

SUSTAINABLE
SEAS

Ko ngā moana
whakauka

Incorporating ecosystem-based management principles into regional coastal plans

Palmer, H



Report

Report for Sustainable Seas National Science Challenge project *Waikato Regional Council Coastal Plan Review (S5)*

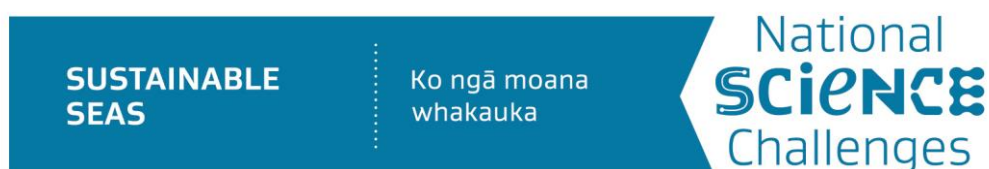
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For more information on this project, visit: sustainableseaschallenge.co.nz/our-research/wrc-coastal-plan



About the Sustainable Seas National Science Challenge

Our vision is for Aotearoa New Zealand to have healthy marine ecosystems that provide value for all New Zealanders. We have 60+ research projects that bring together around 250 scientists, social scientists, economists, and experts in mātauranga Māori and policy from across Aotearoa New Zealand. We are one of 11 National Science Challenges, funded by the Ministry of Business, Innovation & Employment.

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Contents

Executive summary.....	1
Introduction.....	2
What is Ecosystem-Based Management?	2
How does EBM differ to traditional coastal management under the RMA 1991?	4
Why is an EBM approach needed?.....	6
Where does EBM fit into RMA reform?	7
Recommended approach to EBM	10
Case study – Hauraki Gulf Marine Park Act 2000	10
High level guide to incorporating an EBM approach into Regional Coastal Plans	14
Conclusion	17
References and further information	19
Appendix A – Detailed recommendations to implement an EBM approach in Regional Coastal Plans.....	23
Guidance Note 1 – Governance structure and workstream responsibilities.....	24
Guidance Note 2 – Methodology and template for gap analysis	27

Executive summary

Continued pressure is being placed on the marine environment as a result of competing interests and the cumulative effects of multiple ecosystem stressors. Resources are not being sustained for future generations. The current top-down approach to coastal management (both statutory and non-statutory), which often focuses on human activities, is resulting in continued degradation of the coastal environment, loss of biodiversity and ecosystem function, increasing the scarcity of resources and vulnerability to the effects of climate change.

National monitoring of our oceans and coasts is showing that there is a strong need to move away from the status quo if our coastal environment is to be sustained, and better management of cumulative effects is required.

Ecosystem-Based Management (EBM) is a new area of research being undertaken to address this trend. The EBM framework is based on seven principles (unique to the New Zealand context) to guide those responsible for managing marine and coastal environments. With a strong focus on the complex interactions across and within ecosystems and environmental domains, EBM offers a robust and holistic approach to integrated management of the coastal environment by:

- Recognising the many interactions within an ecosystem and moving away from protecting an individual species or dealing with single activities by providing a framework for assessing cumulative effects.
- Ensuring that decisions are informed by science and mātauranga Māori, and allowing tailored and flexible approaches to management, thereby providing for sustainable use and protection and enhancement of ecosystems and the biodiversity within. This ensures that management approaches are adaptive and responsive and provides better management of cumulative effects of activities.
- Recognising the value of co-operation and providing a mechanism to bring people with competing interests (and differing management responsibilities) together to holistically manage the coastal environment, thereby achieving better overall protection of ecosystems and resources.
- Recognising the importance of incorporating knowledge from a wide variety of sources, especially mātauranga Māori and incorporating this into decision-making, thereby strengthening the management system.
- Providing for co-governance, strengthening relationships, and aligning with Treaty obligations in relation to the coastal environment.

This report provides guidance to those about to commence a review of their Regional Coastal Plans prepared under the Resource Management Act 1991 (RMA), on how to incorporate an EBM approach into both statutory plans and supporting systems for implementation.

Introduction

Aotearoa New Zealand has a vast marine estate, the fourth largest in the world, with our Exclusive Economic Zone (EEZ) making up 4 million square kilometres (Sustainable Seas, 2021). With many different competing interests and a complex and fragmented legal framework for marine management, marine ecosystems are coming under increasing pressure (Sustainable Seas, 2021), and cumulative effects of human activities has been identified as one of the most urgent problems facing our oceans (Ministry for the Environment and Stats NZ, 2019).

Staff from the Sustainable Seas National Science Challenge (Sustainable Seas) have been exploring how best to manage the marine environment in a holistic and inclusive way that sees competing uses continue, but in a way which doesn't degrade the marine environment and the ecosystems within. Ecosystem-based Management (EBM) provides a mechanism to navigate these challenges. Based on international research, Sustainable Seas have adapted EBM for the New Zealand context with the creation of seven principles for implementation.

Incorporation of EBM principles into Regional Coastal Plans prepared under the Resource Management Act 1991 (RMA) offer an opportunity to support the implementation of EBM on a wider scale. This report provides a step-by-step guide for incorporating EBM principles into Coastal Plans and has been written for coastal managers who are about to commence a review of their Regional Coastal Plan.






What is Ecosystem-Based Management?

EBM is a holistic and inclusive way to manage the marine environments including the competing uses for, demands on, and ways New Zealanders value them (Sustainable Seas, n.d). Informed by science, mātauranga Māori, community values and priorities, EBM provides a responsive and collaborative framework for managing the marine ecosystem as a whole, including the dynamic and complex network of ecosystem relationships which sees human use of the marine environment as part of the system.



Following a ki uta ki tai (mountains to sea) philosophy, connecting people across disciplines, sectors and jurisdictional boundaries, the EBM framework seeks to shift the focus from sector-specific management to a wider range of interrelated ecological, environmental, and human factors providing a more collaborative and effective way to address complex environmental challenges (Peart et al, 2019). EBM recognises that ecosystem health and function, and the goods and services they provide underpin a lot of what we value about our marine resources and sets about to ensure that these values are upheld.

Implementation of an EBM approach is based on seven clear principles set out in Table 1 below. These principles have been developed by Sustainable Seas researchers based on international literature and tailored for the unique circumstances in Aotearoa New Zealand and form the focus of this guidance document. It is expected that these principles will be implemented through a combination of both Regional Coastal Plan provisions and wider supporting systems.

Table 1: EBM Principles.¹ For the purpose of this report, these principles have been numbered 1 - 7 for easy reference, however they are in no particular priority order.

 <p>Co-governance</p>	<p>EBM 1 Governance structures that provide for Treaty of Waitangi partnership, tikanga and mātauranga Māori.</p>
 <p>Knowledge-based</p>	<p>EBM 2 Based on science and mātauranga Māori and informed by community values and priorities.</p>
 <p>Human activities</p>	<p>EBM 3 Humans, along with their multiple uses and values for the marine environment, are part of the ecosystem.</p>
 <p>Sustainability</p>	<p>EBM 4 Marine environments and their values and uses, are safeguarded for future generations.</p>
 <p>Collaborative decision-making</p>	<p>EBM 5 Collaborative, co-designed and participatory decision-making processes involving all interested parties.</p>

¹ <https://www.sustainableseaschallenge.co.nz/tools-and-resources/ebm-for-aotearoa/>

 <p>Tailored</p>	<p>EBM 6 Place and time specific, recognising all ecological complexities and connectedness, and addressing cumulative and multiple stressors.</p>
 <p>Adapts</p>	<p>EBM 7 Flexible, adaptive management, promoting appropriate monitoring, and acknowledging uncertainty.</p>

How does EBM differ to traditional coastal management under the RMA 1991?

EBM and resource management under the RMA 1991 are complementary in that both approaches seek to ensure sustainable management of resources for future generations. However, there are several key distinctions between the two approaches:

Ecosystem vs jurisdictional boundaries

Marine ecosystems and the activities that impact them cross jurisdictional boundaries, often extending beyond what Regional Coastal Plans can cover. Protection of ecosystems and management activities that impact on ecosystem integrity, form and function therefore require a collaborative approach to management with the setting of common goals where an EBM approach is to be applied.

Whole system approach – bottom up vs top down

EBM represents a shift in thinking to a holistic bottom-up ecosystem based approach which recognises humans as part of the ecosystem. The approach takes a long term view to sustainable use of marine resources and may help to inform better management through Coastal Plans and the wider marine management framework and may help to better address cumulative effects.

Regional Councils form one component of the wider management system which governs the marine environment and are responsible for the development and implementation of Regional Coastal Plans under the RMA. These plans, which can cover from the coastal environment line out to 12 nautical miles, set an objective, policy, and rules framework to govern human activities and their corresponding effects through the establishment of resource consent requirements. Within this context, there is often a top-down human centric focus to assessment of consent applications, where the effects of activities on the environment are managed on a case-by-case basis with limited consideration given to cumulative effects of multiple activities occurring within the same area. This (in part) has led to environmental degradation, and management of cumulative effects has been identified as one of the key challenges facing our oceans.

In practice, addressing cumulative effects remains a challenging area for planners and scientists to assess and develop policy for, particularly when resource consent/coastal permit applications to Councils are generally assessed on their individual merits without a full

understanding of ecosystem impacts or the cumulative effect of activities previously granted consent.

Figure 1 below depicts an Australian example (also applicable to New Zealand) which demonstrates the interconnected nature of ecosystems and the activities which may impact them.

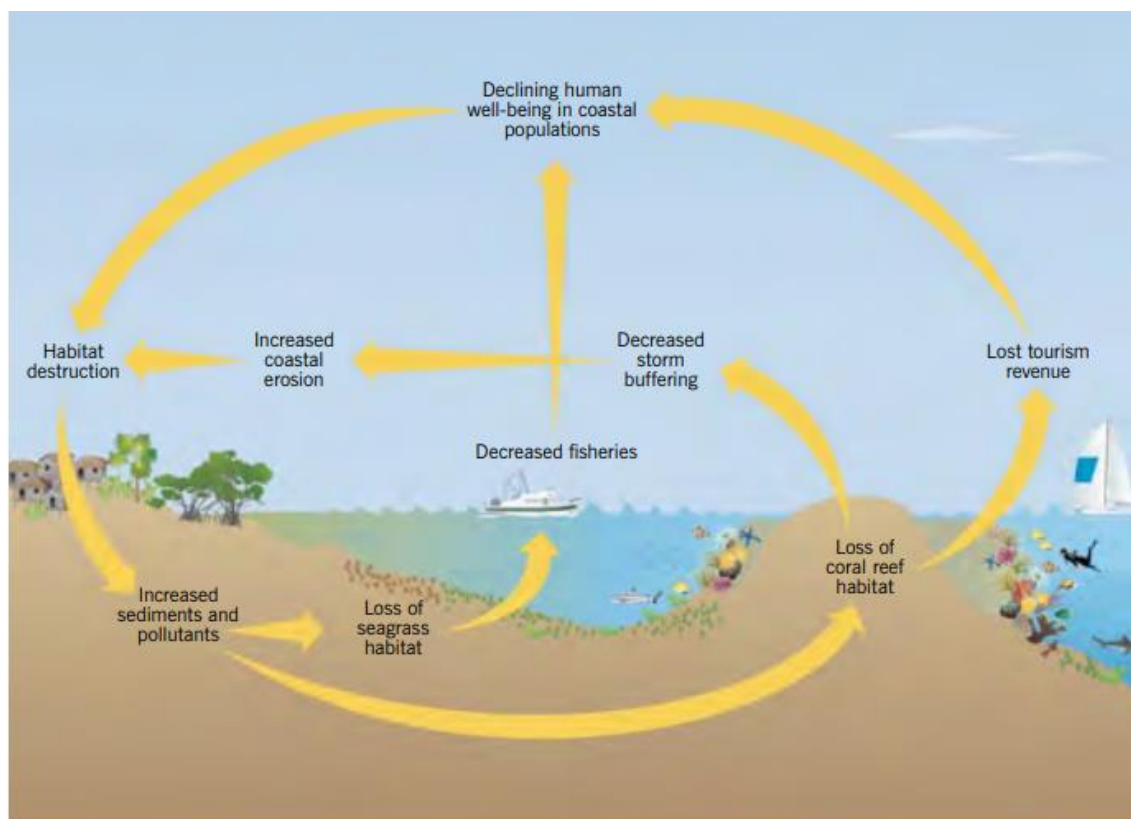


Figure 1: Recognising connections – figure from Agardy et al, 2011.

Given the inextricable links between the cumulative effects of human activities and stressors, ecosystem services provided by species in the coastal environment, and ecosystem responses when one or two factors become out of balance (see Figure 1), it is imperative that coastal management is informed by science (including monitoring), mātauranga Māori, and a sound understanding of the complex relationships and interactions within this system – an approach which is a strong feature of the EBM framework. In addition, this must be supported by well-crafted policy in Regional Coastal Plans to guide decision-making. Recommendations to strengthen cumulative effects management have been included in Appendix A.

Cross-sector, participatory and collaborative approach to management

Whilst the development of Regional Coastal Plans is a participatory process with submissions, and hearings providing opportunities for stakeholder, iwi, and public input, once these plans have become operative, decision-making on any consent applications most often rests with the local authority whose jurisdiction the plan falls under. EBM contrasts with this approach in that it promotes inter-disciplinary group based decision-making informed by science, social and economic factors (Agardy et al, 2011). Under the Aotearoa EBM framework, decision-making is also informed by mātauranga Māori.

Why is an EBM approach needed?

This new approach to managing the marine and coastal environment has been identified by Sustainable Seas researchers as being necessary due to continued degradation of these environments despite best intentions (Sustainable Seas, n.d.). This finding is supported by the most recent State of the Environment Reporting for the marine and coastal environment - 'Our Marine Environment 2019' and 'Environment Aotearoa 2022' produced by the Ministry for the Environment and Stats NZ. State of the Environment Reporting, informed by Council monitoring across New Zealand, captures trends and priority issues for the marine and coastal environment. Table 2 below provides a snapshot of the issues and challenges from 'Our Marine Environment 2019' (Ministry for the Environment & Stats NZ, 2019), and clearly demonstrates that management approaches urgently need to change.

Table 2: Summary of priority issues facing the marine and coastal environment – (Information quoted from Our Marine Environment 2019, Ministry for the Environment & Stats NZ, 2019).

Priority Issue	Explanation	Why it matters
Issue 1: Our native and marine habitats are under threat	There has been a decline in biodiversity, and habitat condition and extent, as a consequence of our activities.	Declining marine health makes our coasts and oceans less resilient to disturbances, including climate change.
Issue 2: Our activities on land are polluting our marine environment	Our activities on land, especially agriculture and forestry, and growing cities, increase the amount of sediment, nutrients, chemicals, and plastics that enter our coasts and oceans	Contaminants affect our ability to harvest kaimoana, swim, and fish in our favourite local places.
Issue 3: Our activities at sea are affecting the marine environment	Our activities on coasts and in oceans, like fishing and aquaculture, shipping, and coastal development, provide value to our economy and support growth.	Most of our activities in the marine environment tend to increase in intensity towards the coast. On top of the pressure from coastal development, this results in coastal environments being most impacted. Coastal waters tend to hold the greatest diversity of species.
Issue 4: Climate change is affecting marine ecosystems, taonga species, and us	Global concentrations of atmospheric greenhouse gas are increasing because of activities like burning fossil fuels for heat, transport, and electricity generation. This is causing unprecedented change in our oceans.	Warmer seas affect the growth of even the smallest things in the ocean like plankton which can impact the whole food web. Some temperature-related changes in individual species and fish communities have been observed. Roads, bridges, coastal communities, and habitats are at

		risk from flooding and sea-level rise.
<p>Issue 5:</p> <p>Issues are not isolated but build on each other and cause more harm.</p>	<p>The pressures associated with biodiversity loss, our activities on land and at sea, and climate change have interacting effects on coasts and oceans.</p> <p>Cumulative effects are one of the most urgent problems we face in our oceans.</p> <p>Given the complexity of the marine environment and lack of long-term data, the nature of cumulative effects is difficult to predict</p>	<p>The ability to report on the impacts of changes on species and habitats in the marine environment is often limited by a lack of baseline data, understanding of tipping points, and connections between domains.</p> <p>Working together across mātauranga Māori and western science is improving our holistic, place-based knowledge that is crucial in understanding cumulative effects.</p> <p>For Māori, the whenua and moana are inextricably linked and there is a complement or balance for everything on land in the oceans.</p>

The most recent report, released in April 2022 shows that these trends are not improving. Our marine environments are seeing (Ministry for the Environment & Stats NZ, 2022):

- Increased sediment runoff mainly resulting from deforestation and catchment activities, affecting filter feeders and juvenile fish.
- Continued high nutrient loads, especially to estuarine areas increasing the risk of algal blooms.
- Ocean acidification resulting from increased carbon emissions which impacts shellfish development.
- An increasing need for translocation of species to other areas to ensure their survival.
- Increased discharges and pollution affecting recreational, cultural, and economic uses of the marine environment.

Where does EBM fit into RMA reform?

The legislative environment is currently shifting with reform/replacement of the RMA with the Natural and Built Environments Act (NBA) on the near horizon, and this presents a challenge for live coastal plan reviews (or those about to commence) as the legislative framework for coastal management by Regional Councils may potentially change within the current Government term.

However, the NBA represents an opportunity to better connect management of activities across ecosystem domains which has been absent to date and gives more attention to the cumulative effects of multiple activities. If done successfully it will achieve one of its key objectives in relation to the marine environment – better outcomes for people and the coastal

marine environment and pave the way for a new thriving blue economy (Sustainable Seas, 2021).

The exposure draft of the NBA has provided an early view into what this Act is likely to contain. On the whole, the exposure draft fits in well with an EBM approach by promoting environmental outcomes, elevating Te Tiriti o Waitangi, and establishing a framework for more collaborative decision-making.

Environmental Outcomes and Limits

One of the key changes the NBA makes is the insertion of a new purpose which differs from the purpose of the RMA. The NBA purpose focuses on the health of the natural environment and its capacity to sustain life, the relationship between iwi and hapū and te taiao (environment), and the interconnectedness of all parts of the natural environment, and sits alongside an expression of sustainability, replacing the RMA's sustainable development purpose (Devine et al, 2021). In addition the NBA shifts away from effects based management towards outcome focused management with the requirement to set environmental limits and targets to help achieve outcomes.

Effects-based management under the RMA focuses on the effects of activities rather than regulating the activities themselves, however in practice many RMA plans do have a strong focus on activities. Without an overarching vision of what needs to be achieved for the natural environment, this approach has not provided appropriate protection with management of adverse effects on the environment largely achieved through litigation on a case-by-case basis (Ministry for the Environment, 2022).

Outcome focused management under the NBA would look towards the achievement of long-term positive outcomes to support intergenerational wellbeing – all within environmental 'biophysical' limits (but still also managing adverse effects). Outcomes are to be provided for in decisions, plans and consents. The outcomes specified in the NBA exposure draft include a protective focus for the natural environment, a development focus (primarily in relation to urban development, rural land, and housing supply), and a risk management focus in relation to reducing the significant risks of, and improving the resilience of the environment to, natural hazards and climate change (Devine et al, 2021), and would be mandated through national direction.

Clause 8(n) of the Exposure Draft contains the key proposed outcome relating to the marine environment and states that the National Planning Framework, a tool which sits under the NBA and sets out clear direction to guide anyone exercising functions and powers under the NBA, must promote the protection and sustainable use of the marine environment. This outcome fits well with EBM principles 3 and 4.²

Environmental limits will also be set through the National Planning Framework. These biophysical limits will either prescribe the minimum biophysical state of the natural environment, or of a specified part of that environment, or state the maximum amount of harm or stress that may be permitted on the natural environment, or of a specified part of that environment. Limits will cover the following matters as a minimum and will apply nationally, in both urban and rural areas:

- Freshwater
- Coastal waters
- Estuaries

² EBM 3 – Human activities, EBM 4 – Sustainability.

- Air
- Soil
- Biodiversity, including habitats and ecosystems

This outcome focused approach accompanied by environmental limits may fit well with further implementation and integration of EBM principles 4, 6 and 7³ as these principles align with ensuring progress towards positive environmental outcomes is maintained.

Whilst the NBA broadly provides an opportunity to achieve better alignment with an EBM approach, there is not a strong focus on the marine environment and further work is needed around environmental limits. Limit setting is unlikely to meet the first objective of the reform *'to protect, and where necessary, restore the natural environment'* (Sustainable Seas, 2021).

One of the key challenges of national limit setting is that it is not appropriate for every type of environment. National limits pose a problem for estuaries in particular. In estuarine environments, generic national limits are unlikely to work due to the state and responses of these environments to stressors being highly place specific (Hewitt et al, 2022).

Estuaries, located at the interface between the land and the sea, are subjected to marine and terrestrial derived stressors and are at the forefront of climate change impacts (Hewitt et al, 2022). Activities that occur within the estuary (e.g., marinas, aquaculture) also generate stress on the ecosystem. As one of the most multi-use ecosystems, estuaries are subject to cumulative effects and multiple stressors (Hewitt et al, 2022). This is concerning due to synergism, where the combined impacts of multiple stressors can be larger than individual ones, creating ecological surprises or tipping points (which usually result in a loss of ecosystem functions and services) (Hewitt et al, 2022). Lag times in ecosystem response can also mean that when tipping points are reached it is often too late to act. Therefore, cumulative effects management will need to play a significant part in managing and restoring our estuaries and coastal waters (Hewitt et al, 2022).

Estuaries are also highly susceptible to climate change effects such as sea level rise, change in temperature, storms, and productivity, meaning that any environmental limits set now may not be applicable in 10, 20 or 30 years' time (Hewitt et al, 2022). This presents a challenge when thinking about how best to protect, through legislation, an ecosystem that is dynamic rather than static. Further attention on limits and whether they are appropriate is also needed before the NBA becomes operative.

To effectively manage these water bodies, processes that promote management of multiple stressors rather than actions that seek to limit single stressors are required. For the marine environment, in place of national environmental limits, provision of national guidance on processes to deliver local solutions would better achieve increases in estuarine integrity. Hewitt et al (2022) note that resource managers and communities need to be empowered to make adaptive and flexible decisions. To this end, national guidance on a risk assessment framework and the types of data or knowledge needed would be useful for estuary management (Hewitt et al, 2022).

Te Tiriti o Waitangi

The NBA seeks to elevate Te Tiriti o Waitangi by providing new roles for mana whenua in decision-making on plans, ensuring that all people exercising functions and powers under the Act give effect to the principles of Te Tiriti o Waitangi, and establishing regional partnerships between central and local government and mana whenua. It is intended that local government

³ EBM 4 - Sustainability, EBM 6 - Tailored, EBM 7 – Adapts.

in each of New Zealand's 14 regions will be required to work together with iwi collaboratively to provide a single 'combined plan' (this will cover all current RMA policy statements and plans and the coastal marine area). This new approach supports EBM principles 1, 2 and 5.⁴ However, it is for tangata whenua to determine whether appropriate recognition of Māori values has been provided for within the NBA, and it will be important to see these values, including the relationship of tangata whenua with te taiao, placed on an equal playing field with all other values that must be considered.

Collaborative decision-making

The implementation of regional planning committees under the NBA promote a collaborative approach to the development of NBA plans for each region. It is likely that these committees will include representatives of each territorial authority, the regional council, and tangata whenua. These combined plans and the approach to their development may potentially make it easier to implement EBM principles 1, 2 and 5 which relate to co-governance, ensuring decisions are derived from an appropriate knowledge base and that decision-making is collaborative.

Recommended approach to EBM

At a macro level, in order to effectively manage the marine environment, an integrated and holistic approach is needed (Peart et al, 2019). However, with nine different Acts covering the coastal and marine space, the marine ecosystem is managed by many different players each for a slightly different purpose. Implementation of this approach through statutory means can therefore be fraught, given the complex and often overlapping legislative framework governing the protection of activities within New Zealand's marine environment (Peart et al, 2019). Although the RMA does go a considerable way in providing for many (but not all) EBM principles, not one piece of legislation addresses all seven EBM principles (Peart et al, 2019).

To truly achieve an EBM approach across the board, legislative reform is needed to simplify the management of the marine environment (Peart et al., 2019), and to bring all relevant legislation into one Act to allow appropriate oversight. Such an approach needs to:

- acknowledge the EBM principles at the beginning of the management process;
- embody a ki uta ki tai philosophy; and
- mandate integrated management, bringing together iwi, hapū and all parties responsible for regulating or managing activities that have an environmental effect (e.g. Fisheries New Zealand, Ministry for Primary Industries, Department of Conservation, Environmental Protection Authority, Maritime New Zealand, Regional and Territorial Authorities) to address ecosystem health, social, cultural, and economic wellbeing.

However despite the above, progress towards EBM can and has been made - an example being the Hauraki Gulf Marine Park Act 2000. The case study below demonstrates one way to provide for EBM in the absence of whole-scale legislative reform for the marine and coastal environment.

Case study – Hauraki Gulf Marine Park Act 2000

⁴ EBM 1 – Co-governance, EBM 2 – Knowledge-based, EBM 5 – Collaborative decision-making.

The Hauraki Gulf Marine Part Act 2000 (HGMPA) seeks to protect and enhance the Hauraki Gulf and is well aligned to EBM principles. However, protection of the Gulf is addressed through a mix of statutory and non-statutory approaches to integrated management rather than statutory alone. There have been recent calls by the Environmental Defence Society to strengthen the objectives of the HGMPA making the priority between them clearer and providing a stronger protective layer over the important biodiversity and landscape values of the Hauraki Gulf islands (Environmental Defence Society, 2020). In summary, the HGMPA seeks to:

- Improve the environmental management of the Gulf through better integrating the decision-making of different management agencies.
- Recognise the deeply rooted relationships between tangata whenua and the Gulf.
- Focuses on sustaining and enhancing the capacity of the environment of the Gulf's coastal marine area and islands through managing the interrelationships between its catchments, coastal marine area, and islands.
- Identifies the Gulf's 'life-supporting capacity' as having ecological value as well as being important in order to provide for tangata whenua relationships with the Gulf and for community well-being more generally.
- Identifies matters of national significance and management objectives which are to be given effect to through RMA policy statements and plans (amongst other mechanisms).
- Establishes the Hauraki Gulf Forum as a governing body. The Forum meets quarterly and provides an opportunity for representatives from tangata whenua, and the various statutory bodies involved in managing the Gulf to share information, to discuss issues of common concern and to devise coordinated plans of action.

Matters of national significance and management objectives expressed in the HGMPA have the same status as a New Zealand Coastal Policy Statement. This sets up a framework within the RMA and corresponding plans, for integration and guidance on decision-making in the Hauraki Gulf area.

The following figure, adapted from the Hauraki Gulf Forum, provides an example of catchment and marine sourced effects on the marine area specific to the Hauraki Gulf. The figure demonstrates the breadth of issues to be considered in implementing an integrated management approach (Hauraki Gulf Forum, 2009), some of which will be applicable for Councils developing Coastal Plans, and Regional and District Plans.

Catchment-sourced effects on the Coastal Marine Area		
<p>Nitrogen enrichment</p> <p><i>Main cause: dairy farming.</i></p> <p><i>Main location: Firth of Thames</i></p>	<p>Sedimentation</p> <p><i>Main causes: earthworks, forestry, farming, re-suspension.</i></p> <p><i>Main locations: estuaries throughout the Gulf, Firth of Thames.</i></p>	<p>Heavy metal contamination</p> <p><i>Main causes: cars, iron roofs.</i></p> <p><i>Main locations: upper Waitemata harbour, Tamaki estuary</i></p>
<p>Microbial pollution</p> <p><i>Main causes: sewage systems.</i></p> <p><i>Main locations: Near-shore seawater adjacent to urban areas</i></p>	<p>Loss of natural character/landscapers</p> <p><i>Main causes: urban development.</i></p> <p><i>Main locations: Auckland region, Coromandel Peninsula east coast</i></p>	<p>Loss of cultural heritage</p> <p><i>Main causes: urban development, forestry, utilities.</i></p> <p><i>Main location: coastal edge throughout Gulf.</i></p>
Marine-sourced effects on the Coastal Marine Area		
<p>Marine habitat degradation</p> <p><i>Main causes: sedimentation, dredging, bottom trawling, reclamation, construction.</i></p> <p><i>Main locations: estuaries, harbours, bays, outer Gulf.</i></p>	<p>Depletion of shellfish</p> <p><i>Main causes: over-harvesting, sedimentation.</i></p> <p><i>Main locations: inshore close to urban areas.</i></p>	<p>Depletion of fish</p> <p><i>Main causes: harvesting, marine habitat degradation.</i></p> <p><i>Main location: entire marine area</i></p>
<p>Invasive species incursion</p> <p><i>Main causes: international vessels, aquaculture, climate change.</i></p> <p><i>Main locations: ports and boat harbours.</i></p>	<p>Stress on marine mammals</p> <p><i>Main causes: ship strike, marine tourism, fishing by-catch.</i></p> <p><i>Main location: entire Gulf</i></p>	<p>Depletion of wading birds</p> <p><i>Main causes: sedimentation.</i></p> <p><i>Main location: Firth of Thames.</i></p>

Figure 2: Environmental impacts on the Hauraki Gulf's coastal marine area – adapted from Hauraki Gulf Forum, 2009.

When it comes to EBM, the HGMPA was ahead of its time promoting integrated management across catchments and sectors. It has now been 20 years since its inception and there have been some wins attributed to this new management system. These include:

- Development of a shared vision for the Gulf;
- A decline in contaminant loading of sediment (Hauraki Gulf Forum, 2020); and
- Development of the non-statutory Hauraki Gulf Marine Spatial Plan 'Sea Change – Tai Timu Tai Pari' which seeks to deliver the vision for the Hauraki Gulf through a number of significant principles, proposals, and innovative measures to manage and protect the Gulf (Sea Change, 2017).

However, the 'State of our Gulf' Report produced in 2020 highlights that there is still much to be done, and that the task ahead is challenging due to balancing economic development and population growth with environmental loss (Hauraki Gulf Forum, 2020).

The following excerpt from the 2020 State of the Gulf Report captures the essence of EBM and reflects the collective narrative for the Hauraki Gulf moving forward. In the absence of legislative change, this type of cross-sectoral vision-setting could be established for each region, guiding the development of provisions in respective coastal plans, regional plans, and district plans.

“KA MAHI NGĀTAHI TĀTOU, KA ORA AKE A TĪKAPA MOANA

Healing the Hauraki Gulf – together

I am a living, breathing embodiment of mauri. The life force that connects us all, ki uta ki tai, from the mountains to the sea.

Look at me on a good day and all seems well. But the truth is I’ve been hurting. Shellfish beds decimated. Fish stocks low. My seabed suffocating with plastic and sediment. A mighty ecosystem brought to its knees.

The healing process will take time, hard mahi, and co-operation.

And it will also take more than just aroha. I need a true, unrelenting partnership. One of protection and active restoration. Every one of us has a role to play in this, but we’ll also need to work as one.

Only when my mauri is fully restored will this journey end. Back where it all began. A healthy, teeming, abundant taonga, with kaimoana and opportunity for all. Mauri ora!

I can be healed. I need you all by my side. Working together, our future looks bright.

‘Healing the Hauraki Gulf – together’ was the result of an exercise conducted at the 2019 Making Waves conference. Nick Sampson (Director of Strategy at Principals Brand Agency) took on the challenge of facilitating this, which saw attendees work together in groups to populate a ‘story structure’ about the Marine Park. The drafts were read aloud, and the results were inspiring, with many common themes. Principals took the stories away and helped develop the story above, which represents a collective narrative about the Marine Park.’

The Hauraki Gulf example demonstrates that continual evaluation of progress against objectives; governance and management structures; how communities, agencies and sectors are connected with the vision for an area; as well as legislative frameworks and whether they are fit for purpose is needed to implement EBM effectively.

As outlined above, including EBM principles in provisions within Regional Coastal Plans is only one piece of the picture, and a wider review of supporting systems is needed. However, steps to begin the journey towards EBM within the context of a Regional Coastal Plan are outlined in the following sections of this guidance document.

High level guide to incorporating an EBM approach into Regional Coastal Plans

The Hauraki Gulf case study provides an example of legislative change which implements an EBM approach. However, if legislative change is not able to be implemented, there are several ways that an EBM approach can be incorporated into Regional Coastal Plans. Appendix A to this report provides a detailed methodology for transitioning to EBM within a Regional Coastal Plan. Actions outlined in Appendix A have been colour coded according to whether they directly relate to Regional Coastal Plans (blue), or systems which support Coastal Plan implementation (green), and some steps can be completed as time and resourcing allows.

In moving through this suggested methodology, it is important to note that EBM is as much a process as it is an endpoint (Agardy et al, 2011), and where possible it is important to acknowledge the EBM principles at the beginning of the review process (Hewitt et al, 2018).

In addition to the detailed recommended actions in Appendix A, outlined below are key high level factors to consider when moving through the Coastal Plan development process to incorporate EBM.

Gain political support, collaborate across sectors

Gaining political support for EBM implementation is imperative to its success, and successful implementation will require a true appetite for collaboration, driven by strong leadership, coordination, and facilitation between cross-sectoral parties (Agardy et al, 2011). It is important to initiate early conversations about how EBM could be utilised to improve marine and coastal management. These conversations should include coastal policy and consents planners, science advisors, iwi and hapū, Council executive level management, Councillors, and when the time is right, stakeholders and the general public.

Furthermore, support for a collaborative approach to management is beginning to be directed through case law. Ulrich (2020, p18) notes that *“the recent Court of Appeal decision in Attorney-General v The Trustees of the Mōtītī Rohe Moana Trust ([2019] NZCA 532) points to the need for co-management appropriate to the scale. Mōtītī ‘invites’ the Ministry of Fisheries, Department of Conservation, regional councils, and iwi to work much more closely together in the coastal marine area.”*

Start small, then expand

When implementing the actions in Appendix A, it is recommended that a discrete area or issue is nominated for rollout of an EBM approach to begin with. Starting small enables supporting systems and governance frameworks to be tested and tweaked prior to rolling EBM out on a larger scale and makes assessing ecosystem interactions easier.

An example of such an area could be an intertidal zone that has seen a depletion of filter-feeding shellfish stock (e.g. kuku or green-lipped mussel). By defining the area where an EBM approach is to be applied, all parties involved in management will have a clear focus. Starting small also makes it easier to identify critical elements affecting the shellfish bed (e.g. sedimentation, eutrophication) and associated causes to be managed. Applying EBM to a discrete area also allows implementation of a targeted baseline monitoring programme to assess the state of the ecosystem services the shellfish bed provides (e.g. filtering of water column, nutrient cycling, kaimoana, biogenic habitat), and linkages between ecosystems. Once these elements have been established, objectives can be set, along with a long-term

monitoring plan to enable adaptive management where appropriate. A Drivers-Pressure-Indicators-State-Response (DPISR) model would be an appropriate framework to guide this process.

Using the shellfish bed example, a policy and rule framework within Regional Coastal Plans can then be developed to promote restoration of habitat, and protection and enhancement of biodiversity. Those developing Regional Coastal Plans can also work with colleagues tasked with drafting and implementing Regional and District Plans to help guide corresponding provisions in respective plans (e.g. sediment runoff from catchment based activities, discharges, contaminant loading, habitat disturbance) which would contribute to the effective management of this habitat.

Case Study – Kuku beds, Firth of Thames

Ensuring that provisions in the draft Coastal Plan provide adequate protection for key species and habitats is imperative. The decline of just one species, e.g. through loss of habitat, or catchment and estuarine management practices which increase turbidity or sedimentation, can change interactions in food webs and cause cascading effects through an ecosystem through the ecosystem services they provide (Pratt et al., 2013 as cited in Jones et al., 2017., & Ministry for the Environment & Stats NZ 2019).

For example kuku beds, which are a biogenic habitat* (habitats created by plants and animals) were once a dominant habitat growing on soft sediments in the Firth of Thames. Over time, approximately 500 square kilometres of kuku beds have been lost from the Firth of Thames (Ministry for the Environment & Stats NZ, 2019). These beds provide important ecosystem services including filtration of suspended sediment. Historically the mussels in these beds could filter the volume of the Firth in a single day. Current estimates are that remnant mussel beds take nearly two years to filter the same amount of water, thereby having an effect on water quality and provision of habitat for other species (Ministry for the Environment & Stats NZ, 2019).

**The Ministry for the Environment & Stats NZ (2019, p. 19) note that “Biogenic habitats play a crucial role in enhancing biodiversity by providing ecosystem services. Examples of their benefits include a mussel bed providing shelter to juvenile fish or seagrass meadows removing and storing carbon dioxide from the atmosphere. Biogenic habitats, however, are vulnerable because they protrude from the seabed and are fragile.”*

Consider using the DPISR model for adaptive management

EBM is a dynamic rather than static approach, with adaptive management forming a critical component to evaluation. As Regional Coastal Plans control anthropogenic activity, the use of a Drivers-Pressure-Indicators-State-Response (DPISR) model may provide guidance for environmental assessment and decision-making in reference to policy responses. This conceptual model can be used (and adapted to fit) to analyse cause, effect, and response, and it synthesises economic and ecological fields of study (Troian et al., 2021).

Troian et al (2021) comment that the cycle starts with identifying the inducing forces (drivers) which generate stress causing positive or negative pressures (pressures) on the natural environment. These effects can alter the physical, chemical, and biological state (state) of the natural system, and cause impacts (impacts) on ecosystems. These impacts can be monitored using appropriate indicators, including mātauranga Māori. Society usually reacts (responses)

with the perspective of mitigating impacts that may affect human well-being through the implementation of objectives and policies (Troian et al., 2021). In the case of EBM, such responses should be directed towards maintaining the health, function, and connectivity of the ecosystem in question. The effects resulting from responses implemented then generates a new cycle of the model (adaptive management) (Troian et al., 2021), which supports the implementation of EBM Principle 7.

Incentivise activities that support EBM, adopt a precautionary approach, and address cumulative effects

Within Regional Coastal Plans, it will be important to:

- Incentivise activities that support an EBM approach through consideration of appropriate levels of activity status.
- Use the EBM principles to inform well-crafted objectives and policies which follow SMART principles.⁵
- Build EBM principles into matters of consideration in rule frameworks.
- Adopt a precautionary approach in the absence of scientific certainty regarding the impacts of activities. This aligns with the New Zealand Coastal Policy Statement 2010.
- Share knowledge and data within and across Councils and implement a consistent approach to assessment and management of cumulative effects (see Appendix A).

Secure appropriate level of funding to ensure longevity of EBM

An appropriate level of ongoing funding is imperative to ensuring the longevity of EBM in addressing the challenges faced by our oceans and coasts. Changes to provisions in Coastal Plans need to be supported by a strong evidence base through section 32 reporting under the RMA. Given we know less about our coasts and oceans than any other environmental domain, the ability to report on the impacts of changes in the marine environment on species and habitats is often limited by a lack of baseline data, understanding of tipping points, and connections between domains.

In undertaking a review of Coastal Plans the timing and cost of collecting this baseline data needs to be factored in. Data collection is a requirement under Section 35(1) of the RMA. Without good baseline data, there is a risk that provisions written into plans may not be strong enough to effect the changes sought. In moving through the planning stages of the review process it is important to consider whether additional funding is required for data collection, where this sits in the Long Term Plan cycle, and the political appetite for prioritising marine management.

Longer term funding options for the continuation of an EBM approach, may include public-private partnership, or sharing costs between Councils where research or monitoring results benefit on a wider scale. Where a partnership model is used, ensuring that the interests of public and private partners are aligned, will help ensure the integrity of management goals (Agardy et al, 2011). In addition, if not already charging under general rates, Councils can also implement targeted funding through coastal occupation charges under the RMA to help fund necessary monitoring.

Communicate outcomes and educate

⁵ Specific, Measurable, Achievable (or agreed), Realistic (or relevant), Time-bound.

Communication of outcomes derived from implementation of EBM, and education on the importance of EBM is key to the success of transitioning to this new approach.

Agardy et al (2011, p. 58) note:

“Ecosystem-based management will not be effective without communication on why EBM is needed, how it promotes integrated approaches, and how it benefits society. EBM is a complex concept that requires a diverse set of communication tools, especially given the wide variety of stakeholders who are part of an EBM process. Developing clear and effective communication plans should be an integral part of any EBM initiative. As such, communications professionals are often brought onto EBM teams. This is done both to help develop communication plans and to train EBM partners and supporters in accurately describing what EBM is and why it is needed.”

Furthermore:

“Clear communication and transparency in decision-making is critical for success in EBM. Short-changing this aspect will likely lead to misunderstanding and lengthy delays. It is key to plan ahead and identify talented facilitators, negotiators, and meeting planners who will commit to the duration of the EBM process.” Agardy et al (2011, p.32).

The above recommendations are reflected in Appendix A - Step 2, and Guidance Note 1 which outlines a recommended governance structure for overseeing the incorporation of EBM into Coastal Plans as part of the plan review process.

Conclusion

Incorporation of EBM into Regional Coastal Plans and the systems which support their implementation forms an important part of implementing EBM on a wider scale. Whilst incorporation into Regional Coastal Plans alone will not solve the trend of increasing degradation of our oceans and coasts or provide full implementation of EBM (as this requires all stakeholders involved in marine management to come on-board), it is a step in the right direction.

Consideration and incorporation of EBM principles into Regional Coastal Planning, particularly through the incorporation of objectives and policies with a strong EBM focus:

- Recognises the many interactions within an ecosystem and moves away from protecting an individual species or dealing with a single activity at a time providing a better framework for assessing cumulative effects.
- Ensures that decisions are informed by knowledge and data, and allows tailored and flexible approaches to management, thereby providing for better protection and enhancement of ecosystems and the biodiversity within. This ensures that management approaches are adaptive, and ecosystems are closely monitored so as not to reach ecosystem tipping points.
- Recognises the value of co-operation and provides a mechanism to bring people with competing interests and management responsibilities together to holistically manage the coastal environment, thereby achieving better overall protection of ecosystems and resources.

- Recognises the importance of incorporating knowledge from a wide variety of sources, especially mātauranga Māori and incorporating this into ecosystem monitoring and decision-making, thereby strengthening the management system.
- Provides for co-governance with iwi, strengthening relationships and aligning with Treaty obligations in relation to the coastal environment.

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Appendix A – Detailed recommendations to implement an EBM approach in Regional Coastal Plans

Guidance Note 1 – Governance structure and workstream responsibilities

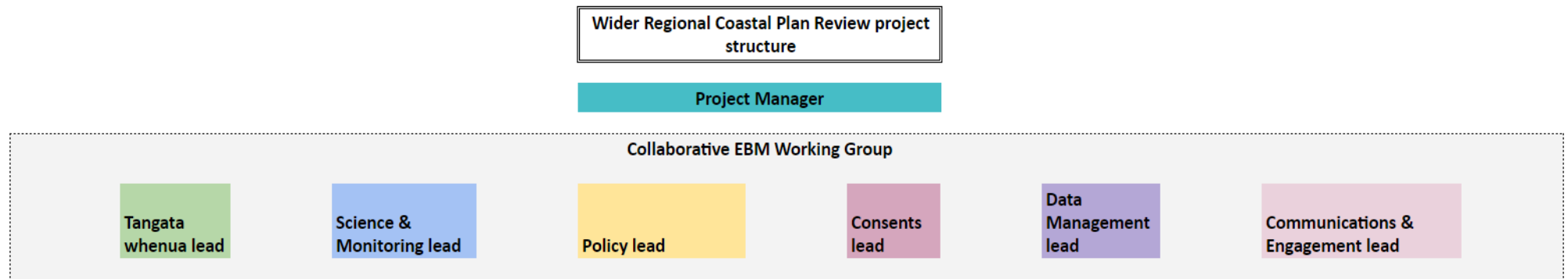


Figure 1: Potential governance structure that could be used to oversee incorporation of EBM into Coastal Plans as part of the plan review process. It is anticipated that the workstream leads within the Collaborative EBM Working Group would report to the Project Manager, who would feed into the wider plan review project team.

Table 1: Responsibilities of EBM Collaborative Working Group workstream leads

Level	Roles	Responsibilities
Management	Project Manager	Test support for EBM with stakeholders, Iwi, Councillors, and public
		Coordination of participatory and cross boundary approach to drafting of Coastal Plan to strengthen management of cumulative effects
		Oversight of Collaborative EBM Working Group
Collaborative EBM Working Group	Tangata whenua workstream lead	Work with planning staff to help with deeper understanding of Te Ao Māori to assist with plan drafting and informing strength of provisions in reference to Te Ao Maori concepts
		Guide discussions with policy staff on whether it is appropriate to include definitions for Māori concepts in Te Reo.
		Work with science and monitoring workstream lead in development of science and monitoring plan to incorporate mātauranga māori
		Work with Communications and Engagement workstream lead to identify iwi and hapū groups for engagement in implementing an EBM approach, and act as a liaison between these groups to feed back into plan drafting process.
		Provide guidance to Council staff in navigating conversations with Iwi around co-governance models, transfer of powers, Joint Management Agreements, or Mana Whakahono a Rohe
	Science and Monitoring workstream lead	Develop overarching science and monitoring plan to sit alongside Coastal Plan which addresses data collection, data management, monitoring and trend reporting.
		Conduct internal review of scientific gaps in coastal management to inform work packages to be completed prior to plan drafting.
		Provide or coordinate a technical review of proposed plan provisions to ensure appropriate monitoring can be implemented and to provide additional check on intent of policies
	Policy workstream lead	Plan drafting
		Gap analysis

		Review of recent case law to inform drafting of provisions
		Comparative review of provisions in other recently operative Coastal Plans
		Amend reporting templates to specifically consider EBM Principles
	Consents workstream lead	Review processes for assessing coastal permit applications to ensure consistency amongst staff, and management of cumulative effects
		Test draft coastal plan provisions in consenting framework
		Work with data management workstream lead in development of centralised database for monitoring and consents data
	Data management workstream lead	Create centralised database for monitoring and consents data
		Work with science and monitoring workstream lead in development of science and monitoring plan
	Communications and Engagement workstream lead	Assist with communications material to Councillors, stakeholders, Iwi and public on EBM approach
Advise on communication and engagement approaches/methods for participatory and cross-boundary hui to inform plan drafting and ongoing implementation		

Guidance Note 2 – Methodology and template for gap analysis

See spreadsheet