

# SUSTAINABLE SEAS

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Ko ngā moana  
whakauka

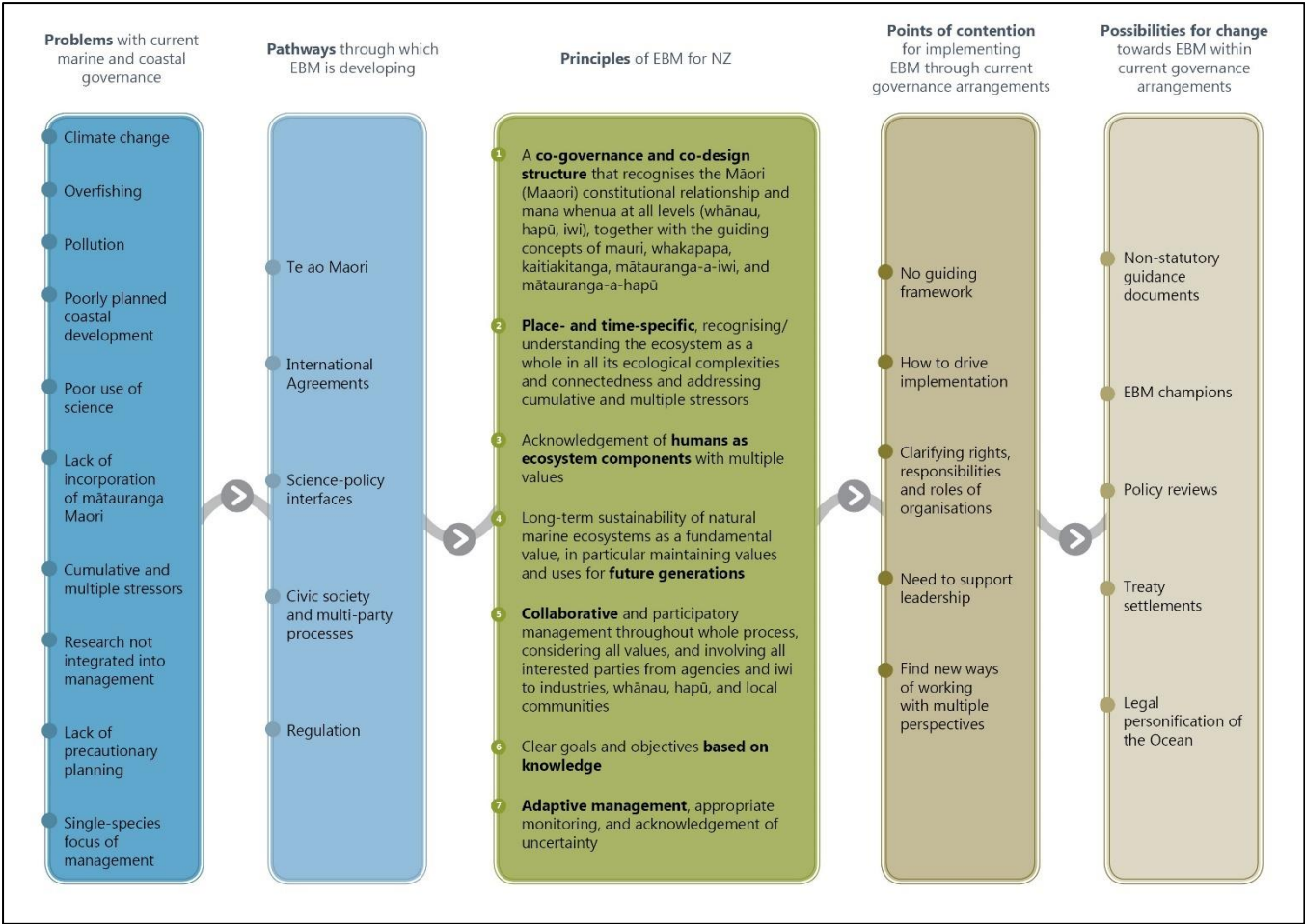
**Discussion paper: Advancing Ecosystem Based Management  
in Aotearoa New Zealand through current governance  
arrangements.**

March 2018<sup>i</sup>

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## Summary

- Ecosystem Based Management (EBM) in New Zealand (NZ) could be supported by existing legislation, but it is not.
- Elements that could be part of an EBM approach are being implemented but are uncoordinated.
- EBM in NZ will be very specific to the NZ context and may look quite different from how EBM is developing in other jurisdictions.
- To advance EBM, existing legislation needs to be strengthened and linked.
- Fragmentation has been created through a lack of policy, operational leadership, and governance arrangements that do not adequately empower collaborative management processes.
- There is a paucity of guidance material about what EBM is and might be.
- The Treaty of Waitangi, and legislation arising from Treaty responsibilities, is a significant enabler of EBM principles.
- Holistic management of ecological integrity and co-governance structures could be supported more fully.
- EBM could be better enabled by a range of non-regulatory changes.
- Resources to support implementation are required, including voluntary protocols to guide marine management, and the appointment of champions of EBM.



## New ways of governing marine and coastal areas are required

There is a pressing need to explore and support new approaches to marine and coastal governance.<sup>ii</sup> Marine ecosystems, both in Aotearoa New Zealand (NZ) and around the world, are being degraded by a range of threats.<sup>iii</sup> The inadequacy of current governance arrangements for managing complex, interconnected coastal and marine systems is now widely recognised. Alternatives need to be implemented that enable more holistic and equitable management of coastal and marine spaces.<sup>iv</sup>

Ecosystem Based Management (EBM) is one such approach that aims to understand and manage ecosystems as a whole, taking into account the wide range of interconnections that exist between parts of the ecosystem (ecosystem integrity).<sup>v</sup> Importantly, in a NZ context aspects of EBM resonate with and are complementary to mātauranga Māori, kaitiakitanga, and customary management regulations such as mataitai<sup>vi</sup> and taiapure.<sup>vii</sup>

Customary management is underpinned by whanaungatanga, the principle of integrated kinship, in which everything physical and metaphysical is related through whakapapa. All objects – both animate and inanimate – are descended from the gods, their physical manifestation bound to coexist as a whole and as equal members of the ultimate social institution. All things in Te Ao Marama (the world of light in which we live) inherit the characteristics of tapu, mana, and mauri from the gods; that is, sacred potential (tapu), the utmost privilege and authority and the reciprocal obligations that come with it (mana), and an essential life force (mauri). These three principles balance the relationship between humanity and the natural environment and are critical for sustainable management and for decision-making and governance. Governing marine and coastal areas in NZ through EBM has the potential to be informed and underpinned by te ao Maori in this way.<sup>viii</sup>

EBM is developing internationally as an approach to marine management. As such, there are many ways of approaching and defining EBM.<sup>ix</sup> Along with a lack of clear guidance on how EBM should be implemented,<sup>x</sup> implementation is further complicated because current legislative frameworks in NZ and elsewhere were established to enable single-sector forms of management.<sup>xi</sup>

Efforts are being made by the NZ Sustainable Seas National Science Challenge and its collaborators to generate a set of common principles to underpin EBM in NZ and to guide its implementation.<sup>xii</sup> To better enable EBM, more insight is needed into how EBM is (and might be) understood in NZ and what possibilities for its advancement exist within current governance arrangements.<sup>xiii</sup>

EBM is more than a natural science approach to marine management; although centred on the ecological ecosystem, it incorporates the cultural, social, spiritual, economic and political. Connections between different parts of an ecosystem cannot be managed well through a fragmented, single-sector or single-issue approach and it is unlikely that global issues such as climate change will be addressed by managing individual threats in isolation rather than managing the system as a whole.<sup>xiv</sup> There is also increased recognition that marine systems are complex socio-ecological spaces, and cannot be effectively understood and managed without input from a diverse range of stakeholders, perspectives, and knowledge. In NZ in particular, there is a need to ensure that the Treaty of Waitangi is honoured and that Māori are empowered to exercise their rights and knowledge in relation to their 'taonga katoa' (all that they treasure).<sup>xv</sup>

This discussion paper therefore examines EBM through a range of different lenses and perspectives, including the voices of Māori and Pākehā, and with thought given to future generations. Case studies showing the potential for EBM in NZ provide insight into the wide range of individuals and groups already involved in re-shaping marine management.

## Avenues through which aspects of EBM are being advocated for in NZ

Marine and coastal areas around NZ are responding to impacts from climate change, overfishing, pollution, and poorly planned coastal development. These impacts are undoubtedly reducing the ability of the ocean to provide key ecosystem services.<sup>xvi</sup> For many years, NZ has had a management regime in which deregulation is the norm and economic prosperity is often prioritised over long-term environmental protection.<sup>xvii</sup> Public advocacy in NZ in the last five years for changes in marine and coastal management has argued for use of longer term time frames, incorporation of Māori practices and worldviews in marine and coastal governance, and integration of multiple values in decision-making (social, economic, cultural, and environmental).<sup>xviii</sup>

Calls for better ways of using science, mātauranga Māori and other knowledge are prominent in discussions about changes to marine and coastal governance, such as considering the effect of cumulative and multiple stressors and climate change in management, ensuring that research is integrated into management, utilising a precautionary approach, and moving away from a single-species approach to one that incorporates the spatial and temporal dynamics of ecological ecosystems.<sup>xix</sup> Practical and processual aspects of management such as ensuring integration across different pieces of legislation and policy, and that management is consistent and aligned are typical assertions made when advocating for EBM or EBM-like arrangements in NZ.

To date, when scientific information has been provided as part of decision making processes, it was generally western science knowledge, with information from other knowledges typically excluded.<sup>xx</sup> This exclusion of other knowledge is inexplicable in NZ, given that Te Tiriti o Waitangi/the Treaty of Waitangi (the Treaty), provides for a partnership between mana whenua and the Crown regarding the management of natural resources and taonga. A key aspect of the Treaty is that Māori have the right to exercise rangatiratanga in the management of their “taonga katoa” (all that they treasure) including natural resources, either through their own forms of governance or through joint-management regimes. The Crown has a mandate to protect this authority when introducing new laws and policy in order to ensure that Māori can fulfil their obligations as kaitiaki. Despite the Treaty’s significance as NZ’s constitutional document, it has historically not been honoured in marine and coastal management. Western knowledge systems and values have become the accepted and reinforced norms in a post-colonial NZ, and Māori knowledge has been constructed as something which sits outside of this dominant management framework.<sup>xxi</sup> Existing statutory and institutional arrangements do not provide adequate conditions for joint governance and management to occur, and mātauranga Māori is subsequently missing from resource management policy and law.

Current governance arrangements have scope for considering the perspectives of multiple interest groups yet fall short of consistently providing for collaborative approaches to management. The Crown and its agencies dominate the current decision-making framework, except where ad hoc legislation, particularly that arising from Treaty responsibilities, specifically provides for a more inclusive decision-making process and Māori rights, values and interests.

With this in mind, the conversation in marine and coastal management has turned to exploring responses to this problem that enable more holistic and equitable governance of the integrity of ecosystems.

## Marine and coastal governance and the introduction of EBM

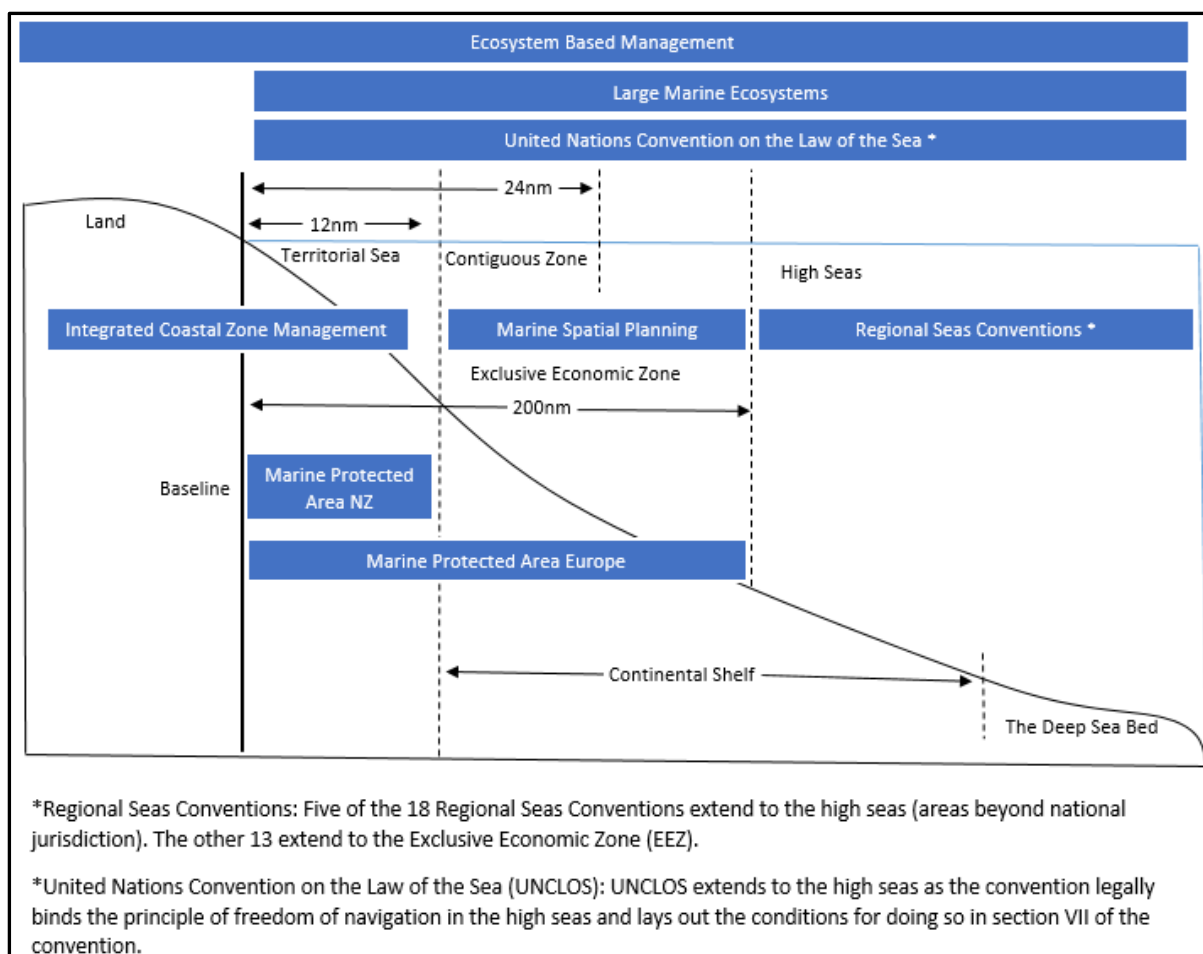
Rather than fixing on a tight definition of EBM, most advocates describe it as encapsulating a holistic, integrated approach to management that addresses the full suite of interactions and relationships within ecosystems, including the impact humans often have on these systems through multiple and cumulative activities. EBM promotes principles of sustainable use and equity, and aims to maintain healthy, productive, and resilient ecosystems that can be used sustainably by humans into the future. A comprehensive definition is provided by Long et al. (2015) based on analysis of a wide range of literature about EBM:

*Ecosystem based management is an interdisciplinary approach that balances ecological, social and governance principles at appropriate temporal and spatial scales in a distinct geographical area to achieve sustainable resource use. Scientific knowledge and effective monitoring are used to acknowledge the connections, integrity and biodiversity within an ecosystem along with its dynamic nature and associated uncertainties. EBM recognises coupled social-ecological systems with stakeholders involved in an integrated and adaptive management process where decisions reflect societal choice.<sup>xxii</sup>*

The potential of EBM is widely recognised, and many countries are attempting to implement EBM principles in their marine management strategies, and comprehensive working models underpinned by appropriate research are increasing.<sup>xxiii</sup> EBM in the marine space, however, is still a developmental approach to management and uncertainty remains about its implementation, particularly when current governance and legislative systems are designed to support less integrated forms of management.<sup>xxiv</sup> EBM is a complex notion that requires coordination across scientific, legal, social, and policy spheres and effective knowledge production and transfer between scientists, stakeholders, and decision makers.<sup>xxv</sup> While existing management approaches deal with single sectors or a combination of some, none account for an interlocking set.<sup>xxvi</sup>

The 1982 United Nations Conference on the Law of the Sea (UNCLOS) provides a global marine governance framework and subsequent international legislation reaching across jurisdictions must operate within this framework.<sup>xxvii</sup> UNCLOS establishes the different marine jurisdictions – sovereignty in territorial sea; sovereign rights (less than sovereignty) for specific purposes in the EEZ and continental shelf.<sup>xxviii</sup> Other approaches to marine and coastal governance internationally have been unsuccessful at sustaining marine ecosystems in the long term.<sup>xxix</sup>

Based on the premise that each jurisdiction's marine and coastal governance approaches should be complementary, and recognising that legislative and operational gaps do exist, EBM is being promoted as an overarching holistic approach to coastal and marine governance.<sup>xxx</sup> EBM aims to better account for the cumulative effects and various interactions that exist between humans and marine ecosystems, and therefore includes links between land and sea. It acknowledges and aims to understand the links between social and ecological systems, provides guidance for management institutions, recognises large-scale as well as small-scale changes and the shifts in scales and vulnerability. None of the other approaches shown in the diagram below enable adequate attention to human–ecological links. While all the approaches in the figure are significant and important for the sustainability of our marine environment, EBM is arguably the most called for, holistic, and main overarching approach.



There are many international agreements to which NZ is a signatory and has obligations that are aligned to varying degrees with emerging principles of EBM. The term 'Ecosystem Based Management' is not explicitly used in all international agreements, but its principles can still be clearly identified. Table 1 outlines a sample of the international treaties to which NZ is signatory, and briefly describes their connections to EBM.

**Table 1** Sample of international treaties to which NZ is signatory, and their connections to EBM

International Treaty	Relation to EBM Principles (in bold)
Convention on the Conservation of Antarctic Marine Living Resources	Under CCAMLR, activities are only permitted that do not change <b>the ecosystem</b> in a way that is not reversible over a period of 2–3 decades (Art II (3) (C) CCAMLR).
Convention on Biological Diversity	<b>Precautionary principle</b> should be used when making decisions in which there is any threat of loss of biological diversity. Calls for the ecosystem to be used in ways that benefit humans but do not lead to decline of biodiversity (Convention on Biological Diversity 1992)
United Nations Convention on the Law of the Sea	Recognises that issues in the marine environment are interrelated and should be addressed as a whole. Signatories are instructed to adopt fisheries management plans in accordance with <b>best scientific evidence</b> . (Article 61(2) UNCLOS)
FAO Code of Conduct for Fisheries	Underpinned by principles including <b>knowledge of species interdependence</b> and continuous change in ecosystems, as well as the need for science based decision making (Garcia et al. 2003)



Convention on Migratory Species	The conservation status of a species is determined by considering the role of the organism in its ecosystem. Calls for decisions to be made based on <b>best available science</b> (World Wildlife Foundation 2007).
Convention on International Trade in Endangered Species of Wild Flora and Fauna	Calls for decision makers to consider the role of a species within an ecosystem, rather than in isolation. <b>Precautionary approach</b> should be taken to ensure the protection of species (World Wildlife Foundation 2007).
South Pacific Regional Fisheries Management Organisation	Encourages the use of <b>best available information</b> and a <b>precautionary approach</b> when making decisions about management (Lodge et al. 2007)

Common themes within these agreements focus on utilising the best available scientific information to inform policy and decision-making processes, although the purpose behind the information is not always clearly defined and thus its relevance to EBM is unclear. There is also a strong emphasis on moving away from traditional single-sector management towards a more holistic. Relationships between species and parts of the ecosystem are considered in international agreements. Finally, a number of the agreements outlined above call for a precautionary approach when dealing with uncertainty or a lack of adequate information. What is not so apparent through these agreements is the place of humans in the ecosystem, scales of management, or governance principles such as collaborative decision making or co-governance partnerships. However, these agreements do represent a shift away from traditional management approaches in which science is responsive to industry and decisions often prioritise economic gain over environmental protectionism.

## Te Ao Māori and the potential of EBM

Māori environmental philosophy is underpinned by whanaungatanga, the principle of integrated kinship. The concept of whanaungatanga refers not only to family ties between people, but also to a wider sense of kinship between living people, ancestors, land, water, plants, animals, and the world of the gods.<sup>xxxix</sup> As Māori consider themselves related to all living things, they express whanaungatanga with their surroundings in the form of relationships bound and connected through the concept of whakapapa.<sup>xxxix</sup> Whakapapa creates an intimate link between relations, a link that extends to the mana of a person or place. All life forms exist and are connected through whakapapa within Te Ao Mārama, a world of light and enlightenment.<sup>xxxix</sup> The gods of Te Ao Mārama are the source of the three key concepts that underpin Māori philosophy: tapu (sacred potential); mana (the privilege, authority and obligations that come with it); and mauri (an essential life force).

These three principles balance the relationship between humanity and the natural environment. Everything has sacred potential and must be respected in that sense – the greater the potential or realised potential, the greater the tapu and subsequent levels of respect and reverence. All things have mauri to be maintained and protected. Those bestowed with the privilege of maintaining the mauri and life force of others inherit authority, the mana whakahaere, from the gods.<sup>xxxix</sup>

All things have mana and mauri at varying levels and all activities impact on mana and mauri, whether positive or negative. Thus, when mauri is reduced, so too is mana.<sup>xxxix</sup>

For Māori, the physical desecration of a place reduces its mauri and thus mana. This could occur, for example, through the removal of water from a river, or the allowance of a discharge. In order for mana to be expressed and preserved, mauri must be preserved and tapu must be respected. Tapu is something sacred or holy and its existence requires caution and spiritual restrictions. The more tapu a place, the more restrictions will be placed upon it. Tapu is also a mechanism for controlling how people behave towards each other and the environment, placing restrictions upon society to ensure tika (correctness), balance and well-being.

For Māori, Tu Ao Turoa (the environment) is intimately linked with the people. Nature and the environment cannot be isolated from the people who inhabit it. Humanity is privileged with mana and is obligated to maintain and protect the mauri of the environment. In return, the mauri of humanity is maintained by the natural environment. This is often described as the principle of kaitiakitanga, defined by Harmsworth and Awatere<sup>xxxix</sup> as “the ethos of sustainable resource management and guardianship”. Within this balanced system, all parts of the ecosystem have the potential to endure and thrive. Kaitiakitanga is exercised by kaitiaki (often non-human), or guardians, who must manage the environment for the benefit of future generations.<sup>xxxix</sup> The concept encompasses ideas of obligation and responsibility<sup>xxxix</sup> that are inherent in both Māori environmental management and EBM.

This is the holistic world view expressed through mātauranga Māori, which has at its heart many natural synergies with EBM. Modern use of the terms ‘ecosystem’ and ‘ecosystem services’ can be understood and explained through traditional concepts such as whakapapa, mana and kaitiakitanga.<sup>xxxix</sup> Because of the interconnectedness of ecosystems, it can be understood that shifts in the mauri of any part of the environment will cause shifts in the mauri of immediately related

components. This belief in the interrelationship of all parts of the environment is reflected in an EBM approach to environmental management.

The behaviour of Māori towards the environment is guided by a body of rules and knowledge known as tikanga. Kaitiakitanga entails rights and obligations that are required in accordance with tikanga.<sup>xi</sup> These rules are often implemented at a highly localised level to respond to specific environmental issues. In the language of EBM, management is 'place-based' and considers the ecosystem as a whole. Humans are acknowledged as a part of the ecosystem, rather than being distinct or separate from the rest of the natural world. Rāhui is a particular tikanga, which is understood in contemporary times as prohibiting certain acts in regard to the environment.<sup>xii</sup>

Many key aspects of EBM can therefore be understood through Te Ao Māori. Principles of long-term sustainability, whole of system management and maintenance of environmental values for future generations are key.<sup>xiii</sup> In both Māori customary management and EBM, social-ecological systems are linked and decisions are made by considering the social, cultural and spiritual worlds as well as the biophysical.

### Traces of EBM in current governance arrangements: Te Ahiaua Pipi Bed

*A recent permanent health warning placed on the taking of shellfish from Te Ahiaua, the Waitoaha pipi bed is an example of the utility of prohibitions like rāhui in the current environmental management regime.<sup>xliii</sup> In this case, however, the warning is not issued by local Māori but by Toi Te Ora Public Health exercising delegated authority of the Bay of Plenty District Health Board. The health warning was necessary to protect human users from the adverse effects of consuming shellfish due to high levels of faecal contamination in surrounding waters.<sup>xliv</sup> This action demonstrates the relevance of rāhui as a modern environmental management tool used in this case to protect human priorities, which are valued alongside conservation priorities in EBM; however, the placing of the rāhui without first engaging with tangata whenua has been perceived as a challenge to kaitiakitanga by some local Māori who consider the pipi bed a taonga and who have extensive environmental management engagement protocols in place with local authorities such as the Bay of Plenty Regional Council .*

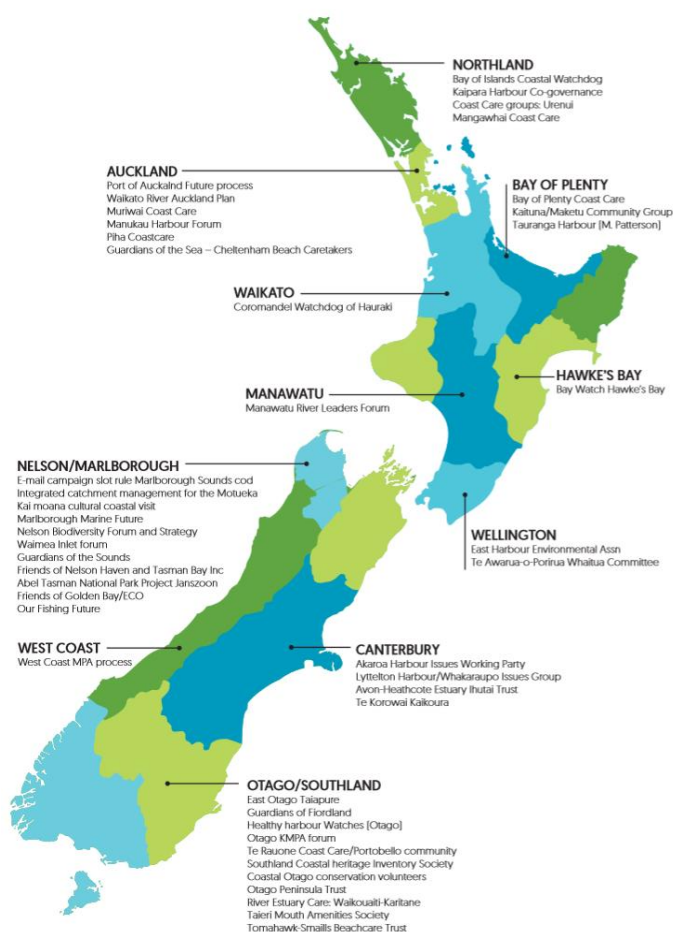
*The omission highlights the complex and fragmented nature of the current environmental management framework whereby some local authorities, such as the regional council, have protocols in place to engage with Māori while other authorities, such as Toi Te Ora Public Health, do not. EBM aims to address fragmentation by promoting integrated and collaborative decision making and management practices. In the case of Te Ahiaua, an integrated management approach could not only alleviate such a perceived challenge to kaitiakitanga but might have helped avoid the root issue of water pollution altogether.*



## The multiple voices and sites of NZ's marine and coastal governance

Numerous collaborative and participatory processes over the last 25 years have led to the involvement of a wide range of stakeholders in coastal and marine management.<sup>xlv</sup> These multi-party initiatives continue to test how policy officials and marine management practitioners understand, extend, and nurture concepts such as ecosystems and sustainability. While expectations typically focus on management outcomes, flawed governance can imperil management aspirations from the outset. Aspects of EBM are being worked on in different ways across the sites. Participation in coastal and marine management currently occurs in three main ways (local, community-led with a national focus, and multi-party):

- 1) Local community-, iwi-, hapū-, and whanau-led action-oriented projects such as coast care or dune restoration groups, rāhui, customary fisheries management, mātaimai and taiapure, and marine cultural health monitoring
- 2) Community-led groups seeking to influence or lobby regional and/or national decisions
- 3) Complex, multi-party collaborative processes.



Scale, resourcing and the ability to affect an outcome influence what type of group evolves. An ability to affect change is likely to be strongly linked to how current governance enables or blocks public participation. In short, the more inclusive the governance regime, the more collaborative conversations emerge. Conversely, legislation that constrains participation can lead to groups seeking to influence those who do make the decisions.

This large number of initiatives shows a strong response to the range of issues

identified in this report. The map above illustrates the existing potential for a plurality of perspectives to inform EBM at multiple scales.

## Traces of EBM in current governance arrangements: The Hauraki Gulf Forum

*Calls for the establishment of a marine park in Auckland's Hauraki Gulf were realised during the late 1980s and early 1990s, when the Hauraki Gulf Marine Park Act was passed into law in 2000<sup>xlvi</sup> to give effect to integrated management within the Hauraki Gulf. The Act established the Hauraki Gulf Marine Park, including the seabed, seawater, coastal and island reserves, and conservation land. The legislation set out clear purposes for the Marine Park, including recognising and protecting its international and national significance, recognising the special relationship of tangata whenua with Tikapa Moana or Te Moananui a Toi (the Māori place names for the Hauraki Gulf), and sustaining its life-supporting capacity. Unlike other areas such as Tāwharanui and Mimiwhangata, which were branded as 'marine parks' in NZ at the time, no restrictions were explicitly placed on any activity within the Gulf, although a common set of management objectives were to apply to statutory decision-making.<sup>xlvii</sup>*

*The legislation also established a new entity, the Hauraki Gulf Forum,<sup>xlviii</sup> to oversee the management of the Hauraki Gulf and its catchments. Instead of having direct management responsibilities, the Forum was conceived as an integrating body, bringing together the many agencies involved in the Gulf. Its members largely consist of central and local government representatives. In addition, six tangata whenua representatives are appointed by the Minister of Conservation, thereby recognising the strong cultural linkages between tangata whenua and the Gulf. While the appointees<sup>xlix</sup> are from a range of different iwi/hapū, due to the large number of tribal groupings with interests in the Gulf, they collectively represent tangata whenua interests more generally.<sup>l</sup> The Forum is required to report on the state of environment in the Hauraki Gulf every 3 years.*

*A particularly promising initiative is the establishment of the Sea Change – Tai Timu Tai Pari project, New Zealand's closest example of EBM at a regional scale. This initiative has seen the development of the Hauraki Gulf Marine Spatial Plan, created through a collaborative process involving tangata whenua, government bodies, and a range of local stakeholder groups,<sup>li</sup>*

*The existence of the Forum and its focus on collective decision-making align with the principles of EBM and could facilitate marine management that takes into account diverse knowledge and best available science. At present, however, members of the Forum have failed to adequately act as leaders in the protection of the Gulf.<sup>lii</sup> A 2015 review of the Forum reported a lack of effort from members to promote the objectives of the Hauraki Gulf Marine Park Act. This was attributed to a range of factors including members being unaware of what their role in the Forum entailed, a lack of appreciation for the Forum's potential to enact better management of the Gulf, conflicts between conservation, development and tangata whenua perspectives, and a lack of resources to support the Forum. Members of the Forum identified the need for a management body to be given a mandate to manage across jurisdictional and ecological boundaries to better enable EBM in the Gulf.<sup>liii</sup>*

## Government ministries and legislation guiding NZ marine and coastal management

A wide range of agencies and legislation are involved in the management of NZ's environment, most of which are responsible for managing a specific process, species or part of the ecosystem. This complicates efforts to manage the ecosystem as a whole and consider or provide the knowledge required to understand the interconnections between species and activities – which is critical to EBM. While traces of EBM-like elements are evident in the text of some current policies and legislation, the implementation through and across ministries is still problematic.

The Ministry for Primary Industries (MPI)<sup>liv</sup> is the primary regulator of fisheries and forestry in New Zealand and has national leadership for terrestrial and marine biosecurity. It also works with Aquaculture New Zealand,<sup>lv</sup> Te Ohu Kaimoana – The Maori Fisheries Trust,<sup>lvi</sup> the Department of Conservation (DOC), and the Ministry for the Environment (MfE) on new space requirements for aquaculture activities.

The Ministry for the Environment (MfE<sup>lvii</sup>) has an important role in monitoring the national performance and outcomes of environmental decision-making.<sup>lviii</sup> MfE has a direct role in reflecting the relationship between the Crown and Māori under the Treaty of Waitangi in environmental policy and resource management arrangements. Under the RMA, MfE has a key role in working with other government agencies to develop national policy statements and national environmental standards to guide consistent decision-making by regional and local authorities. It leads the Natural Resources Sector cross-government approach to natural resources policies and management.

The Environmental Protection Authority (EPA), established in 2011, provides national leadership across aspects of environmental regulation.<sup>lix</sup> It has oversight of New Zealand's international obligations under the UN Framework Convention on Climate Change, the Kyoto Protocol, the Vienna Convention, and the Montreal Protocol. In the marine environment, the EPA has specific functions under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act). Under this act, the EPA must promote the sustainable management of the natural resources of the EEZ and the continental shelf and regulate or prevent the discharge or dumping of waste and harmful substances. Within the EEZ, the EPA is the regulator for activities such as the environmental effects of oil, gas or mineral extraction. The EPA also administers the evaluation of nationally significant proposals under the Resource Management Act. In this role it provides support to Independent Boards of Inquiry appointed by the Minister for the Environment to make decisions on the proposals. The EPA Board is supported by a statutory Māori Advisory Committee (Ngā Kaihautū Tikanga Taiao) that is available to advise the EPA when requested, the HSNO Committee, and decision-making committees under the EEZ legislation.<sup>lx</sup>

The Department of Conservation (DOC) is charged<sup>lxi</sup> with promoting conservation of the natural and historic heritage of New Zealand on behalf of, and for the benefit of, present and future New Zealanders. It has specific roles in conserving protected indigenous marine species and threatened non-protected species. It also has roles under the Fisheries Act in identifying and assessing the adverse effects of fishing on the aquatic environment (notably on protected species) and has some responsibilities for coastal management arising from the Resource Management Act 1991. Specifically, these include preparation of the New Zealand Coastal Policy Statement; approval of all regional coastal plans; deciding on consents for Restricted Coastal Activities; planning and consent

responsibilities for the offshore islands; and calling-in consent applications of national significance in the coastal marine area.

## Resource Management Act 1991

The RMA was developed at a time when sustainable development rather than EBM was a strong theme in international environmental debates. The purpose of the legislation – to ‘promote the sustainable management of natural and physical resources’ (s5(1)) – reflects this. The RMA does not specifically refer to EBM, although this is probably indicative of the age of the legislation (now 25 years old). Despite this, there are many important references to ecosystems in the legislation, including in the definition of ‘sustainable management’ in section 5. This indicates that the need to manage impacts on ecosystems and their ‘integrity, form, functioning, and resilience’ is embedded within the legislation.<sup>lxii</sup> The potential to empower co-governance structures is also present in the RMA. Territorial and regional authorities are both able to transfer any of their relevant functions and powers to community boards, including iwi in matters of significance to that community. Treaty principles must be taken into account when implementing the Act, and in 2017 the Mana Whakahono a Rohe process was introduced to enhance Maori participation in the resource management process.

### References to ‘ecosystems’ in the RMA

- The definition of ‘biological diversity’ includes ‘the variability among living organisms, and the ecological complexes of which they are a part, including diversity within species, between species, and of ecosystems.’ (s2)
- The definition of ‘environment’ includes ‘(a) ecosystems and their constituent parts, including people and communities; and .... (d) the social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) or which are affected by those matters’ (s2).
- The definition of ‘intrinsic values’ ‘in relation to ecosystems, means those aspects of ecosystems and their constituent parts which have value in their own right, including (a) their biological and genetic diversity; and (b) the essential characteristics that determine an ecosystem’s integrity, form, functioning, and resilience (s2).
- The definition of ‘wetland’ includes ‘permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions’ (s2).
- The purpose clause includes ‘safeguarding the life-supporting capacity of ecosystems’ (s5(2)(b)).
- Matters that decision-makers are to have particular regard to include the ‘intrinsic values of ecosystems’ (s7(d)).
- Regional councils have as a function the ‘control of the use of land for the purpose of the maintenance and enhancement of ecosystems in water bodies and coastal water’ (s31(1)(c)(iia)).
- Water quality classes, which can be applied to water bodies managed for a specified purpose under s69 include ‘Class AE Water (being water managed for aquatic ecosystem purposes)’ (Schedule 3).
- Assessments of environmental effects, which are required to accompany resource consent applications, need to consider ‘any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity’ (sch 4 cl 2).

(emphasis added)

Integration is another strong theme within the RMA. The spatial scope of the legislation encompasses management of catchments and the marine area out to 12 nautical miles. In terms of activities, it



covers most catchment and marine activities; the main exception being fisheries management. The Fisheries Act manages the taking of fish, whereas the RMA manages the impacts of fishing activities on the marine environment, and the impact of other activities on fish and their habitats. Therefore, the legislation provides the potential for integrated management of catchments and the territorial sea, one of the key underlying principles of EBM.

Specific integrative mechanisms set out in the RMA (and associated Local Government Act 2002) include:

- The catchment to the sea boundaries of regional councils that could be used to enable integrated management of land, freshwater and the marine areas by a single entity.
- The specific statutory function of regional councils which is ‘... to achieve integrated management of natural and physical resources of the region (emphasis added)’ (s30(1)(a)).
- The requirement that regional councils prepare regional policy statements that have the purpose of ‘providing an overview of the resource management issues of the region and policies and methods to achieve integrated management of the natural and physical resources of the whole region (emphasis added)’ (s59). These have the capacity to be integrative, strategic planning documents.
- The provision for joint plans to address cross-boundary issues and joint hearings where more than one resource consent is required for an activity.<sup>lxiii</sup>
- The explicit consideration of cumulative effects through the definition of ‘effect’ in the Act that includes ‘any cumulative effect which arises over time or in combination with other effects’ (s3).

In practice, regional council boundaries are generally aligned with catchments, but are less well aligned with marine systems. For example, regional council boundaries cut across the Firth of Thames in the Hauraki Gulf and across the Kaipara Harbour. In addition, unitary councils whose boundaries are based on territorial authorities such as the Marlborough District Council, Nelson City Council and Tasman District Council are not necessarily aligned with catchments or natural marine systems. This fragmentation can be considered a barrier to EBM as it does not encourage marine systems to be managed as a whole system.

## New Zealand Coastal Policy Statement (NZCPS)

Decision-making under the RMA is guided by national policy statements. Most pertinent to the marine environment is the New Zealand Coastal Policy Statement (NZCPS). This provides decision makers with specificity on how the RMA is to be applied to the coastal environment. Objective 1 of the NZCPS emphasises the importance of sustaining ecosystems through maintaining natural processes, protecting representative or significant ecosystems and maintaining water quality. Aspects of the NZCPS align with some of the principles of EBM. There is reference to the adoption of a precautionary approach (policy 3), integrated management (policy 4), and strategic planning to address cumulative effects (policy 7). The NZCPS provides strong policy support for the application of EBM to the coastal environment under the RMA.

A large body of case law has sought to further define how the RMA is interpreted and implemented. A significant and defining court statement on the application of the RMA is by the Supreme Court in the 'King Salmon' case,<sup>lxiv</sup> which overturned a large body of earlier case law. The Environmental Defence Society (EDS) appealed a decision by the Board of Inquiry<sup>lxv</sup> to allow a King Salmon farm to be located in Port Gore in the Marlborough Sounds, a scheme that would have 'high' to 'very high' impacts on nearby outstanding natural landscapes. The EDS argued that this decision did not comply with Sections 13(1)(a) and 15(1)(a) of the NZCPS, which call for the 'avoidance' of activities that would have adverse effects on outstanding natural landscapes. The court concluded that the use of the word 'avoid' in the NZCPS 'provides something in the nature of a bottom line'<sup>lxvi</sup> and should be interpreted to mean 'not allow'. The court went on to reason that 'If there is no bottom line and development is possible in any coastal area no matter how outstanding, there is no certainty of outcome...'<sup>lxvii</sup> and there is the potential 'to undermine the strategic, region-wide approach that the NZCPS requires regional councils to take to planning' [139]. The Court's decision was therefore that the proposed Port Gore farm did not comply with the NZCPS, which the RMA gives effect to. This case was significant as the court jurisprudence had earlier supported an 'overall judgement' approach that potentially enabled economic considerations to take precedence over environmental protection.

In a related decision the Supreme Court considered the application of adaptive management<sup>lxviii</sup> in the case of salmon farms, and set out the test, to be applied as follows [133]:

1. There will be good baseline information about the receiving environment
2. The conditions provide for effective monitoring of adverse effects using appropriate indicators
3. Thresholds are set to trigger remedial action before the effects become overly damaging; and
4. Effects that might arise can be remedied before they become irreversible.

At face value, the framework provided by the RMA (and supported by the NZCPS) appears to enable EBM-like approaches. However, while the importance of managing impacts on ecosystems is acknowledged, and an integrative and strategic planning framework is recommended to guide decision-making, there is nothing that specifically requires this combination of principles to be enacted in unison.

## Fisheries Act 1996

The Fisheries Act applies to all fishing activity within NZ's marine realm, including the territorial sea and EEZ. It does not address other impacts on the marine space, fishers or on the health of fish stocks. Although the Act covers an extensive spatial area, it is largely sector-focused.

The Act at first appears to primarily enable the harvest of fisheries; its purpose is stated as 'to provide for the utilisation of fisheries resources while ensuring sustainability' (s8(1)). But the elements of the purpose are further defined; 'utilisation' means to 'conserve' and 'enhance' as well as 'use' and 'develop' fisheries resources (s8(2)(b)). In addition, 'ensuring sustainability' includes 'avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment' (s8(2)). The term 'aquatic environment' is defined to include 'natural and biological resources comprising any aquatic ecosystem' (s2).

While the legislation does not specifically refer to EBM, it does contain a set of environmental principles that address biodiversity and habitat issues, including that 'associated or dependent species should be maintained above a level that ensures their long-term viability, the 'biological diversity of the aquatic environment should be maintained', and the 'habitat of particular significance for fisheries management should be protected' (s9).

Also of significance are the information principles set out in section 10, which require that a decision be based on 'the best available information', that decision makers should be cautious when information is 'uncertain, unreliable, or inadequate', and that 'the absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure' to achieve the purpose of the Act.

The High Court, for example, in a case relating to the protection of Hector's and Maui's dolphins,<sup>lxix</sup> found that section 8 of the Act required the Minister to balance between two competing policies – utilisation and protection. Where information was uncertain, the Minister 'was entitled to take a risk adverse approach, favouring conservation objectives over utilisation of the fisheries' [281].

The focus of fisheries management and the data collected to inform it, however, still remains on the management of individual fish stocks and a few endangered species. Fish stocks are managed spatially using defined quota management areas (QMAs) based on 10 historic fisheries management areas that divide the country's territorial sea and EEZ. They extend from the shore to the edge of EEZ, so are spatially extensive. In some cases, QMAs broadly coincide within the biological range of individual fish populations, but in many cases they do not, complicating management.

The harvest of fish stocks is managed on the basis of 'maximum sustainable yield' (MSY). Under s13(2) the Minister is required to set a total allowable catch that 'maintains the stock at or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks.' The Act also provides broad powers to deploy 'sustainability measures' under Part 3, including regulating the size of fish which can be harvested, the areas from which harvest may occur, fishing methods that may be used, and seasons during which harvest may occur.

MSY is not a concept that embraces EBM principles. Its inception was based on a theory, developed during the 1920s, that reducing the size of fish populations through harvest (and preferentially

removing the larger fish), released more food for younger, faster growing fish, which in turn enabled the biomass to increase at a greater rate. This concept of increasing productivity by thinning out the stock implied that a 'sweet spot' might exist where a certain amount of fishing would reduce a stock to a size where it would produce its maximum biological output.<sup>lxx</sup> The focus of MSY is on managing harvest from individual fish stocks, rather than on interactions with other species in the food web or with the marine environment more generally. MSY therefore does not directly relate to the real oceanic world, and there has been much criticism of it (see, for example, Finlay 2009; Patrick & Link 2015). In its simplistic application, MSY assumes that ocean systems are static, and that fish productivity is not linked to external factors in the marine environment such as ecosystems.

More recently, there has been a growing argument for application of an ecosystems-based management approach to fisheries. The FAO 2003 technical guideline on the 'ecosystem approach to fisheries' prepared under the auspices of the 1995 Code of Conduct for Responsible Fisheries states 'an ecosystem approach to fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries'.

Importantly, section 5 of the Fisheries Act specifies that the Act is to be interpreted in a manner consistent with 'NZ's international obligations relating to fishing'. NZ is a party to UNCLOS, which includes a general obligation to 'protect and preserve the marine environment', which includes taking all measures necessary 'to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life' (Article 194). At the same time, NZ also has an obligation under the convention to promote the 'optimum utilisation' of living resources within the EEZ (Article 62).

Perhaps even more significant in an NZ context, the Fisheries Act supports co-governance arrangements between tangata whenua and other parties. The act recognises customary fishing rights and allows for the creation of taiapure. When new quota shares are allocated for a particular fish stock, the Act stipulates that 20% of the new shares must be allocated to Te Ohu Kai Moana Trust, the Maori Fisheries Trust.

## Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012

The Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act) legislates what is a step towards an ecosystem-based approach to the management of New Zealand's marine environment beyond its territorial sea. In this marine environment – the exclusive economic zone and continental shelf (EEZ/CS) – New Zealand has sovereign rights<sup>lxxi</sup> to explore, exploit, conserve, and manage the natural resources of the waters and seabed. Therefore New Zealand can legislate only within the scope of those sovereign rights.

The EEZ Act sets out the high-level rules that apply generally to the EEZ/CS, including the general restriction on the undertaking of activities. Such a restriction is necessary for a consenting regime to operate. The Act empowers the making of regulations to moderate the restriction and tailor the law for specific areas (marine spatial planning) or circumstances – the regulations were intended to operate much as do the rules in regional plans under the Resource Management Act 1991.

The EEZ Act does not apply to all human activities that take place in the EEZ/CS – the Government of the day decided on a gap-filling approach rather than a full review, and the potential integration, of legislation applicable to the EEZ/CS. The Act attempts to integrate its regime with the other marine management regimes by acknowledging those regimes and requiring decision-makers to take them into account when considering the making of regulations under the EEZ Act or applications for marine consent. Most significantly, fishing remains under the Fisheries Act 1996, with that Act amended to require the Minister of Fisheries to consider, *inter alia*, regulations made under the EEZ Act before he or she sets or varies any sustainability measure (catch limits, area controls, fishing methods, etc.).<sup>lxxii</sup> There is also no comprehensive or integrated protection mechanism for areas of the EEZ/CS. Additionally, decision makers under the Act may be required to consult with the Maori Advisory Committee on any new proposals. When *iwi* and *hapu* groups are consulted, the Act stipulates that they must be given adequate time to consider their position on the matter and provide input.

In the absence of regulations that give substance to the Act's sustainable management approach, the Environmental Protection Authority (EPA), through its decision-making committees, is potentially faced with having to consider applications for activities in any part of the EEZ or continental shelf. There are no parts of the EEZ or continental shelf that are off-limits to any or all of the activities under the jurisdiction of the EEZ Act (unless there is separate legislation that provides for that – the Kermadec Ocean Sanctuary Bill, if enacted, would apply to the territorial sea and the EEZ around the islands) nor are there any prohibited activities (other than specified dumping or incineration activities prohibited by the Act itself from October 2015 when the regulation of those activities was transferred from the Maritime Transport Act 1994 to the EEZ Act).<sup>lxxiii</sup>

The EEZ Act (as it existed when Chatham Rock Phosphate made its application in May 2014) required an application for a marine consent to fully describe the proposal and to include an impact assessment. An impact assessment must, *inter alia*:<sup>lxxiv</sup>

- describe the activity
- describe the current state of the area where the proposed activity would be undertaken and the environment around that area

- identify the effects of the activity (including cumulative effects and effects that occur outside the EEZ/CS) on the environment and existing interests

Once the EPA is ready to consider an application for marine consent, the EEZ Act requires the EPA to consider a long list of matters, including:

- the full range of effects on the environment and existing interests not just of the activity proposed in the application, but also of other activities controlled under the Act combined with those that are not;
- effects on human health that may arise from environmental effects;
- the importance of protecting biodiversity, integrity of marine species, ecosystems, and processes;
- the importance of protecting rare and vulnerable ecosystems and the habitats of threatened species;
- the nature and effect of other marine management regimes; and
- relevant regulations made under the EEZ Act.<sup>lxxv</sup>

There are further matters to consider in determining the extent of adverse effects on existing interests<sup>lxxvi</sup> and information principles to be applied, including a strong direction to the EPA that it should make full use of its powers to request information from the applicant, obtain advice, and commission a review or report.<sup>lxxvii</sup> The EEZ Act makes it clear that the EPA may refuse an application for consent if it considers that it does not have adequate information to determine the application.<sup>lxxviii</sup> If it grants an application, the EPA has broad scope to impose conditions on the consent, including conditions that require an adaptive management approach.<sup>lxxix</sup>

### Traces of EBM in current governance: Chatham Rock Phosphate Limited

*Chatham Rock Phosphate Limited applied to mine phosphorite nodules on the Chatham Rise in depths of 250–450 m over 10,000 km<sup>2</sup> of seabed. The Decision Making Committee considered a wide range of environmental issues, including ‘the significant and permanent adverse effects on the benthic environment’, ‘the effects of the return of waste material to the seabed’, ‘effects on the trophic web (including primary production, microbes and zooplankton), fish and other pelagic fauna, rock lobsters, paua, water quality and seabirds; the effects of mining-related noise, including on marine mammals; and the risks to biosecurity and human health’.<sup>lxxx</sup> It was clearly a very wide-ranging enquiry that considered ecosystem level effects rather than focusing on single species or stressors.*

*The application was ultimately declined, due to the destructive effects of the extractive activity and the potentially significant impact of the deposit of sediment on the areas adjacent to the mining area and on the wider environment, which the decision-making committee found could not be mitigated by conditions or adaptive management. In coming to its decision, the committee found that the destructive impact of the drag-head on the seabed and on the benthic fauna in and on the seabed was a major concern, given that<sup>lxxxi</sup> these effects could not be avoided, remedied or mitigated; the mining would largely be occurring in an area where the seabed is currently protected from trawling and dredging by the Mid Chatham Rise Benthic Protection Area; the effects would include the destruction of communities dominated by protected stony corals which are potentially unique to the Chatham Rise and which the committee concluded are rare and vulnerable ecosystems; the habitat would not return to its present form but rather would be transformed wholly into soft sediment habitat. As well, the committee was not persuaded that the likely economic benefit to NZ of the proposal would be as significant as argued by the applicant.*

*In this decision and the decision on the applications by Trans-Tasman Resources (see section 7.0), the EPA’s decision-making committees rigorously assessed the environmental effects of the proposed mining activities. For both applications, the uncertainty of effects was a significant issue. The split in the Trans-Tasman Resources Decision Making Committee for the second application was indicative of members applying different approaches to dealing with risk. The majority considered the level of uncertainty and risk to be acceptable and able to be managed through conditions. In contrast, the minority considered the level of uncertainty and risk to be higher and meriting the adoption of a precautionary approach in favour of the environment. Both cases highlight the difficulties of fully assessing effects in the context of a case-by-case consenting regime. Regulations could be used to implement spatial planning in the EEZ (an easy win would be to prohibit activities controlled under the EEZ Act in the Mid-Chatham Rise Benthic Protection Area or even all BPAs) and continental shelf, but an EEZ policy statement is unlikely to assist decision-makers on consent applications with the more difficult decisions. The EEZ Act has good bones but whether it promotes EBM will depend on implementation by the Government, what regulations and EEZ policy statements are made and the terms of those instruments.*

## Additional legislation

The Maritime Transport Act 1994, Biosecurity Act 1993 and a raft of national conservation legislation applying to the marine space (Conservation Act 1987, Marine Reserves Act 1971, Wildlife Act 1952 and Marine Mammals Protection Act 1978) do not explicitly enable EBM approaches.

The Biosecurity Act does recognise the potential impact of pests or unwanted organisms on ‘the sustainability of natural and developed ecosystems, ecological processes, and biological diversity’ as being a reason to prepare a pest management or pathway management plan (ss62, 82 and 91).

The definition of ‘nature conservation’ in the Conservation Act includes ‘the preservation and protection of the natural resources of NZ, having regard to their intrinsic values and having special regard to indigenous flora and fauna, natural ecosystems, and landscape (emphasis added)’ (s2). The functions of the NZ Conservation Authority include the investigation of any nature conservation matter, and publicity and educational activities to increase the understanding of nature conservation in NZ (s6B).

The other pieces of conservation legislation provide some spatial and regulatory tools for marine conservation but not in an integrated or holistic manner, which is unsurprising, given that they are 40 or more years old. The Conservation Act provides the ability to wrap conservation management strategies around the management of marine reserves, marine mammal sanctuaries and the like once they are created. The purpose of such strategies is to ‘...establish objectives for the integrated management of natural and historic resources, including any species, managed by the Department...’ (s17D).

The Marine Protected Areas Policy and Implementation Plan released by the Department of Conservation and then Ministry of Fisheries in 2005 sought to provide an integrative framework for the various marine spatial protection mechanisms provided for in different legislation. This sought to improve the workability of the current system before legislative reform was achieved. The policy established a process for the establishment of community-based planning forums to develop proposals for networks of marine protected areas. These have had some success, but in many cases due to a lack of suitable national legislation, the networks have been created by bespoke regional laws such as the Fiordland (Te Moana o Atawhenua) Marine Management Act 2005 and the Kaikōura (Te Tai ō Marokura) Marine Management Act 2014.

Co-governance structures are not explicitly present in the above legislation. The Conservation Act is the most promising in this regard; Conservation boards are typically required to have at least one member who represents iwi and hapu interests, and the Act provides for the creation of rāhui. The Marine Reserves Act and Biosecurity Act and Maritime Transport Act, however, do not mention the need to engage in co-governance or give effect to Treaty principles.

In terms of regional legislation, the Hauraki Gulf Marine Park Act 2000 (HGMPA) is by far the most comprehensive. This establishes a marine park, an integrative body – the Hauraki Gulf Forum, and management objectives that apply to the other statutory regimes operating within the marine park area including the RMA, Fisheries Act and conservation legislation. The objectives address a range of environmental, social, cultural and economic issues. Of particular relevance to EBM is the objective of ‘the protection and, where appropriate, enhancement of the life-supporting capacity of the



environment...’, which includes the capacity ‘to maintain the soil, air, water and ecosystems of the Gulf’ (s7 & 8). The Forum itself is designed as an integrating body consisting of representatives of iwi and statutory agencies. One of its functions is to ‘promote and advocate the integrated management and, where appropriate, the sustainable management of the Hauraki Gulf, its islands, and catchments’ (s17(1)(i)).

Overall, the HGMPA is a potential enabler of EBM for the Hauraki Gulf Marine Park. It discusses management of the catchments and the marine area, and all activities within them, including fishing (which is excluded from the RMA). It also establishes an integrative body to span all the different management regimes. However, the integrated regime has not necessarily resulted in management action. As noted in the Hauraki Gulf Forum’s State of the Gulf Report 2011, ‘... the environmental indicators show that management initiatives have collectively failed to halt or reverse the decline of the Gulf’s natural resources’. The Report then postulates a number of reasons for this, including the activity not being of sufficient scale or intensity, lack of clear environmental goals, key gaps in management response, implementation gaps, fragmentation in management and technical, political, social or economic roadblocks. Building on this analysis, the Forum was one of the prime instigators behind the application of an EBM-focused marine spatial planning process to the Gulf.<sup>lxxxii</sup>

## Science-policy interfaces shaping marine and coastal governance

The emerging threats in the marine environments include increased use of coastal and deep water areas by multiple activities against a background of rising water temperatures and sea levels, acidification and changes in rainfall, storm patterns, and most likely large-scale ocean currents. These complex phenomena require greater understanding of the marine environment and human impact on it, to successfully implement solutions to protect ecosystems. As these ecosystems do not have clear boundaries, changes within them cannot be tracked discretely, further complicating management. Compounding this situation is the lack of availability and steady decline of mātauranga Māori information to adequately consider the relationships between elements in the ecosystem, both tangible and intangible.

Without continued scientific study and kaupapa Māori research about ecosystems, the tangible benefits of EBM may be limited in contrast to ‘business as usual’ approaches. EBM is reliant on scientific research at all levels of ecosystem, as knowledge of ecosystems is still incomplete and is subject to change.<sup>lxxxiii</sup> The scientific community are therefore key to enabling EBM. In addition, research that builds on available Māori knowledge and practice, and enables a mātauranga Māori restoration will be critical to ensuring an EBM approach that is specific to NZ. The continued development of monitoring programmes, sampling methods, models and statistical analyses is crucial to the implementation of better EBM. The role of the scientific community working in partnership with Māori, communities and industry is continual, as socio-ecological ecosystems are ever changing and are dynamic in time and space. Ultimately, if NZ aims to implement EBM in management of its marine environment, we need to better inform (through science and mātauranga Māori) the identification of goals for the marine estate. Ongoing education and discussion with the public and policy makers, to continue research to deepen our understanding of ecosystems, will determine our success in implementing our desired level of EBM.

EBM is being advocated for through science-policy interfaces across the ministries noted above. MPI has established a Science Advisory Governance Board that is charged with ensuring that its use of science embodies excellence and best practice. The Science Board is chaired by the Departmental Science Adviser (DSA) who has general responsibilities for overview and advice on the MPI Science System, including external engagement, and how MPI uses science.

Science is one of the 7 core business units within the EPA. Its decision-making is explicitly based on science, mātauranga Māori and risk assessment. The EPA maintains some expert scientific and technical capability in geology, marine biology, molecular biology and toxicology, but as a small government agency it also relies on external, contracted scientific advice as needed. In 2016 it established a Chief Scientist role that is supported by a science and information management team within EPA. The Chief Scientist is charged with providing science leadership across the full range of scientific disciplines covered by EPA’s operations. A key part of the role is in science translation: closing the gap between the work the EPA undertakes and the public understanding of science, by explaining its application, methods, limitation and opportunities in relation to EPA decision making (Environmental Protection Authority— Te Mana Rauhi Taiao 2016).

MfE has developed a guide to develop and measure quality in policy advice within the Ministry (Ministry for the Environment 2011). The guide describes stages in the policy cycle, in the context of a Cost Opportunity Benefit Risks Analysis (COBRA) framework, and defines criteria for creating good

policy advice. Evidence is a key element in the development of good policy for implementing EBM, as is engagement and consultation with those affected by the policy or who have relevant experience. Sources of evidence could include economic analysis, quantitative and qualitative data from primary and secondary sources, industry statistics, forecasting and modelling, and the expert knowledge of individuals, groups and networks.

DOC has core roles of providing scientific, policy and legal advice to the Minister of Conservation, contributing to whole-of-government policy processes, and servicing ministerial advisory committees, the New Zealand Conservation Authority and conservation boards. It works across government in the Natural Resources Sector (comprising MBIE, MfE, MPI, LINZ, DOC, Te Puni Kōkiri, DIA and MOT) and, in conjunction with MfE, has led recent consultation for development of the *Conservation and Environment Science Roadmap*. DOC's own Strategic Science plan is due for renewal (Department of Conservation 2011). Additionally, DOC has a Departmental Science Advisor who was appointed in 2014. DOC has promoted the assessment of ecosystem health by use of the term 'ecological integrity', which is a multidisciplinary, comprehensive concept involving a number of ecosystem components.<sup>lxxxiv</sup>

A range of departments and statutes are involved in decision making for marine resources, and significant variation in the level of engagement of science in policy development. It should also be noted that the use of scientific evidence by government agencies in NZ is undergoing a process of change, largely on the foundation of recommendations made by the Office of the Chief Science Advisor to the Prime Minister (PMCSA). The PMCSA was established in 2009 to provide independent advice to the Prime Minister, Ministers, and government agencies on the use of science in the formation of public policy and decision-making. An important driver of its activities has been the need for better mechanisms within government for science-based evidence to inform complex, dynamic public policy issues, where there is often incomplete and uncertain knowledge.<sup>lxxxv</sup> To meet these challenges, policy development itself needs to be more dynamic, adaptive, and inclusive, with more frequent engagement, analysis and evaluation of expert technical knowledge. In this context, understanding the role and limits of science in the policy process is key.<sup>lxxxvi</sup>

## Traces of EBM in current governance arrangements: Bryde's whales

### voluntary protocol

*Bryde's whales have been listed in NZ as nationally critically threatened. The Hauraki Gulf is favoured habitat for the whales, with up to 50 Bryde's whales being regular users of the Gulf at any one time.<sup>lxxxvii</sup> The species has been fully protected under law since 1978.*

*The Hauraki Gulf is on the shores of NZ's largest city of Auckland (population around 1.57 million<sup>lxxxviii</sup>), which is in turn supported by the country's busiest port. Due to the port's geographic location, vessels arriving from other harbours must transit through the Hauraki Gulf. Geographically the Bryde's whales and the commercial vessel traffic occupy overlapping water space. This has caused a spatial conflict whereby at least 17 whales are known to have been killed by ship strike at an average of around two a year.*

*In March 2012, a collaborative working group was established to address whale mortalities arising from ship strikes. It was recognised that solutions would affect social, economic and cultural activity in the Gulf<sup>lxxxix</sup> so efforts were made to engage with a diverse range of stakeholders in order to reach collective decisions that would be accepted by users of the Gulf. In a collaborative process involving the University of Auckland, Ports of Auckland, DOC, local council representatives, iwi, and shipping companies, a range of possible mitigation measures to reduce vessel strike were investigated. University of Auckland scientists investigated the spatial overlap between whales and vessel tracks using AIS data, and the economic consultancy Covec carried out analysis of vessel transits in the Gulf to determine average vessel speeds. In 2014, DOC commissioned further research into the efficacy of using a large whale warning system in the gulf.*



*In 2013, the working group developed a voluntary protocol for vessels, consisting of the following recommended steps:<sup>xc</sup>*

- 1) Reduce vessel speed to 10 knots when transiting the Gulf, and make use of recommended shipping routes (as shown in Figure<sup>xc</sup>)*
- 2) Keep watch for whales when moving through the Gulf, and alter course if a whale is sighted.*
- 3) Report any whale sightings to Harbour Control so that other vessels can be alerted and can adjust their course and speed accordingly.*

*The use of local, up-to-date science ensured solutions were relevant and applicable to the specific conditions of the Hauraki Gulf. In overseas cases, for example, a successful strategy has involved directing vessels away*

*from areas frequently populated by whales. Local research determined that this strategy was likely to be ineffective in the Gulf, however, because whales moved throughout the Gulf rather than being concentrated in particular areas.<sup>xcii</sup>*

*Additionally, the involvement of stakeholders in collaborative decision making meant solutions were widely supported and conflict was reduced in both the development and uptake of mitigation measures.<sup>xciii</sup> The working group has been successful in implementing an evidence-based solution that has resulted in no reported whale deaths since September 2014, has had high participation rates from*

*shipping companies, and has seen a significant reduction in the risk to the whales through reducing the average speed of vessels transiting through the Gulf.*

*This case study cannot be considered a true example of EBM as it focuses on the management of a single species. However, principles of EBM are clearly visible in the collaborative nature of the working group, the recognition of the relationship between human activity and whale populations, and the use of best available, up-to-date science to inform solutions tailored to the area.*

## Emerging principles of Ecosystem Based Management for NZ

Emerging from the multiple voices articulating a need for change, the Sustainable Seas National Science Challenge was funded by the NZ Government in 2014. The Science Leadership Team of the Challenge identified the need for researchers, Māori and stakeholders participating in Challenge projects and activities to have a common understanding of EBM to facilitate communication and understanding. As a definition alone was not considered expansive enough to generate the engagement and common understanding NZ requires, a definition and a set of overarching principles were developed that are unique to NZ.

These overarching principles are informed by the international principles of EBM outlined earlier as well as more NZ specific drivers for change.<sup>xciiv</sup> In May 2017, the Science Leadership Team circulated a diagram giving an overview of 6 key principles of EBM on which the Challenge and its partners were working. In early 2018 the set of principles were extended to include a focus on co-governance and exiting constitutional relationships between the crown and Māori. This working definition is being used to test the scope of what EBM might be.

**EBM is a holistic and inclusive way to manage marine environments, and the competing uses for, demands on, and ways in which New Zealanders value them.**

The principles of EBM are

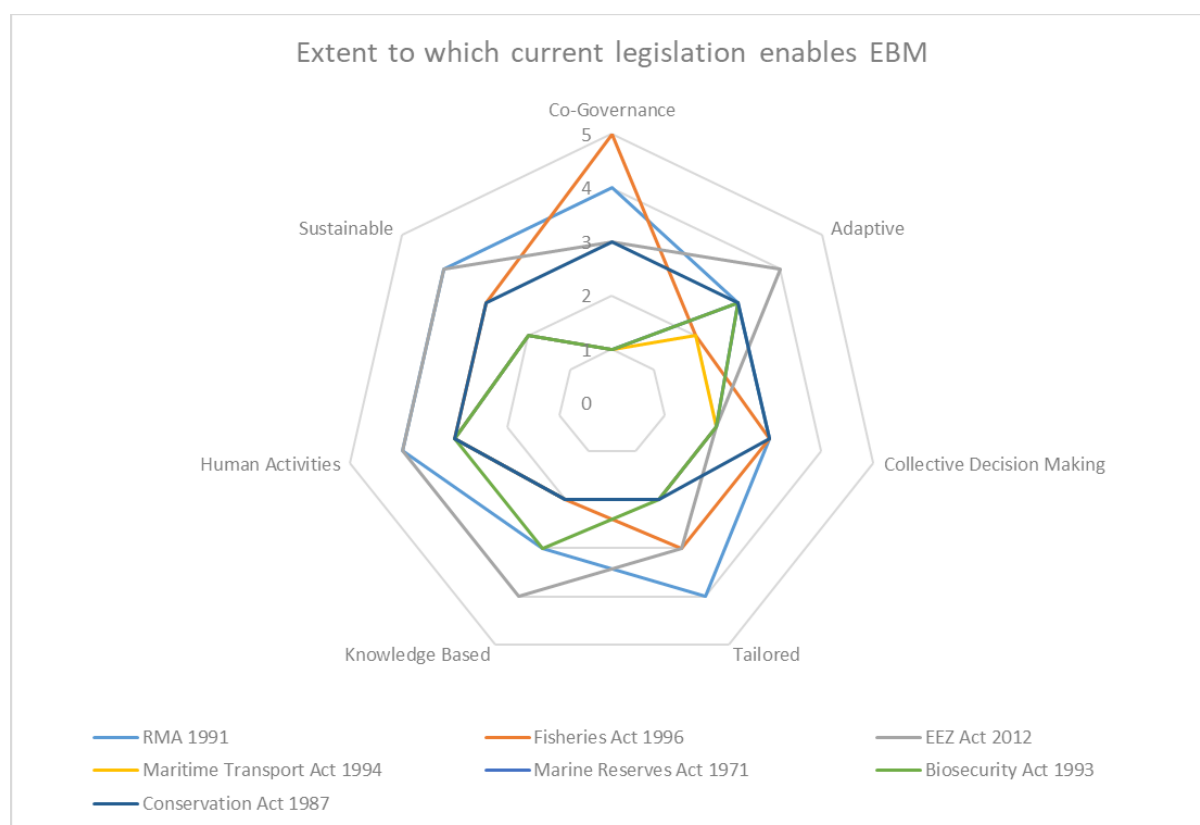
1. A co-governance and co-design structure that recognises the Māori constitutional relationship and mana whenua at all levels (whānau, hapū, iwi), together with the guiding concepts of mauri, whakapapa, kaitiakitanga, mātauranga-a-iwi, and mātauranga-a-hapū
2. Place- and time-specific, recognising/understanding the ecosystem as a whole in all its ecological complexities and connectedness and addressing cumulative and multiple stressors
3. Acknowledgement of humans as ecosystem components with multiple values
4. Long-term sustainability of natural marine ecosystems as a fundamental value, in particular maintaining values and uses for future generations
5. Collaborative and participatory management throughout whole process, considering all values, and involving all interested parties from agencies and iwi to industries, whānau, hapū, and local communities
6. Clear goals and objectives based on knowledge
7. Adaptive management, appropriate monitoring, and acknowledgement of uncertainty

It is important to note that these principles are a work in progress and will be refined by the Challenge Science Leadership Team as participants in Challenge work more extensively with these ideas and test the ideas in a range of settings. For now we are contributing to the national conversation about EBM by providing an assessment of how these principles have already been enabled through existing legislation.

## Advancing EBM through current governance arrangements

The current legislative framework applying to NZ's marine realm is fragmented. No single piece of legislation enables all 6 principles; however, aspects of EBM are being achieved in a fragmented fashion across the legislative framework. There is also fragmentation between pieces of legislation. Some linkages do exist between decision making processes, one example being the requirement for the Minister of Fisheries to consider RMA planning documents when making fisheries sustainability decisions. These legislative linking provisions, however, have not proved effective in practice, and there has been little interaction between the RMA and fisheries regimes (Peart, in press). Despite existing linkages between different pieces of legislation, there is no overarching framework for applying EBM to the marine space in a fully integrated manner.

There is no explicit legislative barrier to such a framework being provided. However, existing legislation is a barrier to 'collective decision making' and 'best available knowledge'. In terms of the latter, the existing legislation does not provide appropriate hooks to enable indirect and intangible effects to be weighted in decision making. Agencies could be encouraged to work more effectively together and, indeed, MPI, MfE, and DOC have several recent initiatives to enable this. There is a need for EBM-based policy statements and guidelines to be created and woven into both existing and future legislation to provide greater guidance to policy and decision makers on how to implement EBM in the marine space. Specific guidance is needed on how to assess and manage the impacts of cumulative and multiple activities, especially when there is uncertainty about their potential effects. At present, the ability of regional councils to incorporate these into plans is being tested in the Environment Court.



Our examination of how current governance frameworks enable EBM reveal there are numerous possibilities and problems associated with advancing EBM in NZ. The questions and provocations below point to some of these unresolved aspects and are structured to reflect the developing principles for EBM in NZ. They are presented here to prompt discussion about current points of contention for advancing EBM in NZ as well as opportunities for change.

### 1) Co-governance and co-design

*Beyond treaty settlements how else can co-governance and co-design structures be established that recognise Māori constitutional relationships and mana whenua at all levels (whānau, hapū, iwi), together with the guiding concepts of mauri, whakapapa, kaitiakitanga, mātauranga-a-iwi, and mātauranga-a-hapū?*

There is evidence of NZ's journey towards co-governance. Treaty settlements are the main catalyst establishing co-governance and co-management arrangements founded on NZ's constitutional relationship between the Crown and iwi/hapū. Examples include the Māori Commercial Aquaculture Claims Settlement Act (2004), the Ngā Wai o Maniapoto (Waipa River) Act (2012), and the Joint Management Agreement for the Waipū River between Gisborne District Council and Te Runanganui o Ngāti Porou (2015). Other examples, such as Te Urewera Act (2014) (14/51) and Te Awa Tupua (Whanganui River Claims Settlement) Act (2017), present opportunities for true co-governance but are still largely un-tested in terms of their implementation and legal implications. These examples challenge more dominant arrangements that merely provide for consultation with and participation by Māori in management rather than an active role in governance and decision making. They are more reflective of Treaty-based partnership. Exploration and imagining of new models of co-governance are relatively recent. Much work is yet to be done to design, implement, and test these arrangements to recognise and provide for Maori values, rights and interests.

What is needed is more planning that considers the integration of mātauranga Māori and the body of tikanga regulations from the outset, requiring Maori involvement at all levels of governance and management. This will require growth and understanding of values and knowledge systems from all parties involved in governing and managing particular ecosystems and an overall shift in the way natural resources are perceived and appreciated. For example, the three fundamental concepts of tapu, mana and mauri need to be understood and valued. They are always present, and understanding their significance for ourselves, our ecosystems, and our livelihoods would help us govern and manage in appropriate manners – for now and for future generations. This enduring and sustained reverence and respect for ecosystems as a whole, with physical and metaphysical elements, would better align with the principles of EBM.

A test case for this approach can be seen in the ground-breaking legal personification of both Te Urewera and the Whanganui River as part of the respective Treaty settlements. There is transformative potential in both these Treaty settlements, in which co-governance and management boards have been established to manage the resource in accordance with a set of agreed provisions grounded in iwi principles, values and aspirations for environmental management. Both Acts expressly allow for the use of tikanga mechanisms in management of the resource, including customary practices such as rāhui (specifically). Plans and strategies emerging from special legislation, with



reference to the Hauraki Gulf Marine Park Act, Fiordland Marine Management Act, and Kaikōura Marine Management Act also have progressive potential.

Further analysis of the effectiveness of this special legislation could provide insight into opportunities for bicultural EBM. Further consideration of the potential opportunities and challenges of the Takutai Moana (Marine and Coastal) Act 2011 could also prove useful; and research relating to the Te Urewera and Whanganui settlements might inform a model for what more appropriate environmental legislation and policy could look like in terms of customary resource management and EBM.

## 2) Time and place specific

*At what scales can EBM be implemented since EBM needs to be place and time-specific, address cumulative and multiple stressors, and also recognise the ecosystem as a whole (in all its ecological complexity and connectedness)?*

Decision makers are directed under the RMA to consider cumulative effects, a directive that aligns well with the principles of EBM. Consideration of cumulative effects is vital to effective EBM, as it demands that decision makers take a holistic and future-focused approach to management. Information about ecosystems, however, is inherently limited. It can be a challenge under the RMA to predict and address creeping damage, where effects are cumulative and it is difficult to pinpoint a particular activity that is causing harm. That there is no baseline or framework against which cumulative effects can be assessed contributes to this problem. Additionally, permitted activities under the RMA are not required to consider precedent effects; which complicates attempts to understand and plan for cumulative effects.

EBM requires that the potential impacts of a proposal be considered. Under the RMA these impacts are recognised, but are often considered in isolation. For example, regional coastal plans are separate from regional freshwater management plans, which are in turn separate from land use plans, making it difficult to analyse the potential impacts of one plan on another. This can result in the fragmented management of an inter-connected ecosystem. More concretely, some issues and impacts are often divided into separate regulatory frameworks. This infringes the idea of EBM that resource use could be managed according to ecosystem boundaries, rather than administrative borders. This is particularly problematic in relation to climate and fisheries, where decision makers under the RMA are expressly prohibited from considering certain kinds of effects.

Iwi and hapū, as well as regional councils (working across-boundaries where necessary), are particularly well situated for time- and place-specific EBM. They have mana or authority over particular areas and resources and know these aspects better than others who are distanced from the source (e.g. in Wellington where national policy and legislation is made). Iwi and hapū, and arguably regional councils, also think holistically and acknowledge the interconnections between ecosystem components and the need for holistic management. Perhaps, iwi and hapū should be empowered alongside regional councils (and/or other authorities) to plan, implement, and monitor EBM at scales that reflect their mana whenua / mana moana status. Mana whenua / mana moana boundaries often correspond with catchment boundaries, and for councils it was acknowledged in section XXX that the RMA does in fact include provisions to re-scale. Empowering place- and time-specific EBM that is

meaningful to iwi, hapū, councils and the communities they represent is one aspect for further investigation to address this particular element of EBM.

### **3) People**

*How will other government agencies (e.g. public health) become involved in planning for EBM since humans are ecosystem components with multiple values?*

From a Māori perspective humans are an integral part of the ecosystem; they are not above or outside it. People within an ecosystem, have particular responsibilities to care for and nurture the other elements, all of which are connected through whakapapa. This does not mean environmental resources cannot be used; however, a sustainability ethos is required. If humans are part of the ecosystem being managed through EBM then more comprehensive integrated planning will be required. This is arguably the goal of the long-term plans regional and unitary authorities develop every 10 years, integrated catchment management plans, and iwi planning documents. These planning instruments need further testing to see how they could be better utilised and if they are adequate for achieving the EBM principle of managing humans as ecosystem components with multiple values. If not, other options need to be considered. There is a risk that the least resourced councils are less able to create fully integrated long-term plans as they have more isolated populations, low infrastructure investment, and often large complex spatial territories. How might this be addressed?

### **4) Long-term sustainability**

*Will the EBM conversation jeopardise recent gains made by sustainability reporting or does the focus on long-term sustainability of natural marine ecosystems as a fundamental value (in particular maintaining values and uses for future generations) fit well with other sustainability initiatives?*

Valuation of ecosystems is core to EBM. Key to this is the need to assign appropriate negative value to adverse effects activities may pose to these ecosystems. This can be done under the RMA by assigning weight to potential effects. However, environmental effects will vary considerably in their probability and magnitude on a case-by-case basis, and the RMA does not provide a consistent mechanism for ecosystem valuation operating within this framework. Comprehensive valuation of ecosystems, and effects of activities on ecosystems, is therefore currently not possible.

The Updated Biodiversity Action Plan 2016—2020 sets out a range of ambitious actions under the targets 'Biodiversity is integrated into NZ fisheries management system'. The actions include '5.1 By 2020, NZ will have moved towards an ecosystem approach to fisheries management that includes enhanced recording of bycatch from the sea and improved understanding of the rates of change in marine biodiversity' and '5.3 by 2020 demonstrable progress will have been made towards managing the impacts of bottom trawling and dredging on the seabed.' This may provide impetus for a faster use of EBM in the fisheries management system.

### **5) Collaboration and participation**

*What insights from collaborative planning for water and integrated catchments might inform EBM aspirations for collaborative decision making, considering all values, and involving all interested parties from agencies and iwi to industries, whānau, hapū, and local communities?*

Consulting with Māori and others does not constitute ‘collaborative decision making’. It constitutes ‘consultative decision making’. Constitutional arrangements are important to enabling a NZ specific EBM. Certain rights-based legislation over particular areas and resources is also important, e.g. Marine & Coastal Area, Crown Minerals, as well as Māori fisheries and aquaculture settlement legislation. Aside from Te Tiriti/the Treaty, which should underpin a partnership approach to all environmental governance and management, more specific rights-based legislation provides the ‘mandate’ for ownership, partnership or participation as it applies to the marine estate. In addition, without this recognised ‘mandate’ marine and coastal governance that considers people and rights, the rest of the legislation is almost wholly ‘natural environment’ focussed. Legislation does not provide well for non-tangible elements like spirituality inherent in kaitiakitanga.

This may be addressed, to some extent, if EBM-based EEZ policy statements emerge under the new provisions. There is also some potential in Takutai Moana (Marine and Coastal Area) settlements that might increase collaboration and participation for Maori and other communities. However, decision-makers only have to have regard to these documents. National Policy Statements (NPS) under the RMA can direct councils as to what they need to do in their policy statements and plans, which must “give effect” to NPS. Consent decision-makers under RMA have to be concerned with NPS but there are many other provisions that guide the decision on consents, specifically the existence of rules in regional and district plans.

## **6) Clear goals and objectives**

*Some industry players are strong producers of EBM related research and implementation. How might industry investment in knowledge production enable clear EBM goals and objectives based on knowledge?*

EBM requires best relevant information to be used to inform decision making<sup>xv</sup>. This is not a specific requirement under the RMA. It is largely left to applicants to identify potential impacts from proposed activities, and to other parties to challenge this evidence if there is the opportunity to do so, and if they choose. Decision-making is subjective, dependent on the information available. While the rules in regional and local plans indicate what information is required, there is little guidance provided to decision makers as to how much information is necessary, the level of robustness required for different scenarios, and when that information will be judged sufficient. Best relevant information is therefore not necessarily always provided when activities are proposed under the RMA. It should be noted, however, that the need for evidence does increase with the type of activity: discretionary activities, for example, will require more evidence than permitted activities. There is also potential for regional and local plans to be more prescriptive, which could provide more certainty regarding EBM and decision-making.

Current investment priorities focus more on best quality information to answer single species fisheries management questions, which is not the same information required for multiple stressors ecosystem management. Whether monitoring of ecosystem integrity is designed in research investments is not likely to be resolved by the current focus on co-produced knowledge across CRIs, industry, and

government agencies. Novel and contentious ideas (i.e. things that are difficult to accept for those heavily invested in current practices) would not be labelled best available science – and research into such ideas would not occur because it would not be “available”.

Section 10 of the Fisheries Act has been an impediment to EBM and not the enabler that it might appear to be. MPI fisheries could take full account of the provisions in the act, scrap its present definitions of “best available science”, make its peer review process more inclusive, and become more independent from the fisheries industry. While scientific journals will often encourage novelty and contentious work that is likely to precipitate debate and ensuing studies, fisheries science peer review places greater emphasis on reliability of the information, its relevance to management decisions, timeliness of delivery, buy-in (or acceptance) by stakeholders (particularly industry), and frequency of information updates (i.e., iteration) – all qualities that are important to a dynamic, ‘co-production’ decision model (Gluckman 2011).

The statutory process for decision making varies across the range of legislation the EPA implements. However, all decisions rely on evidence and information to determine the merits of the application (Environmental Protection Authority – Te Mana Rauhi Taiao 2014). The EPA has been promoting hearings processes that enable a more “inquisitorial” approach, where the decision makers receive the information they require from the applicant and submitters. This is intended to provide more opportunity for good quality information to be provided to decision makers and less emphasis on procedural and legal argument often found in court settings (Environmental Protection Authority – Te Mana Rauhi Taiao 2014).

## **7) Adaptive management**

*Which authority/ies has the mandate to create a guiding EBM framework for adaptive management, appropriate monitoring, and acknowledgement of uncertainty across the whole governance framework?*

Decisions made to authorise an activity rely on an effective and holistic assessment of their potentially adverse impacts. DOC has promoted the assessment of ecosystem health by use of the term “ecological integrity”, which is a multidisciplinary, comprehensive concept involving a number of ecosystem components. Regional Councils are usually the direct managers of the territorial sea and operate under the RMA and the biosecurity act – but they all have their own ways of operating. Iwi and hapū have territorial authority, albeit not always recognised in a ‘mandated’ sense.

We cannot rely on the current RMA’s approach to identifying potential effects from proposed activities because it is fragmented. Under the RMA, there are still separate instruments, and usually separate decision makers, responsible for assessing effects on land, water, air and marine spaces. This limits the ability of decision makers to obtain a holistic view of ecosystems, and makes it difficult to envision how changes to one part of the system may affect other parts. If effects are identified in isolation, their significance can be downplayed.

A key aspect of EBM is that decision makers should exercise precaution when there is uncertainty about whether an activity will compromise an ecosystem in some way. Firm bottom lines should also be established to maintain ecosystem integrity. The RMA recognises that proof and certainty will not necessarily be obtainable in the context of future effects. Consent can be declined on the grounds of

uncertainty or lack of information, or if the potential impacts of an activity are deemed unacceptable. However, there is little guidance in the RMA on which effects should be considered unacceptable, and how to implement bottom lines in reality. Much assessment of effects is left to ad hoc consenting and planning decisions that rely on contextual judgements, discretionary weighing of policies and potential effects, and inconsistent application of the international precautionary principle. It is extremely difficult to predict which effects will be considered unacceptable. Despite the precedent set by the aforementioned King Salmon case, actual bottom lines will not be effective unless there are adequate planning instruments in place to enforce them. While the RMA encourages the use of bottom lines and precautionary approaches to management, the Act cannot impose these guidelines in reality. Is this a role for the EPA? Or is another new overarching body required to oversee the implementation of EBM?

## Conclusion:

EBM is partially enabled through current legislative frameworks, but more could be done to encourage its implementation. RMA and HGMPA legislation is better placed than fisheries and conservation legislation to enable aspects of EBM. Some legislation enables particular principles of EBM but not others. No legislation enables all the principles for transformed coastal and marine governance identified by the Sustainable Seas National Science Challenge.

However, no legislation explicitly prohibits EBM, and most EBM-like processes that have taken place in NZ (e.g. Fiordland) are underpinned by specific legislation. There is considerable scope for realignment of current governance arrangements to support EBM, and a number of processes are underway to enable this. Reviews have been undertaken on the legislative settings for the RMA, marine protected areas, fisheries, and the Hauraki Gulf. The Sea Change Tai Timu Tai Pari process also provides a useful testing ground for the prospects of partnership approach marine spatial planning providing a mechanism to integrate the various management regimes under an EBM framework.

There is potential for a range of non-regulatory changes to enable better implementation of EBM throughout NZ. The traces of EBM through current governance arrangements included in this report typically demonstrate some but not all the key principles identified by the Sustainable Seas Science Leadership Team, and where they did appear the reference was often weak. There is a need to strengthen and link these existing aspects to support the continued institutionalisation of EBM. This could be done, first through government commitment to implementation of EBM through all coastal and marine-related legislation.

Most obviously it is change to practice rather than legislation that is required. Provision and use of better documentation and guidance on how to implement EBM, along with funding and resources to support implementation would substantially progress EBM in the near term. Other enabling factors include the use of voluntary protocols such as those used to protect Bryde's whales, greater reliance on collaborative decision-making processes, capacity-building to boost knowledge production, and better incorporation of environmental limits and bottom lines in decision making. Additionally, champions of EBM should be celebrated and promoted to provide examples of best practice to be emulated throughout NZ. More holistic and equitable management of coastal and marine spaces in and around NZ is possible, with some effort and oversight. In 2018 the NZ National Science Challenge Sustainable Seas will play a key role supporting changes to practice and NZ's growing engagement with Ecosystem Based Management.

## Endnotes

<sup>i</sup> Greenaway, Alison and Bingham, Kelly (Manaaki Whenua Landcare Research) with contributions from Lara Taylor and Florence Reynolds (Manaaki Whenua Landcare Research); Julie Hall, Judi Hewitt, Paula Blackett, Graeme Inglis and Carolyn Lundquist (NIWA); Bruce Glavovic, Ellen McMahon and Gillian James (Massey University); Al Gillespie (University of Waikato); Raewyn Peart (Environmental Defence Society); Catherine Iorns Magallanes, Greg Severinsen, Toni Margaret (Victoria University of Wellington); Richard Le Heron and June Logie (University of Auckland); Tania Te Whenua (Te Whenua Consulting); Janet Stephenson (Otago University); Linda Falkner (Tutaiao).

Suggested reference Greenaway A, Bingham K, Blackett P, Faulkner L, Glavovic B, Gillespie A, Hall J, Hewitt J, Inglis G, Iorns-Magallanes C, James G, Le Heron R, Logie J, Lundquist, C, Margaret T, McMahon E, Peart R, Reynolds F, Severinsen, G., Stephenson J, Taylor L, Te Whenua T 2018. Advancing Ecosystem Based Management in Aotearoa New Zealand through current governance arrangements. A discussion paper produced for Cross Programme 1.1 in the Sustainable Sea National Science Challenge. A Manaaki Whenua Landcare Research Contract Report.

<sup>ii</sup> Governance refers to the broad system of influence and decision making that includes but is not limited to central government. This term is used to include the values and practices that define the boundaries between informal and formal decision making, industry, community, and iwi. Governance is used as a broader category than management, which is limited to the rules and practices of managing as opposed to governance, which is the broader value base that shapes those rules and practices. The authors were informed by literature discussing institutional and socio-ecological transformation. The focus was on both the rules and norms currently shaping marine and coastal governance in New Zealand.

<sup>iii</sup> Ministry for the Environment and Statistics New Zealand 2016. New Zealand's Environmental Reporting Series: Our marine environment 2016

[www.mfe.govt.nz/publications/marine-environmental-reporting/our-marine-environment-2016](http://www.mfe.govt.nz/publications/marine-environmental-reporting/our-marine-environment-2016).

<sup>iv</sup> Rosen F, Olsson P 2013. Institutional entrepreneurs, global networks and the emergence of international institutions for ecosystem-based management: The Coral Triangle Initiative. *Marine Policy* 38: 195–204.

<sup>v</sup> Thrush SF, Hewitt JE, Lundquist C, Townsend M, Lohrer AM 2012. A strategy to assess trends in the ecological integrity of New Zealand's marine ecosystems. Department of Conservation Report.

<sup>vi</sup> Mataitai: An identified traditional fishing ground which has special status under the Fisheries Act 1996 to protect customary fishing values. Restrictions may be placed on taking fish, aquatic life or seaweed in the reserve. A Maori Committee or kaitiaki can be empowered to make by-laws over the reserve.

<sup>vii</sup> Taiapure: Areas that are given special status to recognise rangatiratanga (as Taiapure-Local fisheries); management arrangements can be established (under the Fisheries Act 1996) for Taiapure that recognise the customary special significance of the area to iwi or hapu as a food source or for spiritual or cultural reasons.

<sup>viii</sup> Taylor L, Te Whenua T, Hatami B March 2018. How current legislative frameworks enable customary management and ecosystem-based management in Aotearoa New Zealand: the contemporary practice of rāhui. A discussion paper produced for the Sustainable Seas National Science Challenge. Manaaki Whenua – Landcare Research Contract Report.

<sup>ix</sup> Tallis H, Levin P, Ruckelshaus M, Lester S, McLeod K, Fluharty D, Halpern B 2010. The many faces of ecosystem-based management: Making the process work today in real places. *Marine Policy* 34(2): 340–348.

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<sup>xi</sup> Currie, D. (2007). Ecosystem based management in multilateral environmental agreements: Progress towards adopting the ecosystem approach in international management of living marine resources. Rome, Italy: World Wildlife Fund.

<sup>xii</sup> National Science Challenge Sustainable Seas Research Book 2017.

<http://sustainableseaschallenge.co.nz/news-updates/research-book-2017-now-available>

<sup>xiii</sup> National Science Challenge Sustainable Seas Cross Programme projects 1.2 and 2.1. See the research plan for more detail <http://sustainableseaschallenge.co.nz/sites/default/files/2016-05/Sustainable%20Seas%20Research%20Plan%20-%2030%20September%202015.pdf>

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- <sup>xvii</sup> Parliamentary Commissioner for the Environment 2004. *Growing for good: intensive farming, sustainability and New Zealand’s environment*. Wellington: Parliamentary Commissioner for the Environment.
- <sup>xviii</sup> From a review of NZ media and parliamentary debates 2010–2017 via Hansard, Newstext and Google.
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- <sup>xx</sup> Mace P, Sullivan K, Cryer M 2014. The evolution of New Zealand fisheries science and management systems under ITQs. *ICES Journal of Marine Science* 71(2): 204–215.
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- <sup>xxii</sup> Long R, Charles A, Stephenson R 2015. Key principles of marine ecosystem-based management. *Marine Policy* 57: 53–60. P 59.
- <sup>xxiii</sup> Lonsdale J-A, Weston K, Barnard S, Boyes SJ, Elliott M 2015. Integrating management tools and concepts to develop an estuarine planning support system: A case study of the Humber Estuary, Eastern England. *Marine Pollution Bulletin* 100(1): 393–405. <http://dx.doi.org/10.1016/j.marpolbul.2015.08.017>
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- <sup>xxvi</sup> Rosenberg A, McLeod K 2005. Implementing ecosystem based approaches to management for the conservation of ecosystem services. *Marine Ecology Progress Series* 300: 270–274.
- <sup>xxvii</sup> United Nations Convention on the Law of the Sea. December 10 1982. United Nations Treaty Series, vol 397, No. 1833.
- <sup>xxviii</sup> Art. 56.
- <sup>xxix</sup> Lodge M, Anderson D, Lobach T, Munro G, Sainsbury K, Willock A 2007. *Recommended best practices for regional fisheries management organisations: Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organisations*. Chatham House: London.
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- <sup>xlii</sup> Jackson AM, Mita N, Hakopa H July 2017. *Hui-te-ana-nui: Understanding kaitiakitanga in our marine environment*. Ngā Moana Whakauka – Sustainable Seas National Science Challenge available at



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<sup>xliii</sup> Taylor L, Te Whenua T, Hatami B 2018. How current legislative frameworks enable customary management and ecosystem-based management in Aotearoa New Zealand: the contemporary practice of rāhui. A discussion paper produced for the Sustainable Seas National Science Challenge: Manaaki Whenua Landcare Research Contract Report.

<sup>xliiv</sup> The health warning is permanent as shown on this site [https://www.ttophs.govt.nz/health\\_warnings](https://www.ttophs.govt.nz/health_warnings)

<sup>xliiv</sup> Blackett et al.

<sup>xliiv</sup> Waitangi Tribunal 2001.

<sup>xliiv</sup> Hauraki Gulf Marine Park Act 2000, section 33.

<sup>xliiii</sup> Auckland Council (n.d). Hauraki Gulf Forum. Available at <https://www.aucklandcouncil.govt.nz/about-auckland-council/how-auckland-council-works/harbour-forums/Pages/hauraki-gulf-forum.aspx>, [Retrieved 5 December 2017].

<sup>xlix</sup> The appointees rotate regularly so that the opportunity to be on the Forum is fairly shared amongst the relevant iwi.

<sup>i</sup> Sea Change Tai Timu Tai Pari Stakeholder Working Group 2016. Hauraki Gulf Marine Spatial Plan. Auckland, New Zealand: Sea Change Tai Timu Tai Pari. Available at <http://www.seachange.org.nz/>

<sup>ii</sup> Sea Change Tai Timu Tai Pari 2016.

<sup>iii</sup> Bradly N 2015. Review of the Hauraki Gulf Forum. Auckland, New Zealand: EnviroStrat Consulting Limited.

<sup>iii</sup> Bradly N 2015.

<sup>liv</sup> Formed in 2010 through the merger of the Ministry of Agriculture and Forestry, the NZ Food Safety Authority and the Ministry of Fisheries. MPI has marine and coastal governance responsibilities under the Animal Welfare Act 1999; Biosecurity Act 1993; Fisheries Act 1996; Kaikōura (Te Tai o Marokura) Marine Management Act 2014; Maori Commercial Aquaculture Claims Settlement Act 2004; Māori Fisheries Act 2004; Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.

<sup>lv</sup> Aquaculture New Zealand was formed in 2007 as a single voice for the New Zealand aquaculture sector to protect the current industry, while enhancing its profitability and providing leadership to facilitate transformational growth. <http://www.aquaculture.org.nz/about-us/our-organisation/>

<sup>lvi</sup> An organization that works to advance Maori interests in the marine environment, including customary commercial fisheries, aquaculture and providing policy and fisheries management advice and recommendations to iwi and the wider Maori community. <http://teohu.maori.nz/index.htm>

<sup>lvii</sup> The Ministry for the Environment has responsibilities under the Environment Act 1986; Resource Management Act 1991 (RMA); Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act); Environmental Protection Authority Act 2011; Environmental Reporting Act 2015; Waste Minimisation Act 2008; Fiordland (Te Moana o Atawhenua) Marine Management Act 2005; Hazardous Substances and New Organisms Act 1996; Ozone Layer Protection Act 1996; Soil Conservation and Rivers Control Act 1941; Climate Change Response Act 2002.

<sup>lviii</sup> Ministry for the Environment 2014.

<sup>lix</sup> The EPA has responsibilities under the Environmental Protection Authority Act 2011; Resource Management Act 1991 (RMA); Hazardous Substances and New Organisms Act 1996 (HSNO); Ozone Layer Protection Act 1996; Climate Change Response Act 2002 (CCRA); Imports and Exports (Restrictions) Act 1988; Exclusive Economic Zone (EEZ) and Continental Shelf (Environmental Effects) Act 2012.

<sup>lx</sup> Environmental Protection Authority - Te Mana Rauhi Taiao, 2014.

<sup>lxi</sup> Through the Conservation Act 1987; Hauraki Gulf Marine Park Act 2000; Marine Mammals Protection Act 1978; Marine Reserves Act 1971; Wildlife Act 1953.

<sup>lxii</sup> For a comprehensive discussion about progressing sustainability through the RMA, see Ericksen NJ, Berke P, Dixon J, Crawford J 2017. Planning for sustainability: New Zealand under the RMA. London: Routledge.

<sup>lxiii</sup> There are provisions in the RMA to establish regional plans around a natural resource, such as a harbour, so the potential for EBM is there. For elaboration, see Kirschberg A 2007. Kaipara Harbour Coastal Environment Policy Review. Auckland.

Regional Council Technical Publication Number 345.

<sup>lxiv</sup> Environmental Defence Society Incorporated v the New Zealand King Salmon Company Limited 2014. NZSC 38 [17 April 2014].

- lxv Established by the EPA.
- lxvi [132]
- lxvii [137]
- lxviii *Sustain our Sounds Inc. vs NZ King Salmon Company Ltd* 2014
- lxix *The New Zealand Federation of Commercial Fishermen Incorporated v The Minister of Fisheries* HC CIV-2008-485-2016
- lxx Smith, 1994
- lxxi United Nations Convention on the Law of the Sea, art 56. “Sovereign rights” are not the same as “sovereignty”, but lesser rights constrained by the purpose for which they may be exercised.
- lxxii Fisheries Act 1996, s 11(2) and (3).
- lxxiii See ss 20E, 20F and 20I inserted in 2015 by the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Amendment Act 2013.
- lxxiv EEZ Act, s 39.
- lxxv EEZ Act, s 59(2).
- lxxvi EEZ Act, s 60.
- lxxvii EEZ Act, s 61.
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