and authorities and relevant local authorities; ‘Te Kōpuka’, a collaborative strategy group for Te Awa Tupua comprising representatives of persons and organisations with interests in the Whanganui River, including *iwi*, relevant local authorities, departments of State, commercial and recreational users, and environmental groups; and ‘Te Heke Ngahuru’, a strategy for the collaboration of persons with interests in the Whanganui River to address and advance the health and well-being of Te Awa Tupua.

Te Urewera Board acts on behalf of Te Urewera (Table 1). From 2017, the Board comprised six Tūhoe appointees and three members appointed by the Minister of Conservation (Te Urewera Act 2014, s 21). The Board is empowered to speak and act on behalf of Te Urewera and is explicitly required to consider and give expression to *Tūhoetanga* and Tūhoe concepts of management such as *mana me mauri* and *tohu* (s 18(3)).⁵ The Act sets out an extensive list of powers and obligations of the Board (s 18), including the power to create bylaws (s 50), and to authorise certain activities that are otherwise prohibited under conservation laws, including the taking, cutting, or destroying of Indigenous plants and the hunting of Indigenous animals (s 58(a),(b)).

In contrast to the place-based examples, NPSFM 2020/*Te Mana o te Wai* (TMoW), the New Zealand Biodiversity Strategy/*Te Mana o Te Taiao* (TMoT), and *Hua Parakore* (HP) are implemented through decentralised governance structures that coordinate and steer state and non-state organisations and actors across multiple scales to achieve specific goals. Giving effect to the objectives of these arrangements occurs at multiple levels and is undertaken by multiple actors.

As a concept in NPSFM 2020, TMoW refers ‘to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the *mauri* [life force,

vital essence] of the *wai* [water] ... [and] is about restoring and preserving the balance between the water, the wider environment, and the community’ (Ministry for the Environment 2020: [1.3]; emphasis added). Regional councils must give effect to NPSFM/TMoW through planning and management, and priority must be given to the health of the water ahead of the health needs of humans and finally communities to provide for their social, economic, and cultural well-being, now and in the future (Ministry for the Environment 2020: [1.3(5)]; [2.1]). To achieve this, TMoW provides for the integrated management of freshwater resources pursuant to the holistic Māori resource management approach known as *ki uta ki tai* (from the mountains to the sea) and regional councils are required to engage with Māori (Ministry for the Environment 2020; Te Aho 2019).

Te Mana o te Taiao/NZ Biodiversity Strategy (Department of Conservation 2020) is a high-level strategic document that outlines the regulator policy position (that is, central and local government) for indigenous biodiversity. The vision of TMoT is ‘Te Mauri Hikahika o te Taiao – the life force of nature is vibrant and vigorous’ (Department of Conservation 2020: 10). A key element of TMoT is recognising people as part of nature and that ‘we can only thrive when nature thrives’ (Department of Conservation 2020: 10). As a national strategy, TMoT is intended to guide decision-making by central government bodies in terms of funding and policy making, including the shaping, prioritising, and administration of regulatory regimes by central government. In this regard, TMoT seeks to rationalise the current complex regulatory and policy framework for biodiversity in Aotearoa NZ. Key ministerial departments involved in its implementation include Department of Conservation, Ministry for the Environment, Ministry of Primary Industries, and Land Information New Zealand. Other people, organisations, and agencies involved in the biodiversity system include local government bodies, community conservation groups, environmental nongovernmental organisations, Māori as *kaitiaki* (guardian, custodian), industry, and individuals (Department of Conservation 2020: 64–65).

HP is an Indigenous food verification system based on *tikanga*, which is administered by Te Waka Kai Ora (the National Māori Organics Authority that represents Māori interests in the organic sector) and is in a Treaty partnership with Organics Aotearoa NZ (Table 1) (Epps and Wheeler 2020). *Te Papawhairiki mō Hua Parakore*, a resource guide for HP, outlines a decentralised network structure to support and guide producers at local and regional scales comprising elders, mentors, members of Te Waka Kai Ora, and others (Te Waka Kai Ora 2011). While HP is a nation-wide verification framework, implementation is localised and informed by practices and knowledge appropriate to people and place. This emphasis on local (Indigenous) knowledge distinguishes HP from non-Indigenous organic verification

⁵ ‘*Mana me mauri* conveys a sense of the sensitive perception of a living and spiritual force in a place’ and ‘*tohu* connotes the metaphysical or symbolic depiction of things’ (s 18(3)).

systems (Hutchings et al. 2012). As a largely self-governing network, HP is promoted as a means by which to ensure food sovereignty while is also reconnecting to place-based intergenerational cultural knowledge (Hutchings et al. 2012).

Diversifying knowledge production

Each governance example exhibits moves towards diversifying knowledge production; specifically, the potential contribution of *mātauranga* to contribute to environmental governance is emphasised. Whereas *mātauranga* and Māori values were largely subordinated in environmental governance until the 1990s, efforts to utilise Indigenous knowledge alongside western science can be seen as a way of addressing environmental injustices (Parsons et al. 2021a, b).

At both an operational and institutional level, IKHMG and OHIF are underpinned by knowledge production processes that attempt to bring science alongside *mātauranga-a-hapū/iwi*. In the case of OHIF, this is evident in the co-design and co-development of the Ōhiwa harbour Mussel Management Action Plan (MMAP) as part of a transdisciplinary action-oriented research project (Paul-Burke et al. 2018). The research, which adopted a *Kaupapa* Māori⁶ approach and prioritised *mātauranga*, focused on *kūtai* (Green Lipped mussel, *Perna canaliculus*) abundance and the overabundance and dominance of eleven-armed sea star (*Coscinasterias muricata*). *Kūtai* are an important traditional, intergenerational food source for coastal Māori that have declined sharply in the harbour since the mid-2000s (Paul-Burke et al. 2018). Development of the MMAP was a response (supported by OHIF) to an action in the 2014 *Ōhiwa Harbour Strategy* to investigate shellfish populations and advocate for sustainable shellfish management (Bay of Plenty Regional Council et al. 2014; Paul-Burke et al. 2018). The design and implementation of MMAP can be seen as ‘an expression of contemporary kaitiakitanga’ and the exercise of intergenerational knowledge and practices for present and future generations (Paul-Burke et al. 2018: 552).

In the case of IKHMG, *He Mahere Pāhekoheko Mō Kaipara Moana* is a framework co-developed through a participatory process over a 7-year period that connected Māori values and knowledges alongside principles of EBM. The framework strengthens the position of Māori as partners in managing the Kaipara *moana* and the position of Te Ao Māori and *mātauranga* in informing management actions (Makey and Awatere 2018). Like Ōhiwa, a co-design/

co-develop/co-implement approach underpins IKHMG work including their strategic planning (IKHMG 2011).

Te Awa Tupua Act and Te Urewera Act set the larger frameworks for enabling management and the practice of *kaitiakitanga*. Recognition of Te Awa Tupua is based on the *tikanga* and *mātauranga* of Whanganui *Iwi*, who have responsibilities in relation to Te Awa Tupua. As the human face of Te Awa Tupua, *Te Pou Tupua* must act in the interests of Te Awa Tupua and in a manner consistent with *Kawa te Tupua* (s 19(2)). To this end, and in recognition of the loss of *mātauranga* and practical knowledge developed through the practice of *kaitiakitanga*, the use and application of *mātauranga* are a priority. Similarly, Te Urewera Act recognises Te Urewera as ‘ancient and enduring, a fortress of nature, alive with history’ and a place ‘of spiritual value, with its own mana⁷ and mauri’ (Te Urewera Act, s 3). *Tūhoe* is identified as the way to give expression to Te Urewera; therefore, knowledge held by *iwi* and *hapū* is fundamental to ensure the connection between Tūhoe and Te Urewera, and the wellbeing of Te Urewera itself is strengthened and maintained.

TMoW and TMoT emphasise diversifying knowledge production processes to enable inclusion in the context of regulatory frameworks for freshwater and biodiversity by centring the *mana* of water and the *mana* of indigenous biodiversity, respectively. Both acknowledge a Māori worldview, Māori values, and the potential for *mātauranga* to contribute to achieving outcomes. Moreover, both acknowledge the key role and contribution of Māori as *kaitiaki* and the importance of *mātauranga* for achieving desired freshwater and biodiversity outcomes. TMoT recognises both science and *mātauranga* as having a role to play in biodiversity restoration and protection, decision-making, research, and monitoring. TMoT adopts the *He Awa Whiria* (‘braided rivers’) approach to implementing and understanding the Strategy, which is used as a ‘cross-cultural conceptual framing tool’ that aims to bring different people, cultures, knowledge, and sectors together to contribute to realising the strategy (Department of Conservation 2020: 37). The NPSFM sets out six principles relating to the role of Māori and other New Zealanders in the management of freshwater, which recognise the interconnectedness of people with water, especially the ‘power, authority and obligations’ of Māori *kaitiaki* to care for water on behalf of future generations, as well as water’s own vitality and agency (Ministry for the Environment 2020: [1.3(4)]).

⁶ A *Kaupapa* Māori approach is a Māori-centric research approach underpinned by Māori philosophies and practices that emphasises self-determination and autonomy of those participating in and benefiting from the research (Smith 1999).

⁷ *Mana* is a complex and multifaceted term that does not translate easily into English. It is generally understood as referring to prestige, authority, control, power, influence, status, and spiritual power. *Mana* is inherited from *atua*. Animate and inanimate objects can have *mana* because they also derive from *atua* through *whakapapa*, and through association with people imbued with *mana*.

HP is composed of six interconnected and interdependent Māori values underpinned by *mātauranga* (Hutchings et al. 2012). A key element of HP is the emphasis given to revitalising the connection between Māori producers and *mātauranga* within specific localities relating to *whenua* (land) and *oneone* (soil). Central to this is *whakapapa* connections — of soil to *atua*, soil to people, people to *atua*, and so on. Knowledge sharing as part of HP utilises Māori practices such as *pūrākau* (storytelling, myths, legends), *whaikōrero* (formal speeches), *karakia* (ritual chant, prayer), *waiata* (song), and *karanga* (ceremonial call, welcome). In this regard, HP is as much about the use of *kaitiaki* and other cultural practices as it is about soil management and ‘conventional’ organic/regenerative practices.

Prioritising equity, justice, and social difference pou

There is evidence of efforts within each of the examples to address inequities and injustices arising from settler colonial systems that have disadvantaged Māori and marginalised or excluded Māori knowledge and values. In all the examples, there is a strong emphasis on ensuring Māori inclusion in decision-making processes as a way of undoing the injustices that have disadvantaged Māori. There is also a strong emphasis on Māori values, knowledges, and practices within each of the examples including recognising and providing for Māori relationships with *te taiao* (the natural world, environment) and their rights and obligations as *kaitiaki*. Whereas the place-based examples have explicit values and principles relating to their specific locations, which are *iwi/hapū*-specific, TMOt, TMOw/NPSFM, and HP articulate values and principles to guide all those implementing the policies at national and local scales. Table 2 summarises the principles and values for NPSFM/TMOW, TMOt,⁸ and HP.

Te Awa Tupua Act and Te Urewera Act were both passed as part of the settlement of claims to the Waitangi Tribunal. Both acts incorporate components of *tikanga* and Te Ao Māori (specifically related to identifying Te Awa Tupua and Te Urewera as ancestors connected to specific *hapū* and *iwi* through *whakapapa*) as well as settler legal traditions (Parsons et al. 2021a; Ruru 2018). Both these acts were accompanied by a formal apology from the Crown for the damage suffered because of settler-colonialism. The role of each *iwi* as *kaitiaki* in their respective environs is formally recognised and incorporated into the co-governance models established under the acts, and the ongoing connections between

people and their *taiao* are recognised. In many respects, Te Awa Tupua and Te Urewera demonstrate a profound shift in power by enabling Māori ways of knowing and being to be given status in governance arrangements situated within the legal frameworks of the settler-state (Muller et al. 2019; Parsons et al. 2021a).

For Te Awa Tupua, when managing the river, *Te Pou Tupua* must act using *Tupua te Kawa*, which comprises the intrinsic values that represent the essence of Te Awa Tupua (s 13). The river values embody the customary law of the Whanganui *iwi* and reflect their traditional knowledge as established resource managers (MacPherson and Ospina 2018). The values acknowledge the river as a source of spiritual and physical sustenance, feeding the resources within it and people living alongside it, and the link between the health of the river and the people is interconnected (Te Awa Tupua Act 2017, s 13). The arrangements for Te Urewera are similar in the sense that the Te Urewera Board is required to consider and give effect to *Tūhoetanga*, and the ancestral relationship between Te Urewera and Tūhoe is foregrounded and affirmed.

Despite these governance innovations, critics point to the fact that such arrangements are embedded within settler-colonial structures rather than providing for Indigenous self-governance (or *rangatiratanga*) in its own right (Coulthard 2014; Parsons et al. 2021a; Todd 2016). Moreover, the Treaty claims process has been criticised because it is a time-consuming and convoluted process and because the process is divisive whereby *iwi* compete with one another for resources (Kawharu 2018).

In contrast to these highly formalised arrangements, IKHMG and OHIF are both bottom-up collaborative models, although how they were initiated differs. While OHIF arose following a local government-initiated process (that culminated in the Ōhiwa Harbour Strategy) (Bay of Plenty Regional Council et al. 2014; Lowry 2012), IKHMG was established shortly after the Te Uri o Hau Treaty settlement in 2002, with Te Uri o Hau Settlement Trust leading the initiative. The leadership shown by Te Uri o Hau Settlement Trust in the establishment of IKHMG reflects investment in growing capacities and capabilities of the post-settlement governance entity, *hapū*, *whānau*, and *kaitiaki* (Makey & Awatere 2018, Taylor 2015). Te Uri o Hau Settlement Trust (and later IKHMG) leveraged opportunities arising from the 2002 settlement and memoranda of understanding with local and central government organisations to develop extensive community relationships between *hapū* and local Kaipara communities as well as with agricultural and horticultural industry, businesses, research institutions, and local government (IKHMG 2011). This leadership enabled restoration practices to be designed and implemented in accordance with *iwi* preferences and cultural practices.

⁸ TMOt also identifies a set of principles to guide implementation: Stewardship principles (especially related to *Te Tiriti o Waitangi*); integrated implementation (*ki uta ki tai* and ecologically sustainable use); and decision making (Indigenous biodiversity, involvement in decision making, knowledge, precautionary approach, internalising environmental costs).

Table 2 Principles and values guiding NPSFM/TMoW, TMoF, and HP

<i>Te Mana o Te Wai</i> — principles (NPSFM)	<i>Te Mana o Te Taiao</i> — guiding values	<i>Hua Parakore</i> Principles
<p>a. Mana whakahaere: the power, authority, and obligations of <i>tangata whenua</i> [people of the land] to make decisions that maintain, protect, and sustain the health and well-being of, and their relationship with, freshwater</p> <p>b. Kaitiakitanga: the obligation of <i>tangata whenua</i> to preserve, restore, enhance, and sustainably use freshwater for the benefit of present and future generations</p> <p>c. Manakitanga: the process by which <i>tangata whenua</i> show respect, generosity, and care for freshwater and for others</p> <p>d. Governance: the responsibility of those with authority for making decisions about freshwater to do so in a way that prioritises the health and well-being of freshwater now and into the future</p> <p>e. Stewardship: the obligation of all New Zealanders to manage freshwater in a way that ensures it sustains present and future generations</p> <p>f. Care and respect: the responsibility of all New Zealanders to care for freshwater in providing for the health of the nation</p>	<p>a. Kaitiakitanga: We enable <i>kaitiakitanga</i> of our natural environment by Treaty partners, <i>whānau, hapū, iwi</i> and Māori organisations</p> <p>b. Mahi whaiapainga: We care about making a difference for nature in Aotearoa New Zealand</p> <p>c. Ngākaunui: We are passionate and enthusiastic about the work ahead</p> <p>d. Mahi tahi: We work together towards a common purpose, particularly at a regional level</p> <p>e. Whakapapa: We recognise inter-connections and have an intergenerational view</p> <p>f. Tohungatanga: We recognise expertise and pursue new knowledge and ideas</p> <p>g. Manaakitanga: We build trust and inclusiveness through our actions with others</p>	<p>a. Whakapapa: <i>Hua Parakore</i> is a connection to the natural environment</p> <p>b. Wairua: <i>Hua Parakore</i> maintains peace and safety</p> <p>c. Mana: <i>Hua Parakore</i> is a vehicle for social justice</p> <p>d. Māramatanga: <i>Hua Parakore</i> is a source of enlightenment</p> <p>e. Te Ao Tūroa: <i>Hua Parakore</i> maintains natural order</p> <p>f. Mauri: <i>Hua Parakore</i> maintains healthy soils, <i>kai</i> and people</p>

Sources: Department of Conservation (2020), Ministry for the Environment (2020), and Te Waka Kai Ora (2011)

The OHIF collaboration evolved as the 2008 *Ōhiwa Harbour Strategy* was developed. According to Lowry (2012), *iwi* groups were initially reluctant to engage in the process but in the end, their rationale for engaging came down to *iwi* rights as *kaitiaki*. Lowry and Simon-Kumar (2017) also identified the need to address historical tensions and conflicts and to be aware of the socio-political context within which collaborative approaches take place particularly where groups have been previously excluded from decision-making processes. An important inclusion in the *Ōhiwa Harbour Strategy* was to recognise *kaitiakitanga*, and the role of *hapū* and *whānau* of Ōhiwa as *kaitiaki*, as underpinning management actions in the 2008 *Strategy*, whereby policy 5.1 states ‘*kaitiakitanga* will always be integrated into management of Ōhiwa harbour’, and policy 5.2 affirms that ‘Sites of significance to Māori will be protected, or managed in an appropriate manner’.

Each of the examples discussed previously in this section demonstrates conscious efforts to undo the inequities and injustices perpetuated against Māori peoples and knowledge through place-based collaborative approaches. TMoT, TMoW, and HP differ in the sense they represent high-level normative shifts in terms of setting overarching objectives for biodiversity, water, and food production beyond the local. TMoT and TMoW are both nationally significant given their scope and the range of actors with responsibilities in achieving their objectives and provide potential anchors for ecosystem-based governance that recognise the importance of Indigenous rights and interests (Macpherson et al. 2021b). For instance, a recent Environment Court decision in *Aratiatia Livestock Limited v Southland Regional Council* (2019: [21]) demonstrates that TMoW is already having a practical impact on water planning in New Zealand, including (in that case) the prioritisation of water’s ecological and spiritual health above resource exploitation for primary production. The Court provides an early discussion of the meaning and significance of TMoW, which it describes as an integral part of freshwater management and a fundamental shift in perspective around management of this natural resource (Macpherson et al. 2021a; *Aratiatia Livestock Limited v Southland Regional Council* 2019).

HP also has national significance, though for a specific sector (organic food production), on a voluntary rather than a statutory basis. The six guiding principles provide a just and equitable foundation for Māori food producers that acknowledges the agency of soil, humans, and more-than-human/nonhumans and supports the use and application of place-based *mātauranga*. As a set of practices and an ontological orientation, HP is perhaps the most radical of each of the examples in the sense that the form of governance and tools used in implementing HP is firmly embedded within Te Aō Maori (Te Waka Kai Ora 2011). The partnership with Organics Aotearoa NZ and the alignment with

NZ Standard for Organic Production NZSA 8410.2003, an ostensibly technocratic invention firmly embedded in a modernist ontology, attests to the flexibility of HP as a model of governance and signals possibilities for doing governance otherwise.

Recognising interconnections and interconnectedness

The examples we analysed displayed shifts away from governance arrangements premised on dualistic conceptions of humans and nature towards arrangements that seek to foster inclusive and ontologically plural democratic spaces (Howitt & Suchet-Pearson 2000), and which recognise human/nature interconnections and entanglements.

The incorporation of Māori ontologies, *mātauranga*, and values into governance arrangements expands notions of holistic or integrated approaches by encompassing metaphysical and spiritual dimensions in addition to social and biophysical characteristics. In each of the governance examples analysed, the use of *te reo* Māori, the inclusion of Māori values, concepts, and principles, and the status of *mātauranga* prompt practices that diverge from reductionist, techno-managerial, or instrumentalist top-down practices. For example, the importance of *mauri*, and efforts to protect, restore, or revitalise *mauri*, informs and shapes the work undertaken by OHIF including the *hapū*-led research agenda surrounding shellfish (Paul-Burke et al. 2018). Similarly, protecting and restoring the *mauri* of the Kaipara *moana* is identified as a long-term objective in the co-management framework for IKHMG and is reflected in its workplans (IKHMG 2011; Makey and Awatere 2018). The relational nature of Māori ontology, with its emphasis on reciprocity, collective action, and kin-based relationships, further destabilises modernist assumptions about what is governed and who (or what) has agency. For instance, IKHMG’s *He Mahere* positions the Kaipara *moana* as a family member; as such, the work of the IKHMG fosters *whakapapa* relationships between Indigenous peoples.

The conceptualisation of Te Awa Tupua as *taonga* (treasure, something that is prized), as an ancestor, ‘as a whole and indivisible entity’ (s 12) with *mauri* and *mana*, centres Māori cosmology and a relational ontology that confounds dualistic understandings of nature as separate/distinct from culture. The intrinsic connection and the importance of the relationships between the *iwi/hapū* and the River are captured in the *whakataukī* (proverb) ‘*ko au te awa, ko awa ko au* – I am the River and the River is me’ (s 13) and underpin the approach to be taken by *Te Pou Tupua* (s 13).

The NPSFM provides for the integrated management of freshwater resources pursuant to the holistic Māori resource management approach known as *ki uta ki tai*. This approach recognises the interconnectedness of the whole environment,

from the mountains and lakes, down the rivers to the sea as well as the interactions between freshwater, land, water bodies, ecosystems, and receiving environments. In the case of TMoT, the ‘disconnect between people and nature’ is identified as one of the main challenges confronting biodiversity management in Aotearoa NZ (Department of Conservation 2020: 43). This sentiment echoes research conducted elsewhere, where researchers have advocated for relational approaches that emphasise connections and interconnections and which overcome dualistic modernist governance arrangements (Foggin et al. 2021).

For HP, *whakapapa* is one of the six principles guiding the programme. As elaborated above, by adopting a *tikanga* and *mātauranga* approach, HP places soil (and the *whakapapa* embodied in soil) at the centre of human and more-than-human/nonhuman relationships. Thus, ecosystem management and restoration, including practices that align with organic or regenerative practices (such as enhancing fertility and soil structure, companion planting, or biological control of pests), are elevated into more-than-physical actions.

Conclusion

Recent changes in environmental governance in Aotearoa NZ, such as co-governance and other hybrid arrangements, are transforming how governance is performed and by whom. From an organisational perspective, environmental governance in Aotearoa NZ increasingly emphasises collaboration between state and non-state actors and is seemingly attuned to the importance of place and enabling place-based actions and decision-making for enhancing social and environmental outcomes. From an ontological perspective, there is an apparent shift in how the environment is understood in relation to people and others (more-than-human/nonhumans). Both these shifts are evident in our examples, whether formal or informal, or local or national scale. This shift to embrace a more relational paradigm has the potential to transform practices and actions premised on resource extraction and exploitation to ethical practices premised on reciprocity and collective action to ensure sustainability.

In acknowledging the ontological (and epistemological) ‘baggage’ that accompanies EBM as a concept, our analysis finds potential in EBM as a strategic approach to managing the marine environment because of the synergies with Indigenous and relational ontologies, which lie in the emphasis on interconnectedness, inclusivity, diversity, and relationality. As has been demonstrated above, Indigenous relational ontologies emphasise the interweaving of human and more-than-human beings, biophysical, social, and spiritual dimensions in contrast to modernist ontological assumptions, which separate land/water, freshwater/saltwater, nature/culture, and scientific/spiritual and apply

universalist (and universalising) techniques and measures to know (and enact) the world (Blaser 2009; Chandler and Reid 2018). By focusing on these examples, which we conceive as acts of ontological disobedience, and identifying *pou* to generate alternatives to modernist governance forms, we contribute to scholarship that attends to ontological diversity in EBM (and more generally environmental). In emphasising holism, interconnectedness, and inclusivity, we expanded our analysis beyond marine governance as a way of situating EBM into a larger context and suggest the need to consider the broader institutional context as this might provide opportunities for leveraging changes and improvements in the operationalisation of EBM.

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Declarations

Conflict of interest The authors declare no competing interests.

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