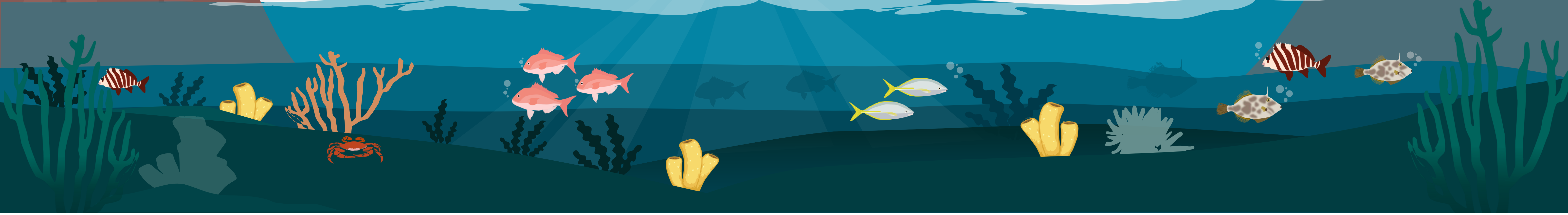# Enabling Ecosystem-Based Management in the Hawke's Bay

Project Leader: Carolyn Lundquist

National Institute of Water and Atmospheric Research, Hamilton, School of Environment, University of Auckland
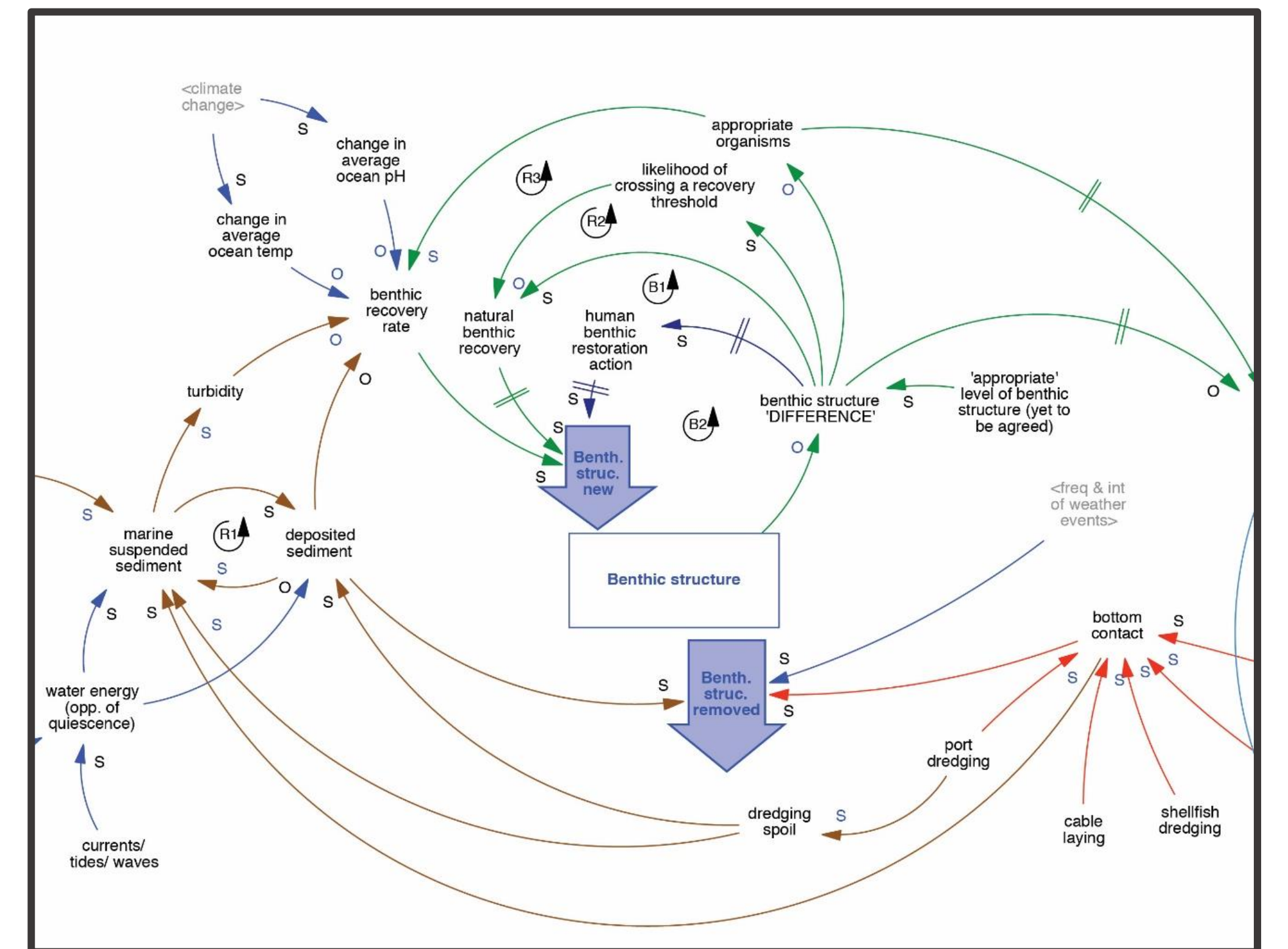
2019 — Initiation: Identify Stressors

The Hawke's Bay case study was selected as one of the Challenge's case study areas for research on implementing **ecosystem-based management**, using tools, processes and analyses developed within the Challenge research.

An initial meeting with the Hawke's Bay Marine and Coastal Group (HBMaC) identified potential impacts of two overlapping stressors (sedimentation from land and seabed disturbance through bottom contact fishing activities), as the focus of this case study.
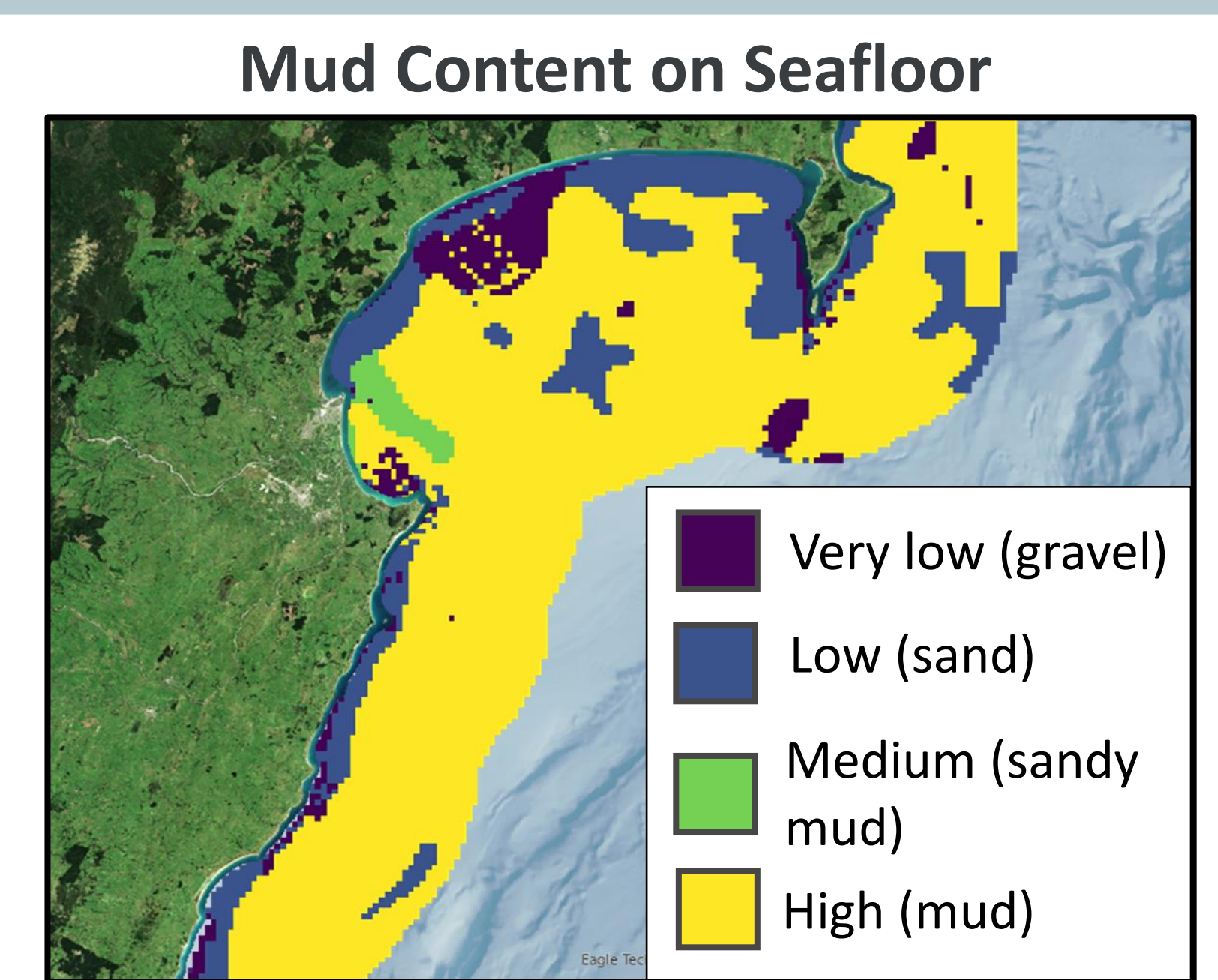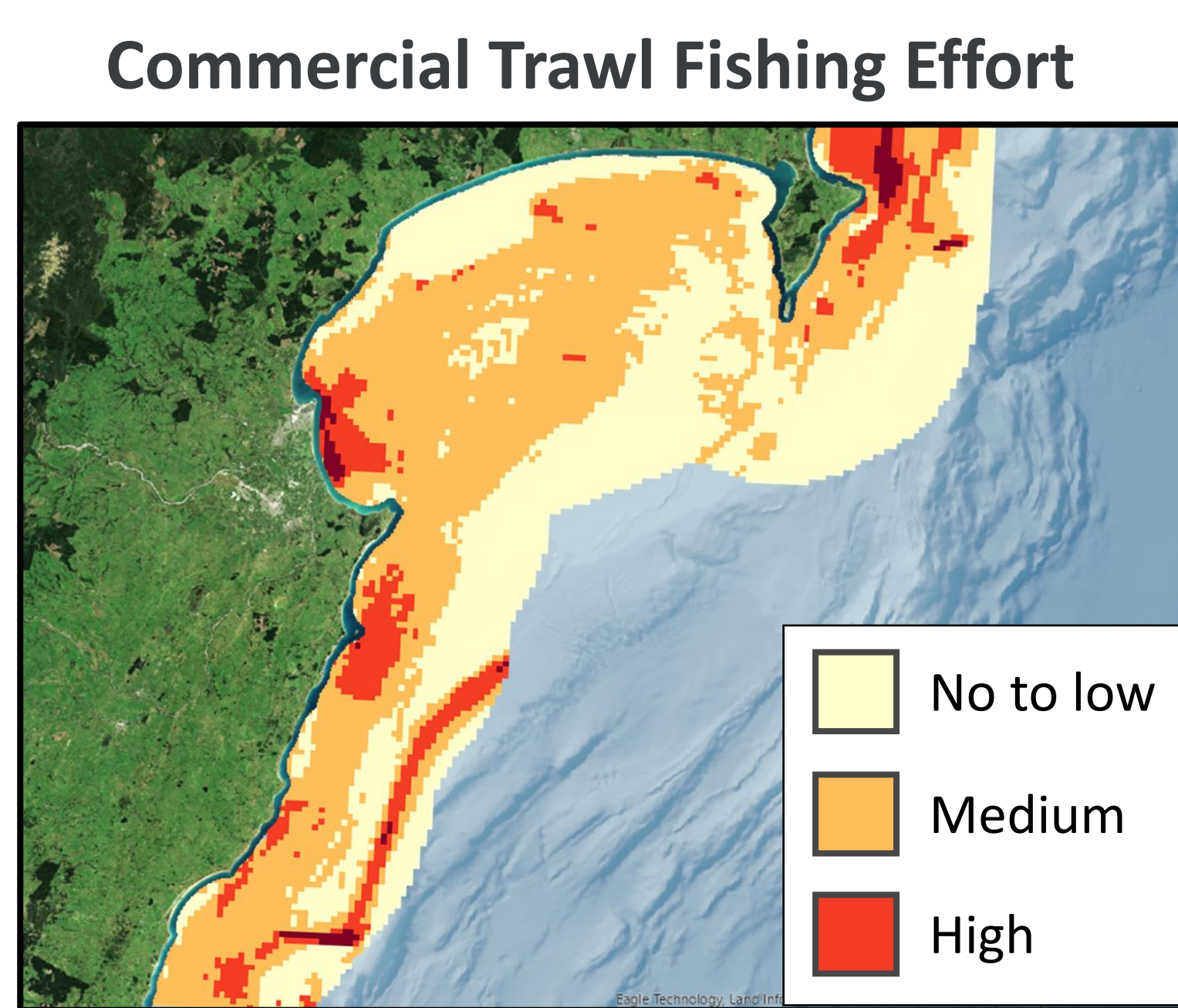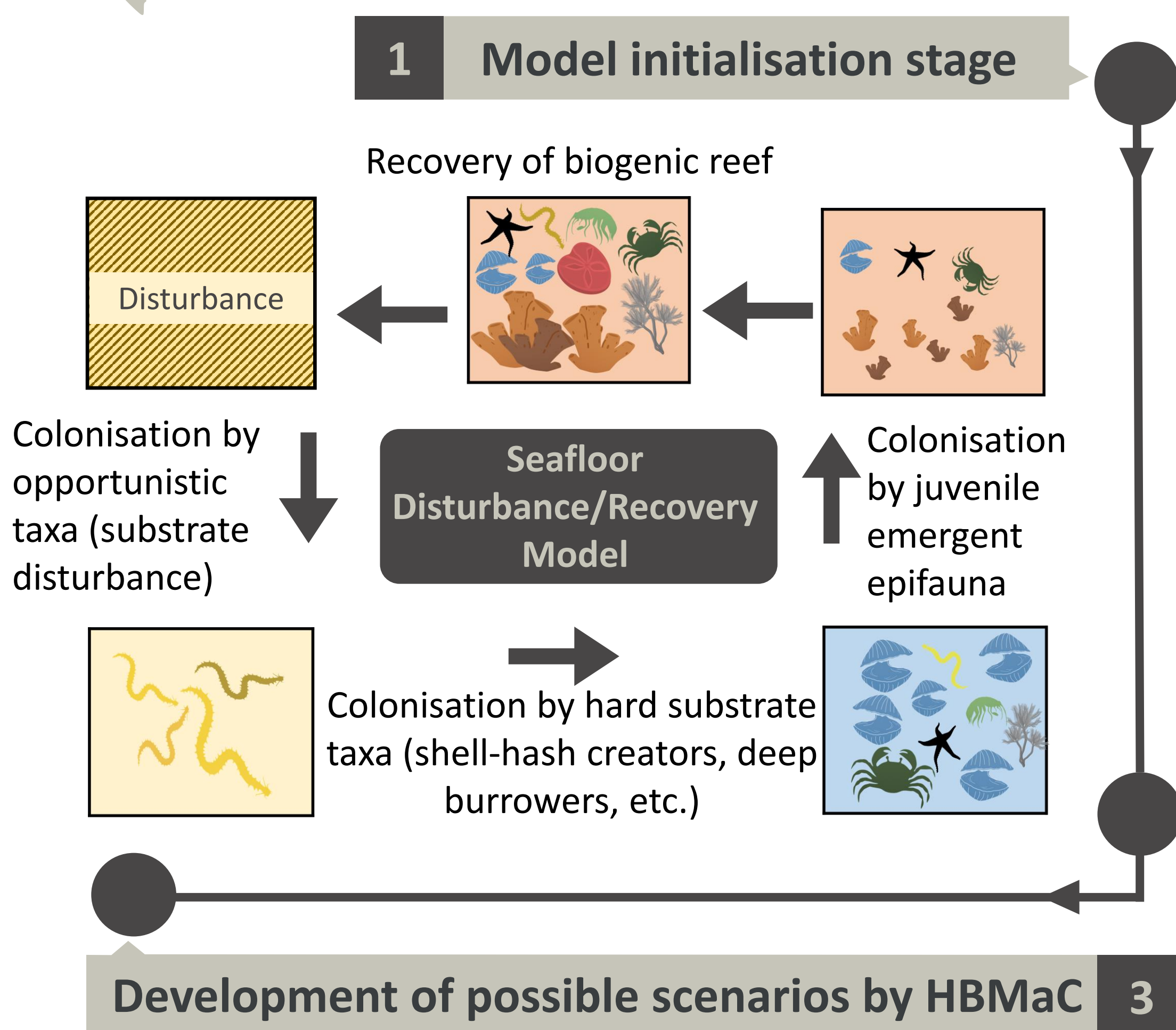
Hawke's Bay Marine and Coastal Group

- Ministry for Primary Industries
- Te Ohu Kaimoana
- Department of Conservation
- Ngāti Kahungunu Iwi Inc.
- Tangata whenua
- Fisheries Inshore New Zealand
- Napier Fisherman's Association
- eCoast
- Ngāti Pāhauwera Development Trust
- Pania Surfcasting Club
- Hawke's Bay Regional Council
- Ngāti Kere
- Te Taiwhenua o Tamatea
- Pan Pac Forest Products

Vision to achieve a healthy and functioning marine ecosystem in Hawke's Bay that supports an abundant and sustainable fishery

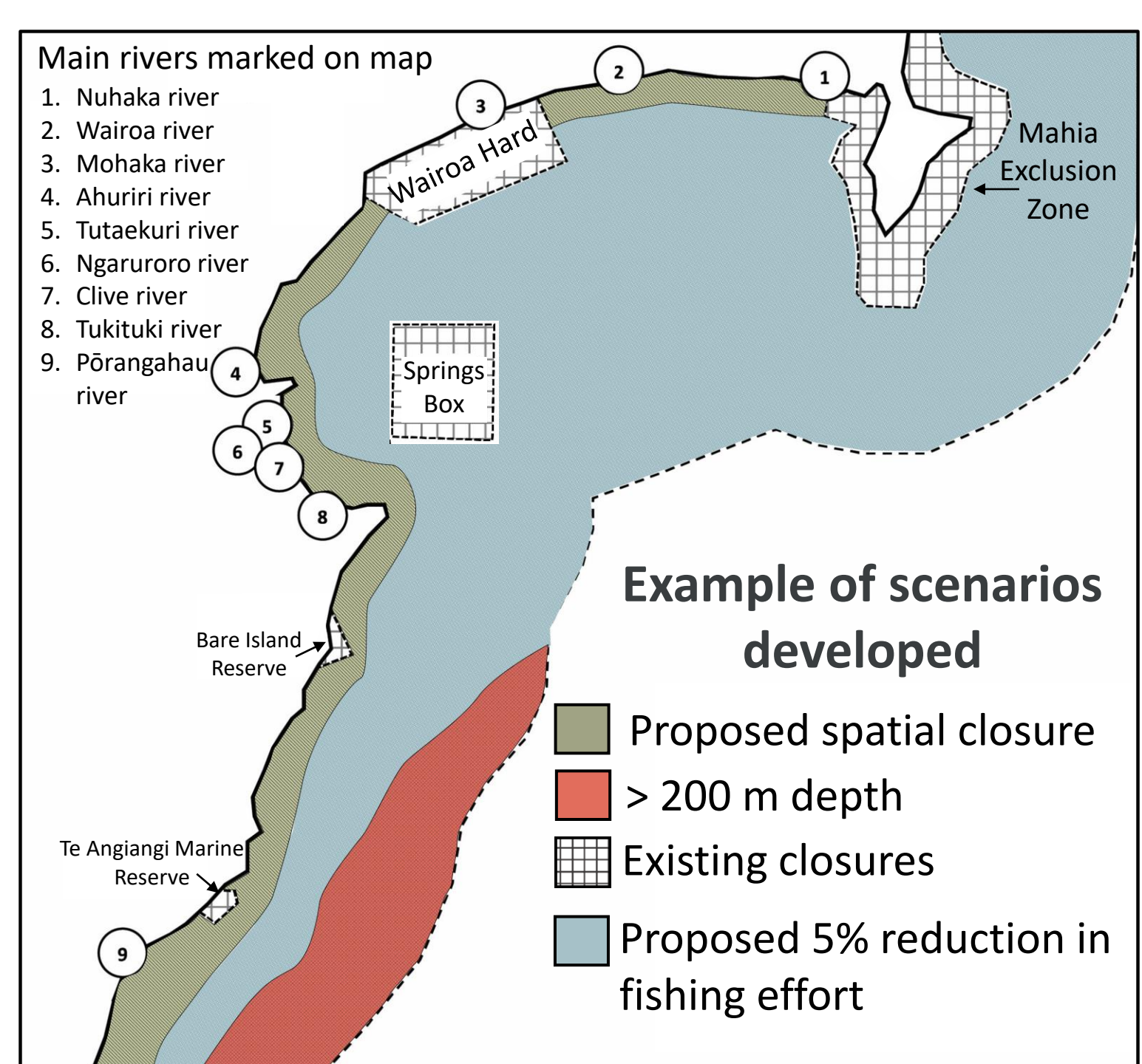### 2019-2020 — Stage 1: Development of Systems Map

Above: Section of the Systems map highlighting sediment from land, benthic structure and how these variables interact with social, economic and cultural elements in the systems map.
The Systems map for the Hawke's Bay marine region was developed through in-person and virtual workshops with HBMaC participants.

2020-2022 — Stage 2: Seafloor Model & Analogue Simulation

1 Model initialisation stage

- Recovery of biogenic reef
- Disturbance
- Colonisation by opportunistic taxa (substrate disturbance)
- **Seafloor Disturbance/Recovery Model**
- Colonisation by juvenile emergent epifauna
- Colonisation by hard substrate taxa (shell-hash creators, deep burrowers, etc.)

2 Add historical sediment & fishing stressor

3 Development of possible scenarios by HBMaC

Commercial Trawl Fishing Effort

- No to low
- Medium
- High

Mud Content on Seafloor

- Very low (gravel)
- Low (sand)
- Medium (sandy mud)
- High (mud)

Main rivers marked on map
1. Nuhaka river
2. Wairoa river
3. Mohaka river
4. Ahuriri river
5. Tutaekuri river
6. Ngaruroro river
7. Clive river
8. Tukituki river
9. Pōrangahau river

Example of scenarios developed
- Proposed spatial closure > 200 m depth
- Existing closures
- Proposed 5% reduction in fishing effort

Parameter	% change	Where this occurs?	Year change occurs
Fishing effort (FE)	5%	All over <200 m depth. No change in FE >200 m depth	2025
Spatial closures	2 NM	Current spatial closures plus extension of Mahia Peninsula coastal closure to Pōrangahau	
Sediment	10% (0.4%/y)	All 9 rivers in Hawke's Bay	2027-2052

In light of recent events with **Cyclone Gabrielle**, the models developed and the information gathered on Hawke's Bay marine ecosystems will be useful in informing the cyclone recovery response.

- In stage 2, current sediment input from rivers and trawling footprint maps for Hawke's Bay coastal marine region were applied to the seafloor model to establish the "current state" of benthic structure.
- Final scenarios developed by HBMaC participants were modelled to explore how different interventions affected ecosystem health over time.
- An analogue simulation exercise was then carried out with HBMaC participants to discuss the results of the modelled scenarios and to explore how 'recovery' of the seafloor ecosystem would 'flow through' to the socio-ecological variables in the systems map.

Project summaries, reports & presentations available here

NIWA — Taihoro Nukurangi
HAWKE'S BAY REGIONAL COUNCIL — TE KAUNIHERA Ā-ROHE O TE MATAU-A-MĀUI
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