

A. PROJECT TITLE	S1 Enabling EBM in the Hawke's Bay - Stage 2
"SHORT" TITLE	Hawke's Bay regional study
B. THEME / PROGRAMME	Synthesis (EBM in action)

C. PROJECT KEY RESEARCHERS			
Role	Name	Institution / company	Email
Project Leader	Carolyn Lundquist	NIWA	Carolyn.lundquist@niwa.co.nz
Systems Mapping specialist	Justin Connolly	Deliberate	
Co-development partner	Anna Madarasz-Smith	Hawkes Bay Regional Council	
Co-development partner	Becky Shanahan	Hawkes Bay Regional Council	
RMA Policy partner	Ellen Robotham	Hawkes Bay Regional Council	
Land Science Researcher	Barry Lynch	Hawkes Bay Regional Council	
Vision Mātauranga specialist	James Whetu	Whetu Group	
Marine Ecologist	Richard Bulmer	NIWA	
Social Scientist	Stephen FitzHerbert	NIWA	
Fisheries scientist	Ian Tuck	MPI (previously NIWA)	

D. CO-DEVELOPED WITH			
Name	Role	Organisation / company / agency	Level of partnership
Hawke's Bay Marine and Coastal Group (HBMaC)	Partner	Multi-stakeholder group including Ministry for Primary Industries, Department of Conservation, Hawke's Bay Regional Council, Ngāti Kahungunu Iwi Incorporation, Ngāti Pāhauwera, Te Taiwhenua o Tamatea, Ngāti Kere, Fisheries Inshore NZ, Legasea, Napier Fisheries Association, Te Ohu Kaimoana, regional commercial fishers, Port of Napier, Pan Pac Forest Products.	Co-development of project aims, participation in systems mapping, co-development and review of Stage 2 proposal, and anticipated participation in Stage 2 research activities

E. ABSTRACT
<p>The Hawke's Bay has been selected as a Challenge Phase 2 case study to enable ecosystem-based management (EBM) in a real-world context using tools, processes and analyses developed within Challenge research. The case study is a collaboration between Challenge researchers, the Hawke's Bay Regional Council, and the Hawke's Bay Marine and Coastal Group (HBMaC), a non-statutory multi-stakeholder group with representation from government agencies, tangata whenua, recreational and commercial fishing interests. At the initiation of the collaboration with HBMaC, two stressors were selected as the focus of the project, related to the key areas of sediment loads from freshwater bodies and the status of seafloor habitat structure. To date in the first year of this project (hereafter Stage 1), a systems mapping exercise with HBMaC produced a conceptual map of the inter-relationships between stressors, their drivers and their impacts and importance to reversing perceived environmental degradation in the Hawke's Bay marine environment. Stage 1 of this project also compiled a list of metadata for existing environmental and socio-cultural datasets that could be used populate model scenarios based on the systems map. Through co-funding by Hawke's Bay Regional Council (HBRC), geospatial layers of biodiversity and seafloor habitats were acquired for use in Stage 2 of the project.</p> <p>The systems mapping exercise identified perceived drivers of stressors and their impacts on ecosystem health, and critical knowledge gaps to address and further enable implementation of EBM within the Hawke's Bay. Three key tasks will be investigated in the second half (Stage 2) of this project: 1) co-development of potential management interventions to reduce the gaps between current and desired states highlighted through Stage 1; 2) exploration of their potential impacts <i>in the marine space</i>, using spatially explicit decision support tools; and then 3) extension of these marine-based insights to explore their potential impacts <i>in the socio-ecological and cultural space</i>, i.e. what are the implications for societal objectives such as community wellbeing, or fisher job security, or cultural identity. This third task will be informed by the systems map along with social scientific tools and insights from Phase 1 of the Challenge to explore gaps in the understanding, perception and satisfaction with the current state of sediment inputs and seafloor habitat structure, disconnects between humans and Tangaroa, and awareness of the current state of marine ecosystem health. In combination, these tasks will inform future decision-making. Direct involvement of HBRC in the project and associated workshops, including coastal science, land science and policy staff, will ensure scenarios and policy interventions explored in Stage 2 are developed that are feasible and achievable to facilitate potential uptake by regional authorities.</p>

F. RELEVANCE TO CHALLENGE OBJECTIVE

The Challenge objective is directly aligned with the HBMaC vision: to achieve a healthy and functioning marine ecosystem that supports an abundant and sustainable fishery. This project's focus is on overlapping stressors and associated impacts in Hawke's Bay, connecting the identification and quantification of multiple uses with potential policy and management options to address the perceived decline in ecosystem health. This EBM case study will inform options and levers available within a policy and management framework to understand the biological and environmental constraints associated with the Hawke's Bay marine environment, and enable abundant and sustainable Hawke's Bay fisheries. This project will identify a suite of potential options that could be actioned to address ecosystem degradation, restore ecosystem health and enhance resource utilisation of the Hawke's Bay marine ecosystem. Through direct involvement of HBRC science and policy staff, the project will pilot the use of decision-support tools developed in Phase 1 of the Challenge to explore better outcomes for EBM.

G. OUTPUTS	This project will produce the following Outputs:	Linked to which Theory of Change Outputs:	Explain briefly your plan to ensure uptake by iwi and stakeholders:
	<ul style="list-style-type: none"> • <u>Web content, newsletter articles, brief summary report, and public webinar</u> to support release of the detailed Systems Mapping Report developed in Stage 1 	(a) Biophysical and social-ecological knowledge that supports the development and understanding of tools that underpin EBM	The systems map resulted from a collaborative participatory process with HBMaC which encouraged inclusion and future uptake of ecosystem-based management both within and outside of the case study region. Socialisation of Stage 1 content will allow further outreach and engagement from the Stage 1 activities, both with HBMaC and with the additional viewers of the webinar, newsletter- and webpage. The anticipated audience for these outreach and engagement activities are HBRC coastal and land science and policy staff, central government agencies, industry, environmental groups, and other national and regional stakeholders.
	<ul style="list-style-type: none"> • <u>Tool</u>: iterative process utilising Stage 1 systems map with Stage 2 models and scenarios 	(b) Traditional, local and other cultural knowledge that supports EBM is captured/ understood/ recognised	The systems mapping exercise and ongoing hui and direct project co-development with HBMaC partners allow inference on how these tools can be used to navigate social tensions in a highly contested marine space, lessons which are useful for enabling implementation of EBM in other case studies both nationally and internationally, particularly with building consensus across the multitude of shared knowledges in this case study, including te ao Māori.
	<ul style="list-style-type: none"> • <u>Tool</u>: Model scenarios developed using Phase 1 Seafloor disturbance-recovery tool 	(f) Tools for predicting and managing cumulative and multiple stressors developed, assessed and demonstrated	A seafloor disturbance-recovery model (further developed in Sustainable Seas Phase 1, project 5.1.2) will be used to explore implications of different management interventions (i.e. reducing sediment supply; changing the spatial footprint of fishing) on ecosystem health. The co-developed scenarios used in the models can be used to envision a suite of potential options that could be actioned to address ecosystem degradation, restore ecosystem health and the enhance resource utilisation of the Hawke's Bay marine ecosystem.
	<ul style="list-style-type: none"> • <u>Guidelines</u>: A case study of the use of systems mapping, seafloor disturbance models, and the participatory processes toolkit for EBM 	(j) Guidelines for participation in EBM decision-making processes evaluated, refined and packaged for targeted iwi,	This collaborative participatory case study of EBM in the Hawke's Bay will serve as a proof of concept of the Participatory Processes toolkit developed from Sustainable Seas Phase 1 Project 1.1.1 (Participatory

	stakeholder processes	stakeholders and decision-makers.	Processes), and will be used to update and enhance these guidelines for participatory decision-making.
	<ul style="list-style-type: none"> • <u>Report</u>: Final project report 	(c) Effective partnership models for an EBM approach to decision-making and management developed, evaluated, and demonstrated.	A final report will be presented to the stakeholder group, summarising the case study iterative process between the systems map and disturbance model, allowing for lessons to be extrapolated to additional ecosystem-based management case studies, and presentation of conclusions and recommendations to inform future use of this approach.

H. OUTCOMES	This project will contribute to the following Theory of Change Outcomes:
	<ul style="list-style-type: none"> • (2) Decision making practices that are more inclusive, multi-sectorial and account for the effects from cumulative and multiple activities are adopted
	<ul style="list-style-type: none"> • (3) Knowledge from the Challenge (science and mātauranga) is used in decision making to improve ecological health and influences marine management and policy
	<ul style="list-style-type: none"> • (8) Researchers and iwi and stakeholders involved during the life of the Challenge continue to actively promote, research in, and use knowledge from the Challenge

I. INTRODUCTION
<p>Case studies in Phase 2 of the Challenge are intended to enhance the implementation of EBM in NZ through the evaluation and application of tools developed through the Challenge research projects in both Phase 1 and Phase 2 to ensure that they are fit for purpose, and further enhance NZ's ability to utilise an EBM approach. The Hawke's Bay has been identified as a suitable case study area that satisfies the following criteria:</p> <ul style="list-style-type: none"> • Address a real-world EBM issue • Co-designed with willing partners • On-the-ground champion(s) committed to driving progress • Access to existing data and knowledge useful for the case study • Opportunity to trial tools • Demonstrating how to enable EBM • Supported through I&O fund with form(s) of co-investment <p>The case study partners are the Hawke's Bay Regional Council and the Hawke's Bay Marine and Coastal Group (HBMaC), a multi-stakeholder group with representation from government agencies, tangata whenua, recreational and commercial fishing interests. HBMaC was established in 2016 due to concerns over the perceived localised depletion of inshore finfish stocks and environmental degradation in the Hawke's Bay marine area. HBMaC partners consist of HBMaC and partners at HBRC have highlighted that there is general consensus that there has been a degradation of the marine environment of Hawke's Bay, however the scale, direction and underlying causes of this change is unclear. A workshop with HBMaC and the Challenge Leadership Team in Nov 2018 clarified alignment of the stakeholder group's objectives with the Challenge and their willingness to participate as partners with the Challenge, identifying a set of priorities for case study research to address EBM in action in the Hawke's Bay.</p> <p>Sediment deposition from land-based impacts, and bottom contact impacts to the seafloor have been identified as key stressors to the Hawke's Bay marine ecosystem. These multiple stressors are likely to be acting both singularly and in combination. The cumulative impact of these stressors and their interactions on the Hawkes Bay coastal marine environment and the values held for it are unclear. Management of these effects is complex, with different statutory agencies exerting different roles. A benefit of this project is in identifying policy levers and management options that could be used to reconcile these multiple impacts, then facilitating the exploration of which interventions (and where they could occur) are likely to result in the best management outcomes.</p> <p>Seven principles have been identified as underpinning EBM in Aotearoa-New Zealand, and this project attempts to address both societal/cultural and ecological components of enabling EBM. In particular, the project incorporates Hewitt et al. (2018)'s EBM principles with particular focus on four of these principles: Co-governance incorporating <i>governance structures that provide for Treaty of Waitangi partnerships, tikanga and mātauranga Māori</i>; Collaborative Decision-Making through the use of <i>collaborative, co-designed and participatory decision-making processes, involving all interested parties</i> from agencies, iwi, industries, whānau, hapū, and local communities; and Knowledge-Based through enabling decisions <i>based on science and mātauranga Māori, informed by community values and priorities</i>. The focus on identification and mitigation of cumulative and multiple stressors can enable implementation of EBM in the Hawke's Bay to address the Sustainability EBM principle and ensure that <i>healthy marine environments, and their values and uses, are safeguarded for future generations</i>.</p>

J. AIMS

This project will pilot a holistic EBM approach using environmental and social-scientific tools developed in Phase 1 of the Challenge and evaluate options for decision making around multiple stressors, including scientific, societal and mātauranga knowledge to inform understanding of these stressors in the Hawke's Bay marine environment. Stage 1 of this project resulted in the co-development of a systems map, based on a series of workshops involving a diverse and representative stakeholder group. Stage 2 of this project will identify management interventions aimed at reducing the gaps between current and desired states identified through the systems map in Stage 1. The potential impacts of these interventions *in the marine space* will be explored using spatially explicit decision support tools that investigate scenarios for reducing impacts on benthic ecosystems due to sediments and seafloor disturbance impacts from fishing. Then, these marine-based insights will be extended to the potential impacts of these interventions *in the socio-ecological space* (i.e. impacts on livelihoods, wellbeing, cultural health). This final task will be explored using the systems map along with social scientific insights from Phase 1 of the Challenge, and will explore gaps in the understanding, perception and satisfaction of key stressors; their drivers; and their flow-on impacts; and the implications of these flow-on impacts for future decision-making relating to management and policy options. The full process will serve as a proof of concept of the use of the EBM toolkit including spatially explicit decision-support tools for seafloor ecosystem health, systems mapping, and participatory process guidelines that can inform and enhance EBM participatory stakeholder processes.

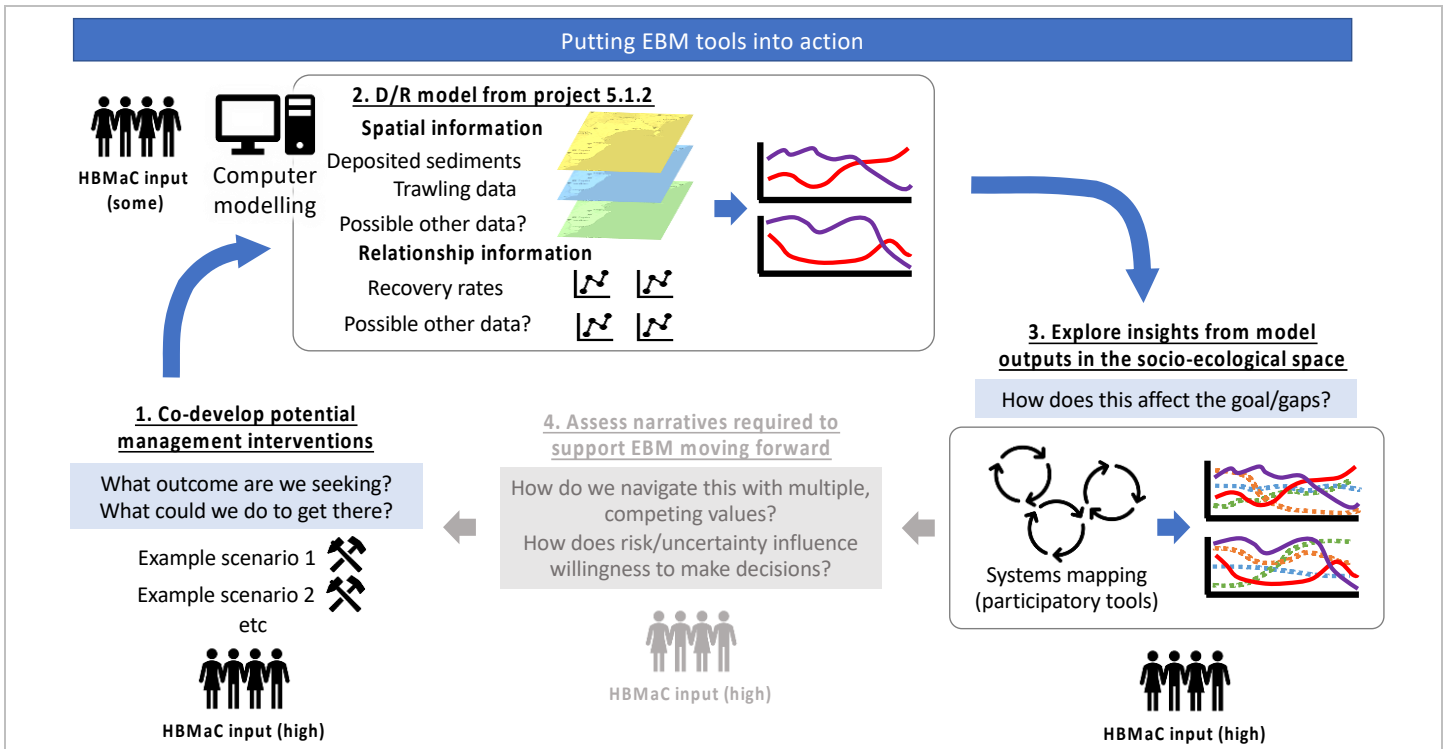
K. PROPOSED RESEARCH

This Challenge case study project is comprised of two stages: the initial (completed) stage included a systems mapping exercise and the scoping and collation of knowledge required to inform the understanding of cumulative effects and multiple stressors on the Hawke's Bay marine environment. The second (current) stage, explores potential interventions to reduce the gaps between current and desired states highlighted through the systems map.

Summary of S1 Phase 1 outputs: The systems mapping exercise developed a conceptual map of the known stressors and impacts, their inter-relationships, and how improved understanding of stressors might inform potential levers or policy actions (Connolly et al. 2020). The systems mapping exercise visually demonstrated the interconnected nature of the Hawke's Bay marine ecosystem, including its ecological components, the stressors that act on the ecosystem, and the ecological, societal, cultural and economic impacts or indicators of ecosystem health and how the health of the ecosystem is perceived by different groups. This system map is broadly made up of three parts: a land-based activity section; a marine environment section; and a socio-ecological section.

Existing knowledge was compiled to develop a system map that can be used to explore temporal trajectories of different elements identified in the system map (e.g. stressors such as sediment delivery to the marine environment; changes in intensity of seafloor fishing impacts; responses of seafloor communities to sediment and fishing disturbance). A knowledge mapping exercise highlighted where knowledge or data exists, and how robust the knowledge or data is. Systems maps can be used to qualitatively inform scenarios based on potential management interventions that could be used to mitigate against these stressors and reverse the ecological degradation currently experienced in the Hawke's Bay marine environment. Other sources of knowledge and data may also inform the use of this system map to explore potential management interventions, such as computer modelling of multiple stressors developed in Sustainable Seas Phase 1 project 5.1.2, the existing knowledge base including data on the primary land-based and water-based stressors of the Hawke's Bay marine environment (Haggitt and Wade, 2016), ecological information on stressors and their interactions from the Sustainable Seas Phase 1 projects 4.2.2 and 4.3.2, and methods to quantify stressor footprints from the Stressor Footprints project 4.1.1.

Proposed S1 Phase 2 research: Three tasks have been identified as priorities for the second stage of this project: 1) co-development of potential management interventions; 2) exploring their potential impacts *in the marine space*, using spatially explicit decision support tools; and then 3) extending the marine-based insights to explore their potential impacts *in the socio-ecological space*.



Task 1: Co-development of potential management interventions

Using the gaps between current and desired states (i.e., goal-gaps) identified in the systems map as a base to guide discussion, a suite of potential management interventions and associated reductions in spatial footprints or intensities of sediment and fishing stressors will be co-developed with HBMaC. These management interventions will be explored in more detail in Tasks 2 and 3. The direct involvement of HBRC coastal science and policy staff is further enhanced by the commitment of Barry Lynch (Principal Scientist – Land Science) to attend workshops to develop these scenarios, to ensure alignment with regulatory authority, that they are underpinned by updated knowledge of other interventions taking place on land, and that they are feasible and practical interventions that could be implemented by HBRC.

Task 2: Use of spatially explicit decision support tools to inform seafloor disturbance and recovery dynamics (seafloor disturbance model from project 5.1.2)

To predict changes in marine ecosystems, we need to understand the effects of multiple stressors on seafloor communities, including how these communities respond to stressors at different spatial and temporal scales, and potential time lags in response and recovery from stressor impacts. When stressors such as sediment and fishing impacts occur at large scales over areas of high environmental variability, it is difficult to assess impacts due to species-specific responses to environmental drivers (e.g. exposure, sediment, habitat) and interactions between stressors. Decision support tools can be used to predict changes in seafloor community dynamics at scales relevant to science and management perspectives that are difficult or expensive to examine empirically. A seafloor disturbance/recovery model has been selected for application in the Hawke's Bay. This approach builds on the application of this tool (in Project 5.1.2 in Phase 1 of the Challenge) to multiple stressors (sediment deposition, seafloor fishing impacts) in Tasman and Golden Bays, and development of versatile model boundaries that can be applied in a place-specific context to other case studies (Bulmer et al. 2020). The selected tool is a Matlab based model of patch dynamics that explores how disturbance spatial extent and frequency impact on the abundance and distribution of eight seafloor functional groups. Hawke's Bay datasets will be used to populate the tool. Scenarios, as designed in Task 1 by HBMaC, will be used to explore how different interventions (e.g. changes in fishing intensity or the spatial distribution of fishing, reductions in land-based sediment impacts) might increase ecosystem health of the Hawke's Bay.

Key information required to populate this tool has been identified through the Stage 1 systems mapping exercise. Many datasets have been identified and acquired and will be updated if required (e.g., fishery trawl information at temporal and spatial scales of highest available resolution; changes in sediment supply from freshwater bodies). These datasets will be integrated with data on benthic habitats and stressor-response curves to fishing disturbance and sediment impacts which were developed in Phase 1 projects 4.2.1, 4.32, and 5.1.2. Sediment footprints will be informed (if available) by stressor mapping by a HBRC-funded PhD student (supervised by Prof Karin Bryan, UoW) to provide additional detail and resolution to contaminant dispersal and inform on spatial and temporal variability in stressor footprints. A GIS database of available information on different habitat types and their spatial extent was prepared by Haggitt and Wade (2016), and further information on benthic habitats and structure has been compiled by Lundquist

et al. (2020). Additional multibeam mapping of the Hawke's Bay seafloor will occur in 2020/2021 and be available to inform the spatial model.

Following development of a baseline model, the impacts of potential management interventions developed in Task 1 will be incorporated into a series of scenario simulations. These simulations will help envision how well each intervention addresses the stressors responsible for marine ecosystem degradation, as well as potential time lags in recovery, and hysteresis such as the lack of recovery due to prior sediment deposition, and potential interactions of resuspension of this sediment by seafloor fishery impacts. The decision-support tool seeks to account for many of the main inter-relationships identified in the marine environment section (the central section) of the system map developed in Stage 1.

Task 3: Use social scientific tools from Challenge Phase 1 and the system map to explore insights from model outputs in the socio-ecological space.

The outputs from the spatially explicit decision-support tool will be used to guide further exploration of impacts in the socio-ecological space using the system map developed in Stage 1 of this Hawke's Bay case study project. This exploratory analysis will also build on the approach developed in the initial pilot of systems mapping with respect to enabling EBM in Aotearoa – New Zealand in the Tasman Base case study (Sustainable Seas Phase 1 Project Trialling EBM in the Tasman Bay – Golden Bay case study). Best practice for facilitating participatory decision-making during Task 3 will be undertaken, based on the participatory processes toolkit and cumulative effects framework developed in Phase 1 of the Challenge (Our Seas Participatory processes (1.1.1) and Enabling inter-agency collaboration on cumulative effects (1.3.2)).

These discussions will also be informed by the approach used in the research project EBM-enabling narratives for Aotearoa New Zealand (Phase 1 Project CP1.2). Narratives in this context refer to the development of descriptive stories based on visions of desired futures for the Hawke's Bay marine region that include both improvements in ecosystem health, and in socio-economic and cultural wellbeing. Hui with HBMaC will be hosted by the project to further clarify the future vision of HBMaC for Hawke's Bay that will be used to develop a suite of policy or management actions that could be actioned to reverse environmental degradation or promote restoration.

The linkages identified between system components, indicators of ecological, societal, cultural and economic health, and the policy and management interventions, will be investigated to assess their likely applicability for enabling EBM in this region, and achieving the future vision identified for the region. All scenarios interventions identified in Task 1, and modelled in Task 2 will focus on the reduction of environmental stressors to result in healthy marine ecosystems such that their values and uses are safeguarded for future generations; however, different interventions will vary in how they influence other activities or values, as per connections identified in the systems mapping exercise in Stage 1 of this project.

Task 4*: Assess narratives required to support EBM moving forward (*additional work envisioned to start in January 2022)

A significant discussion during the co-development of this Stage 2 proposal revolved around the 'what next' following the completion of the first three tasks identified for Stage 2 of this project. As part of the co-development, partners agreed to explicitly identify a Task 4 as a placeholder for the Challenge's anticipated commitment to ongoing research in the Hawke's Bay as one of the Challenge's flagship case studies, and that the useful work done to date will not end on 30 June 2021. The use of the decision support tool, and connecting it with insights from the system map, will identify policy tools and management levers that could be used to mitigate against the primary stressors to the Hawke's Bay marine environment. However, identifying the levers also brings with it the recognition of the diversity of values and objectives, both shared and competing, for the Hawke's Bay. The team has tentatively identified Task 4 as representing a further workstream that facilitates the inclusion of insights from Challenge Phase II projects, particularly with respect to navigating of multiple, complex values, as this is a key element for enabling EBM. The case study team envisions applying for further funding from the Challenge to support this further research in this Challenge flagship case study.

Key aspects to this further research are envisioned to include: utilisation of outputs of Phase II Project 1.1 (stressor interactions, and novel developments to bring interacting stressors into the seafloor disturbance-recovery model that will occur in 2020/2021) and Phase II Project 3.1 (Perceptions of risk and uncertainty, anticipated to allow further iterations of the systems map to identify aspects of the system that are of particular risk or uncertainty, and how this risk and uncertainty influences willingness to make decisions with respect to support of particular management or policy interventions to reduce the seafloor degradation in the Hawke's Bay). The project will be complemented by the decision support tool approaches that will be utilised and developed by Phase II Project 1.2 for its Hawke's Bay case study. These include both prioritisation models, and use of the tool SeaSketch for making geospatial information directly available to HBMaC, and an associated cumulative effects gaming tool that SeaSketch will co-develop with Project 1.2. The application of multiple tools in one location will contribute to the activities supported with the Challenge's Synthesis theme (Ecosystem-based management and blue economy in action), and allow the direct comparison of multiple decision-support tools and the mapping of different tools onto EBM principles that they best address. The commitment of HBRC staff to the project will facilitate its potential implementation.

L. LINKS TO PHASE I RESEARCH

- 1.1.1 Testing participatory processes for marine management (Proof of concept test of guidelines for participatory decision-making processes)
- 1.3.2 Enabling inter-agency collaboration on cumulative effects (Proof of concept test of recommendations for the Aotearoa Cumulative Effects Framework)
- 4.2.1 Tipping points in ecosystem structure, function & services (Empirical data to quantify stressor responses to sediment and nutrient impacts)
- 4.2.2 Stressor footprints and dynamics (Conceptual model of dynamics of sediment stressor footprints)
- 4.3.2 Sediment tolerance and mortality thresholds of benthic habitats (Quantitative relationships between health of soft sediment fauna and turbidity)
- 5.1.2 Spatially explicit decision support tools (Development of an adaptable place-specific disturbance model of seafloor ecosystems that incorporates sediment and fishing disturbance)
- CP1.2 EBM-enabling narratives for New Zealand (Development of narrative approach for visioning what EBM would look like and how societal relationships and utilisation of the ocean might change under these future visions)
- CP2.1 Trialling EBM in the Tasman Bay – Golden Bay case study (Pilot of systems mapping approach for stakeholder case study to enable EBM)

M. LINKS TO & INTERDEPENDENCIES WITH PHASE II RESEARCH PROJECTS

- 1.1 Understanding ecological responses to cumulative effects
 - 1.2 Tools for incorporating ecological responses to cumulative effects into management action
 - 3.1 Perceptions of risk and uncertainty
 - 4.2 Options for policy and legislative change to enable EBM across scales
- T5 He Kāinga Taurikura ō Tangitū: Treasured Coastal Environment (in development; at this stage it is unclear how these two projects may be aligned, but we will endeavour to continue conversations with the T5 project leaders as their project develops)
- Synthesis: Ecosystem-based management and blue economy in action
Synthesis: Other regional case studies
- Regional and central government directly support HBMaC through their participation, and HBRC is providing in-kind co-funding via contribution of personnel (Anna Madarasz-Smith, Becky Shanahan) to facilitate co-development and implementation of this project with HBMaC, and of personnel (Ellen Robotham, Barry Lynch) to facilitate alignment of scenario development with Land Science and Policy teams at HBRC. HBRC has also contributed direct co-funding to address data gaps including a review and compilation of regional (Haggitt and Wade, 2016) and national databases (Lundquist et al. 2020). Additional co-funding from HBRC includes funding of a NIWA glider voyage (\$20,000), multibeam surveys of known significant areas including further surveys in 2020/2021 (>\$200,000 also co-funded by Fisheries NZ (\$25,000)), funding for a PhD position to develop a hydrodynamic model looking at sediment source, transport and fate (\$150,000) supervised by Prof Karin Bryan (UoW), and an updated NIWA sediment map funded by HBRC's Hotspot programme. If results are available within the timeframe of this project, collaborations with projects from the Land and Water Challenge (PI Anne-Gaelle Ausseil, Manaaki Whenua Landcare Research) may provide relevant information on land-use impacts on sediment supply to the coastal environment.

N. VISION MĀTAURANGA (VM)

Vision Mātauranga is seeking to unlock the innovative potential of Māori knowledge, resources and people to assist New Zealanders to create a better future. There are four themes in the Vision Mātauranga (VM) policy framework (Indigenous Innovation, Taiao, Hauora/Oranga, and Mātauranga). This project represents an opportunity to apply learnings from Phase 1 and 2 of the Challenge to this case study which will enhance the ability for iwi and hapū, alongside stakeholders, managers and policy makers in the Hawke's Bay region to participate in and enable ecosystem-based management.

Māori continue to express grave concerns regarding the condition of marine environment in their local rohe. Initial workshops that led to identification of the topic of this proposal were co-developed with HBMaC whose environmental kaitiaki (guardians) include hapū/iwi (Ngāti Kahungunu, Ngāti Pāhauwera, Te Taiwhenua o Tamatea, Ngāti Kere). Ongoing co-development with Māori will occur throughout the project via those participants involved in HBMaC.

There will be direct incorporation of te ao Māori to generate a distinctive direction and contribution to the research. The project team will work together with Māori involved in HBMaC to explore how best to enable EBM in the Hawke's Bay. Research will explore how te ao Māori in accordance with tikanga Māori practices, can inform or support the tools proposed in this project to enable EBM. There is extensive capability within the HBMaC team in this area, including participants who are heavily involved in developing Marine Cultural Health monitoring indicators.

Vision Mātauranga Deliverables

Partnerships:

VM P1. Iwi partners actively participate at HBMaC hui to ensure a te ao Māori perspective is incorporated in the co-development of potential management interventions.

Distinctive Contribution:

VM D1. A seafloor disturbance model is developed that is relevant to areas of the systems map that highlight goal gaps with specific reference to loss of connection with Tangaroa.

Meaningful Outcomes:

VM M1. Series of project hui are held to disseminate and build trust and confidence in the model and systems mapping, and the recommendations emerging toward enabling EBM in the Hawke's Bay.

The results of this project will be presented to the Hawke's Bay Regional Planning Committee (RPC; under the Regional Planning Committee Act (2015)).

O. ENGAGEMENT REQUIRED WITH IWI AND STAKEHOLDERS

HBMaC, as an existing multi-stakeholder entity, will continue to provide a platform for engagement across all interested stakeholder groups. HBRC will continue to facilitate organisation and engagement with the group, and further commitment from Barry Lynch (HBRC land science) will facilitate alignment and understanding of HBRC's current activities and interventions to reduce land-based sediment inputs into the coastal environment. Linda Faulkner (Challenge Deputy Director) has been directly involved in early HBMaC hui and is envisioned to continue to serve as a critical liaison with the multiple Māori/iwi and treaty partner organisations involved in this case study project.

Uptake of this project within a policy framework will be encouraged by the co-development with statutory partners. It cannot be ensured due to the legislative requirements of each organisation, however members are responsible for providing the relevant organisations with information on the project. For Hawke's Bay Regional Council, the current project has been presented to the Environment and Integrated Catchment Committee on 04 November 2020, and will be presented to the Regional Planning Committee (Hawke's Bay Regional Planning Committee Act (2015)) at a future time.

P. PROJECT COMMUNICATIONS

This project will engage with a wide range of iwi, stakeholders and decision-makers through its collaborations with the Hawke's Bay Marine and Coastal Group, directly supported by HBRC. We will work with this network, using newsletters, webinars, websites and other venues for communications. Lay summaries of the project will be co-developed with HBMaC and with the Challenge Comms Team following similar design to the HBMaC Roadmap.

Q. RISK & MITIGATION

Primary risks are working with a stakeholder group built of diverse partners, potentially with conflicting objectives. However, the existence of the HBMaC group, its defined objectives and roadmaps, and strong sense of community, collaboration and partnership exhibited at the HBMaC workshops in the initial stage of this Challenge project suggest that this group has developed a strong sense of social capital which will contribute to shared objectives and pathways forward.

The project is highly dependent on support from HBRC through coordination of the interaction with HBMaC, co-funding of aligned data compilation projects, and interactions with HBRC land science and policy staff to ensure that outcomes fit in within existing legislative frameworks through which EBM can be enabled. HBRC has allocated \$200,000 toward habitat mapping that will be used in the models in this project, a key information gap identified in the systems mapping exercise in Stage 1 of this project.

Additional meetings were held in the early stages of this project with HBRC high level staff and with iwi partners to pre-identify potential risks to allow for their mitigation, and to clarify the non-statutory role of HBMaC. While the involvement of iwi, treaty organisations and regional and central government organisations provide a pathway toward using case study results to inform future management of Hawke's Bay, we have clarified the Challenge's case study project role as one that is providing scientific advice to a non-statutory advisory body (HBMaC). Representatives of HBMaC are not mandated decision makers, and represent various roles e.g. environmental managers, analysts, scientists, fishers. A number of the iwi representatives on HBMaC also serve on either the Hawke's Bay Regional Council Māori Standing Committee, or the Regional Planning Committee enacted under the Hawke's Bay Regional Planning Committee Act (2015).

A final risk, identified during the co-development of the Stage 2 proposal, was a significant concern by HBRC and HBMaC that the Challenge would not continue its collaborative work informing EBM in the Hawke's Bay beyond 30 June 2021 when this contract ends. Co-development partners were strongly supportive of the specific identification of this risk in this Stage 2 proposal, specifically the risk of the Challenge ending its contributions to the Hawke's Bay. Co-development partners see the existing stakeholder group, and the support and willingness of HBRC to use the lessons from the Challenge, as key enabling factors for enabling the implementation of EBM; thus the Hawke's Bay is ideally placed to serve a role for the Challenge as an exemplar of EBM in New Zealand.

R. **CONSENTS & APPROVAL**
required to undertake
research

- An initial human ethics application was processed from NIWA's Human Research Ethics Committee for Stage 1 of this proposal, and this proposal will be revised based on the scope of the project following co-development of Stage 2.

S. REFERENCES

- Bulmer RH, Stephenson F, Hewitt J, Lundquist C. (2020). Exploring the effects of multiple stressors on the recovery dynamics of a conceptual seafloor community. Submitted manuscript.
- Connolly, J.; Lundquist, C.; Madarasz-Smith, A.; Shanahan, B. and the Hawke's Bay Marine and Coastal Group. (2020). Development of a systems map of the Hawke's Bay marine region. Report prepared for Sustainable Seas National Science Challenge. Deliberate, Ltd., Hamilton. 85 p.
- Haggitt, T., Wade, O. (2016) Hawke's Bay Marine Information: Review and Research Strategy. Client report prepared for Hawke's Bay Regional Council. eCoast Marine Consulting and Research: 121.
- Lundquist, C.; Watson, S.; McCartain, L.; Stephenson, F. (2020). Key ecological areas of the Hawke's Bay Coastal Marine Area NIWA Client report No.2020042HN, prepared for Hawke's Bay Regional Council (project HBR20201). 91 p.