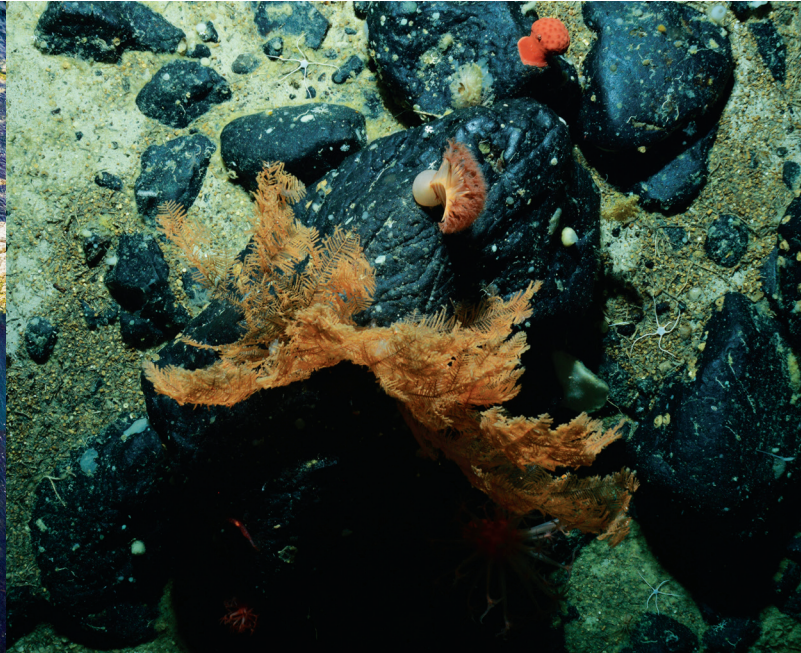


Tools and resources for marine managers

SUSTAINABLE
SEAS

Ko ngā moana
whakauka



This is a catalogue of our tools and resources that are relevant to marine managers, kaitiaki and decision-makers.

Many were – or are being – developed with stakeholders and Māori partners. Some are already being used, others may require further development or adaptation by users.

I'm interested in tools and resources to/for...

	Available now	In development*
Address cumulative effects (CE)	1 2 3	<ul style="list-style-type: none"> Mātauranga Māori perceptions of cumulative effects to support kaitiakitanga <i>June 2021</i> Recommendations for addressing critical issues in marine management (discussion paper) <i>July 2021</i> Cumulative effects – summary of 2014 – 2019 research <i>August 2021</i> Guidelines on interactions between stressors and responses <i>June 2022</i> A decision-making framework for assessing cumulative effects that can take account of varying levels of uncertainty and data limitations <i>June 2023</i> Guidance and tools for preventing degradation and enhancing seafloor recovery rates and assessing relative success of management actions <i>June 2023</i>
Do effective marine monitoring	4 5 6 7 8	<ul style="list-style-type: none"> Monitoring estuaries in a changing world (guidance) <i>August 2021</i> Technical report describing the application and use of maramataka based coastal indicators <i>December 2022</i> Updated Pātaka mātauranga <i>June 2023</i>
Tackle uncertainty and/or data gaps	9 10 11 12 13 14	<ul style="list-style-type: none"> A model and guidelines for integrating risk and uncertainty into decision-making <i>June 2023</i>
Support marine spatial planning (MSP)	12 13 14	<ul style="list-style-type: none"> National scale SeaSketch tool for marine reserve planning <i>June 2022</i> Guidance and tools for preventing degradation and enhancing seafloor recovery rates and assessing relative success of management actions <i>June 2023</i>
Ecosystem services	14 15 16 17	
Supporting tikanga/ mātauranga Māori and other expert knowledge in decision-making	10 11 18 19 20	<ul style="list-style-type: none"> A digital resource in the Ngā Tohu o te Ao digital collection disseminating the process to develop localised tohu using maramataka <i>December 2021</i> Coastal Indicator Framework based on localised Maramataka for iwi partners <i>March 2022</i> A toolkit for developing collaborative EBM and kaitiakitanga approaches that draw on mātauranga and scientific knowledge <i>June 2022</i> Place-based tohu (traditional indicators) of the ecological condition of our estuaries and coasts <i>June 2023</i> Mātauranga and western science definitions of degradation and recovery <i>June 2023</i>
Support participatory/ collaborative decision-making	10 11 13 3 18 19 22 23	<ul style="list-style-type: none"> A toolkit for developing collaborative EBM and kaitiakitanga approaches that draw on mātauranga and scientific knowledge <i>June 2022</i>
Support transition to a blue economy	21 24 25 26	<ul style="list-style-type: none"> Seaweed sector framework <i>June 2022</i>

	Available now	In development*
Support kaitiaki	3 4 18 19 20 21	<ul style="list-style-type: none"> Mātauranga Māori perceptions of cumulative effects to support kaitiakitanga <i>June 2021</i> A digital resource in the Ngā Tohu o te Ao digital collection disseminating the process to develop localised tohu using maramataka <i>December 2021</i> Coastal Indicator Framework based on localised Maramataka for iwi partners <i>March 2022</i> A toolkit for developing collaborative EBM and kaitiakitanga approaches that draw on mātauranga and scientific knowledge <i>June 2022</i> Mātauranga and western science definitions of degradation and recovery <i>June 2023</i> Infographic report of a Pātaka Kōrero system developed for specific regions showing how the tool has been used for marine management <i>June 2023</i>
Help explain blue economy	27 28	
Industry sectors	29	<ul style="list-style-type: none"> Fisheries: Research, tools and resources (research round-up) <i>September 2021</i>
Policy	30	<ul style="list-style-type: none"> Comparative study of EBM in international law, policy and practice <i>December 2021</i> The implications of recent changes in the regulatory seascape <i>December 2021</i> Information about the barriers and opportunities to implement practice, policy and legislative change <i>June 2022</i> How EBM is being implemented internationally <i>June 2021</i> How EBM and kaitiakitanga practices can complement each other <i>June 2021</i> A pathway identified for implementing EBM <i>June 2023</i> A transition plan for implementing EBM in Aotearoa New Zealand that ensures a just transition and fairly distributes costs and benefits <i>June 2023</i>
Help explain what EBM is, why it's needed, and/or where it's happening	31 32 33	
Discover other Sustainable Seas research and datasets	34 35 36	

*This content will be updated by September 2021; details of these outputs are being refined following co-developer input as part of our project review process.

I'm interested in examples of councils working with iwi, hapū, industry and/or local communities to 'do' EBM...

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1 Managing the impact of turbidity, nutrients and sea level rise on coasts and estuaries

This guidance explains the cumulative effects of three significant coastal stressors, the likely impact on ecosystem function, and provides management recommendations.

Contact: Conrad Pilditch, University of Waikato



2 Shady business: The problem of mud in our estuaries

In this webinar from May 2021, Conrad Pilditch (University of Waikato), Simon Thrush (University of Auckland), Kura Paul-Burke (University of Waikato) and Megan Carbines (Auckland Council) discussed the effects of terrestrial sediments on estuary ecosystems and discuss future management strategies.

Contact: Conrad Pilditch, University of Waikato



3 Aotearoa Cumulative Effects (ACE) framework

A framework to help planners and agencies collaboratively manage cumulative effects across a range of scales (spatial and temporal), developed in partnership with Aquaculture New Zealand, central government agencies, regional councils, Māori entities, and community representatives.

It can be used to facilitate discussions with community, stakeholders, local authorities, and other users. It can also help identify potential issues to do with cumulative effects when developing resource consents applications.

It is underpinned by the principles of Te Tiriti o Waitangi/Treaty of Waitangi, especially regarding partnership and rangatiratanga.

Contact: sustainableseasNC@niwa.co.nz



4 Pātaka mātauranga

Kaitiaki can use data from marine ecology, spatial planning, real-time monitoring, and aquaculture to support their work, but finding out about and accessing these troves of science information is not always straightforward – and the format is not always readily understandable or useable.

This online pātaka mātauranga (digital resource) was co-developed with hapū and kaitiaki of the Tauranga Moana. The tool is being used by frontline kaitiaki and Māori communities to:

- Tailor and develop information into forms that best suit them
- Support their educational, research, future co-management/co-governance
- Plan activities in the domain of Tangaroa

Contact: Caine Taiapa, Manaaki Te Awanui



Sensitive mātauranga Māori has been removed from this publicly accessible version of the pātaka mātauranga.



The pātaka mātauranga is being expanded to empower kaitiaki across Aotearoa with relevant environmental management approaches, frameworks and tools for an EBM approach.

5 Using drones for coastal monitoring

Our researchers demonstrated how drones can be used to monitor large and/or inaccessible areas of coast.

The team used drones to capture standard RGB (red-green-blue) and multispectral images of seven sites along the Kaikoura coast, six of which were uplifted by the 2016 earthquake, then produced composite images showing kelp and seaweed coverage and biodiversity. These images could inform sustainable management of kelp forests in the region by identifying areas that need protection to support kelp forest recovery.

Contact: Leigh Tait, NIWA



Video



This short film (1m30s) is an overview of the research.



Map



This StoryMap is a visual summary of the findings at each of the seven sites.



Presentation



This webinar provides more technical information.

6 Monitoring for tipping points in the marine environment

This guidance summarises the critical factors to consider, and the recommended data required, for a robust monitoring programme to detect the early warning signs that a tipping point is being approached – or to increase the certainty that a tipping point has occurred.

Contact: Judi Hewitt, NIWA



Guidance



7 Uncovering estuary health with eDNA

Research in two Nelson estuaries shows that environmental DNA (eDNA) metabarcoding offers a sensitive, cost effective and fast way to detect nutrient enrichment effects.

Contact: Dana Clark, Cawthron



Video



8 Plastic, pests and industry

A model we developed to underpin the Ocean Plastic Simulator, a tool for public engagement that demonstrates ocean connectivity, has dramatically reduced processing times compared with existing models commonly used in Aotearoa New Zealand and around the world. This reduction has enabled novel research, and commercial and biosecurity applications.

Contact: Ross Vennell, Cawthron



Summary



This impact case study shows how the public engagement tool and/or its underlying model are being taken up, nationally and internationally.



Digital tool



Try the latest iteration of the public engagement tool, expanded by the Moana Project to cover the whole of our coast and almost all of our EEZ.

9 Tools for risk assessment under uncertainty

This report reviews a range of best practice analytical tools and processes that can be used to support risk assessment across a spectrum of problems of differing complexity and uncertainty. It includes:

- The role of risk assessment in decision-making
- Methods for eliciting, representing and incorporating uncertainty in risk assessments
- Methods for assessing cumulative and indirect risks from multiple stressors
- Scenario-based methods for evaluating management alternatives under uncertainty

Contact: Graeme Inglis, NIWA



Report



10 Using Bayesian networks to bridge data gaps

This guidance describes how Bayesian network models can combine data with expert knowledge (ecological, physical or mātauranga Māori), to bridge the data gap and support decision making.

It includes a proof-of-concept example, where we developed a digital tool to compare outcomes on seabed health and scallop abundance from different management scenarios. The management objectives – fisheries, sediment and nutrient inputs, and restoration of seabed habitat – were identified with iwi and local stakeholders.



This presentation describes how the tool was developed using expert knowledge, and how application of this Bayes network model with a structured decision-making framework enables stakeholders and managers to make informed management decisions.

The model that sits behind this tool can be adapted for other environmental management scenarios to support decision-making.



Contact: sustainableseasNC@niwa.co.nz to find out more about the tool's capabilities, and what resource is required to run or adapt it.

11 Systems mapping for ecosystem-based management

System mapping is a visual tool that builds a picture of interconnected factors contributing to, and impacted by, a certain issue(s) of interest.

It specifically focuses on the circular nature of these relationships and how they 'feedback' on themselves and each other. It can be used to explore how any action taken will impact other parts of the system over time.

We have used systems mapping to assess:

Scallop decline in Tasman-Golden Bay – This pilot explored whether systems mapping could be useful for ecosystem-based management (EBM). Section 5 of the report provides a summary, and outlines recommendations for potential applications of this process.



Contact: Judi Hewitt, NIWA

Marine stressors in Hawke's Bay – This describes the interlinked influences on the local ecosystem (including the social impacts) of two main environmental stressors, freshwater sediments and disturbance of the seabed, to inform management action.



Contact: Carolyn Lundquist, NIWA/University of Auckland

12 Filling gaps in marine data using Gradient Forest models

This guidance describes how large numbers of different data sets can be effectively pooled to group marine species into 'community assemblages'.

These assemblages can be used to identify biodiversity hotspots and explore 'gifts and gains' (trade-offs) resulting from management decisions.



Advantages of this approach:

- It requires less data to run than considering 100s of species individually
- It provides a limited number of groups of species (community assemblages) for decision makers to consider, which is:
 - » Easier than an individual assessment for 100s of species
 - » More holistic as these species interact and affect one another
- It predicts assemblages that serve as proxies for rare species that cannot be modelled as they are poorly represented in available data

Contact: Fabrice Stephenson, NIWA

13 Cetacean conservation planning

We have developed a tool to visualise cetacean distribution and diversity hotspots with varying levels of uncertainty. This identifies the best locations in our EEZ for protection, and can help to incorporate uncertainty for marine spatial planning and/or decision-makers for marine or resource consent applications.

The method underpinning the visualisation is applicable to other species/taxa, and can be used as a framework for incorporating uncertainty when dealing with multiple species. This provides a robust and efficient step towards better decision-making for conservation management in a participatory process.

Contact: Fabrice Stephenson, NIWA



Watch the webinar



See the research summary

14 Ecosystem services maps

We developed ecosystem service maps that show where:

- Biogenic refuge habitats, which act as nurseries for young finfish and invertebrates, are predicted to be found in Hauraki Gulf, Te Tau Ihu/Top of the South Island, and Queen Charlotte Sound
- Nitrogen removal by soft-sediment seabed is predicted to be high in Whitford estuary



This pre-filtered search links to maps for:

- Hauraki Gulf (biogenic habitat provision)
- Te Tau Ihu/Top of the South Island (biogenic habitat provision)
- Queen Charlotte Sound (biogenic habitat provision)
- Whitford estuary (denitrification potential)

Contact: Drew Lohrer, NIWA

15 Using ecosystem service bundles to improve marine management

Ecosystem service (ES) are the goods and services that nature provides, which people benefit from. A single ecological process can underpin multiple services, eg shellfish filter feeding improves water quality, supports the food web and leads to kaimoana.

ES can be grouped into 'bundles', which are sets of associated services that appear together repeatedly across space and/or time. The services within and between bundles can interact as either synergies, positively interacting to have a combined effect greater than the sum of their separate effects, or trade-offs where one service is increased at the expense of another.

This two-page guidance document explains how ES interact with each other and are affected by stressors – and which values might be affected for better or worse following a management decision. It uses the ecosystem services provided by shellfish as a case study.

Contact: Drew Lohrer, NIWA



16 Measuring and mapping marine ecosystem services

Despite the vast coverage of the seafloor, very little is known about its contributions to ecosystem service delivery, in part because it is difficult to observe and measure what is happening there.

In this webinar, Drew Lohrer presents research that used a rules-based approach to predict and map refuge habitat in the Hauraki Gulf and Marlborough Sounds, and then validated this technique by surveying the seafloor at a range of sites around Great Barrier Island. The research team also developed tools to measure and map nitrogen removal in Whitford and Wairoa Bays, near Auckland.

Contact: Drew Lohrer, NIWA



17 Ecosystem models

We have developed a suite of ecosystem models to explore the implications of a range of environmental or management scenarios in Tasman and Golden Bays.

- *Atlantis model* – An ‘end-to-end’ modelling tool that allows researchers and decision makers to test the effects of different scenarios on the whole ecosystem, encompassing everything from sunlight and nutrients through to predators and fisheries.
- *Food web model and size-based model* – These are simpler to use with shorter run times than Atlantis and can be used to prioritise scenarios for Atlantis runs.

Resource required: For all these models, stakeholders and Māori partners can identify possible scenarios, but a modelling expert is required to adapt and/or run the models, and support interpreting their outputs.



See an example of the Atlantis model.

Which model works best for what you need?



This webinar discusses which ecosystem model is best for different scenarios and criteria.

Contact: sustainableseasNC@niwa.co.nz

18 Hui-te-ana-nui: Understanding kaitiakitanga in our marine environment

This report examines mātauranga associated with the marine environment, and explores themes and why they are important to consider in decision-making.

It also indexes the reference sources of this varied mātauranga, and signposts where to go for further detail.



These visual summaries present the key themes identified in the report.



Available by
30 June 2021

The content included in this report and visual summaries remains under the guardianship of the original knowledge source. We caution the use of quotes or analysis out of context, without respect for the ancestors who provided it, and in isolation of reference to existing tangata whenua sources and authorities.

Contact: Linda Faulkner, Sustainable Seas Challenge

19 Addressing politics when conducting valuation for decision-making

Decision-makers have to consider diverse and often conflicting economic, cultural, social and environmental values.

Officials advising decision-makers want best practice valuation frameworks and methods to render decision making more objective and less political. However, politics and social context unavoidably shape the way that information is generated and decisions get made. Attempting ‘best practice’ valuation without attention to this social and political context has consequences for local democracy and the environment.

This guidance offers recommendations to help advisors recognise and choose how to ethically and responsibly respond to this context.

Contact: Jim Sinner & Marc Tadaki, Cawthron



20 He Pou Tokomanawa: Kaitiakitanga in practice

This iwi-led project gathered data and research to guide the formulation of a culturally relevant pathway for iwi to engage in the evaluation and development of EBM tools and processes.

This report is relevant to Māori, scientists, resource management professionals, students and others. The documentation of Kaupapa Māori research methodologies may be informative and helpful for those who wish to support similar iwi-led projects.

Care has been taken to ensure that any sensitive mātauranga Māori is not included.

Contact: sustainableseasNC@niwa.co.nz



21 Kaitiaki-centred business models: Case studies of Māori marine-based enterprises in Aotearoa

This report describes case studies representing different business models: ACE (annual catch entitlement) trading company, joint venture or iwi fishing company.

The case studies were:

- Ngāi Tahu Seafoods
- Moana New Zealand
- Iwi Collective Partnership
- Ngāti Kahungunu
- Whakatōhea
- Aotearoa Clams

Contact: Jason Mika, Massey University



22 Ingredients to catalyse participation in marine decision-making

There is no failsafe 'recipe' that can be applied to every marine decision-making scenario, and which will work for every iwi and hapū, government agency, community group and business with an interest in a particular marine ecosystem.

However, our research has identified 'ingredients' – questions grouped into themes – that can help build consensus and reduce conflict.

The tool can be adapted to suit local circumstances and priorities. This means anyone can use it as a practical guide to structure discussions, determine agreed goals and encourage deep conversations about challenging issues.

Contact: Paula Blackett, NIWA



23 Dissecting the discourse of social licence to operate

This poster summarises our research into how and by whom the term 'social licence to operate' is being used in Aotearoa New Zealand.

The term 'social licence to operate' suggests that communities have power to grant or withhold approval of commercial operations in the marine environment. However, the language used by industry and government when talking about social licence can empower or disempower communities.

This poster summarises the types of verbs that should be considered when discussing social licence to empower communities and build the genuine relationships required for social licence.

Contact: Jim Sinner, Cawthron



24 Transitioning to a blue economy: Scoping and horizon scanning

This report documents trajectories in blue economy innovation and development, domestically and internationally. It discusses the drivers of blue economy development at national and sectoral scales and provides an overview of industry perspectives on opportunities and constraints.

It also sought input from more than 40 iwi and stakeholders from a range of perspectives, including both public and private sectors (including investment and finance), industry, Māori organisations, and NGOs.

Contact: Nigel Bradly, EnviroStrat



25 Māori marine economy: A literature review

More than 150 articles and reports were examined to investigate the historical and contemporary structure of the Māori marine economy.

Contact: Jason Mika, Massey University



26 Mapping the Māori marine economy

This report and public talk describe how the Māori marine economy has emerged out of Māori responses and adaptations to Crown-created institutions and structures that are different from traditional Māori institutions.

Contact: Jason Mika, Massey University



27 Building a blue economy

In this webinar, Nick Lewis discusses the Challenge's definition of a 'blue economy', a term which is being increasingly used around the world.

This webinar bridges the blue economy research from Phase I (2014–2019), with what we are now working on in Phase II (2019–2024).

Contact: Nick Lewis, University of Auckland



28 AgriSea – a blue economy success story

AgriSea is an example of an innovative enterprise that is creating economic value from sustainable marine activities, based on healthy marine ecosystems.

Contact: sustainableseasNC@niwa.co.nz



29 Aquaculture: Tools, resources and research

This is a research round-up of our tools, resources and research that are relevant to aquaculture. It is a living document, and more tools, resources and research projects will be added as they are developed.

Contact: sustainableseasNC@niwa.co.nz



30 New Zealand law and the principles of EBM

This webinar by Raewyn Peart and Alison Greenaway summarises the legal framework that applies to the management of Aotearoa New Zealand's marine environment, and explains the extent to which the seven principles of ecosystem-based management (EBM) are already incorporated into law.

This webinar is most suitable for people who aren't already familiar with relevant laws for marine management and would find an overview helpful.

Contact: sustainableseasNC@niwa.co.nz



31 EBM in Aotearoa

An interactive online map showing the locations of, key information about, and links to, initiatives that meet some/all of the seven ecosystem-based management (EBM) principles for managing marine environments that we have developed with stakeholders and Māori partners.

Contact: Alison Greenaway, Manaaki Whenua - Landcare Research



32 EBM: A remedy for Aotearoa New Zealand's oceans

This short animation explains what ecosystem-based management (EBM) is, and why better marine management is needed.

Contact: sustainableseasNC@niwa.co.nz



33 Aotearoa New Zealand's key marine legislation

At least 20 pieces of legislation apply to our marine environment and our activities in it. This graphic shows key pieces of legislation in our marine realm, and where they apply.

Contact: sustainableseasNC@niwa.co.nz



34 Where's our research happening?

This interactive map shows the locations and key information of all our active and complete research projects.

Contact: sustainableseasNC@niwa.co.nz



35 Webinar back catalogue

All our webinars are recorded and uploaded to this YouTube playlist within 48 hours.

Contact: sustainableseasNC@niwa.co.nz



36 Metadata catalogue

These catalogue items help you discover and explore the varied qualitative and quantitative datasets that our research projects have produced.

Contact: sustainableseasNC@niwa.co.nz



37 Hawke's Bay regional study

This collaboration in Hawke's Bay is mapping environmental stressors, their interactions, and providing guidance for reducing their impacts.



39 Waikato Regional Council: Coastal plan review



New project, webpage in development.

38 Shellfish management in Marlborough Sounds



New project, webpage in development.

40 Measuring progress towards Ecosystem-Based Fisheries Management

Developing a monitoring and indicator framework to measure the application of EBFM in the Hauraki Gulf.

Project proposal in development.



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