National SCIENCE Challenges
SUSTAINABLE SEAS
Ko ngā moana whakauka

How likely is it that the action we want will benefit others?

For individuals, communities, and businesses

Taking or supporting an action is unlikely to benefit everyone. There are ways to understand the immediate and indirect effects of actions on a range of users and aspirations. Once these are mapped out, the likelihood of benefits and losses for different people and the health of the ecosystem can be discussed, leading to more transparent decisions.

To work out how likely an action that you want will benefit others or to understand who loses and why, use the following questions and resources.

1. Create a conceptual map (*see examples below*) of what you think is happening in the area's ecosystem and why your action will achieve the aim that you think it will.

Here are a few ways you can do this. It can be as simple as drawing components and connectors, or could involve:

- using a workshop and a facilitator to create a systems map (see examples in Systems map of marine stressors in Hawke's Bay, Conceptual system maps of 'blue economy' activities)
- drafting a Bayes Net to explain how likely connectors are to affect outcomes using probabilities (for an introduction see P20-21 in User guide: Tools for ecosystem-based management, for examples see P7, EBM3 case study and P47-48 in Understanding and communicating risk and uncertainty)
- creating an agent-based model — this is a computational modelling approach that simulates interactions between autonomous entities and their impacts on the system (see example Co-developing an agent-based model to support ecosystem-based management decision-making).

Bayes net, or Bayesian network (decision) modelling
Bayes net modelling is a modelling method that can be used to create transdisciplinary and participatory synthesis tools for making marine management decisions. The method is effective at allowing stakeholders and managers to interact, engage, and explore the effectiveness of alternative marine management strategies. The usefulness of the method for marine management is highest when a variety of people such as stakeholders, experts (eg ecology, biology, policy, etc), managers, and decision-makers are involved in its development.

Bayes net modelling can represent how a marine ecosystem is likely to respond to various management interventions. This type of modelling is designed to be co-developed with stakeholders and managers at a practical decision-making level and is beneficial to use it at local or regional scales.

2. Extend this map by bringing in other perspectives

- Who (what world views and positions) are not represented in your group?

🔗 Quick guide 2: Worldviews influence people's perceptions of risk and uncertainty

- How do you bring them together to find out what they would want?

🔗 Ingredients to catalyse participation in marine decision-making

- Stretch out the spatial area that you are considering to see if this brings in more potential benefits. For example, enhancing mussel densities in a harbour may lead to increased recruitment outside the harbour.

For decision makers, planners, policy makers, and consenters

Decisions to take or support an action are unlikely to benefit everyone. Ways are available to understand the effects (both immediate and indirect) of actions on a range of users and aspirations. Once these are mapped out, the likelihood of benefits and losses for different people and the health of the ecosystem can be discussed, leading to more transparent decisions.

To work out how likely an action that's been decided on will benefit others or to understand who loses and why, use the following questions and resources.

Who was not in the room, what viewpoints, knowledge and aspirations were not considered?

🔗 Quick guide 2: Worldviews influence people's perceptions of risk and uncertainty

🔗 Tool 3 in Quick guide 4: Tools to help navigate perceptions of risk and uncertainty

Participatory process tool — setting up engagement, getting people in the room, talking and understanding world views and talking of their aspirations.

🔗 Ingredients to catalyse participation in marine decision-making

Create conceptual map of desired outcomes and integrate it with your actions and outcomes. You can do this in a few ways, see the summary above in step 1.

Finally, use a model to run other action scenarios, for example a Bayes net or agent-based model.

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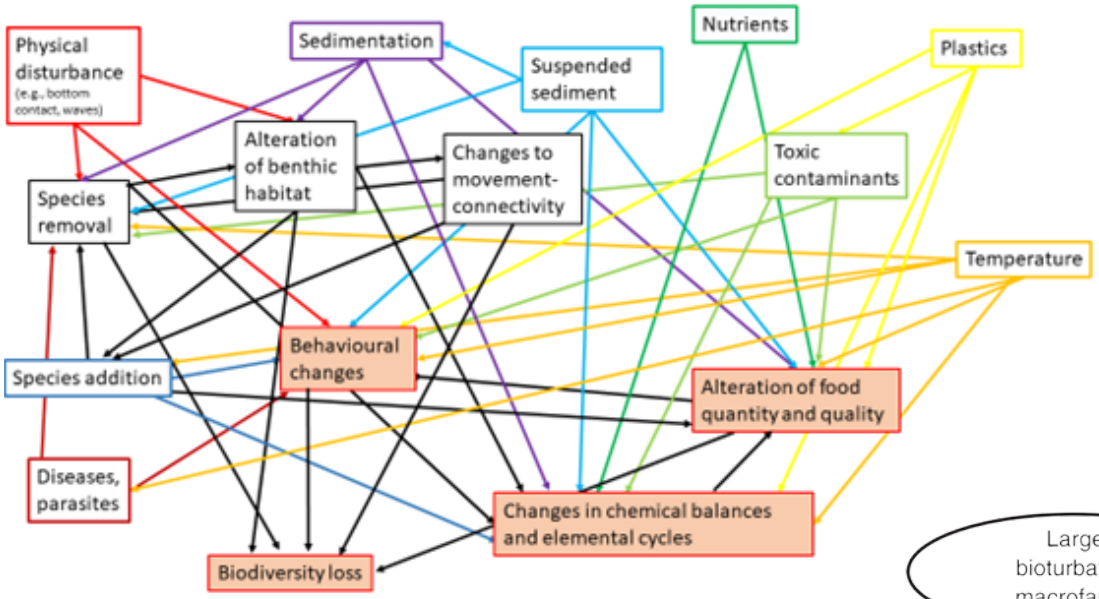
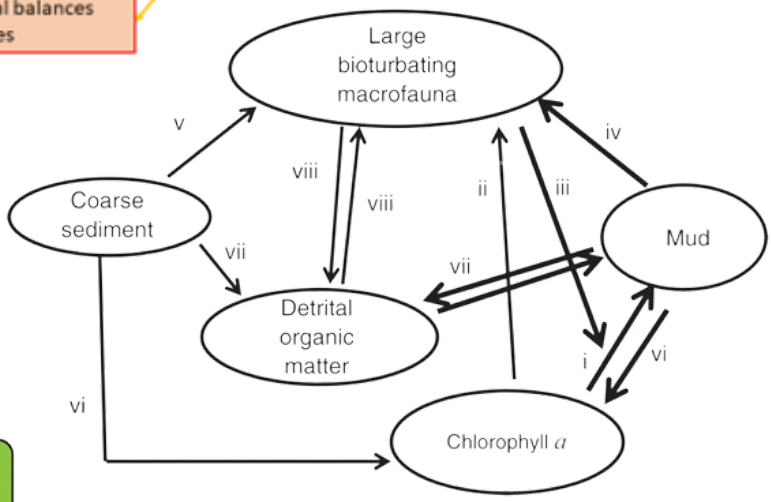
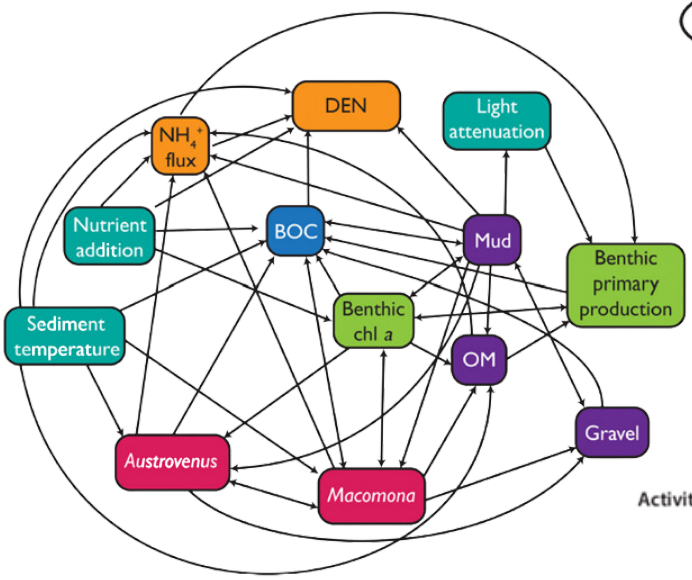
Examples of conceptual maps



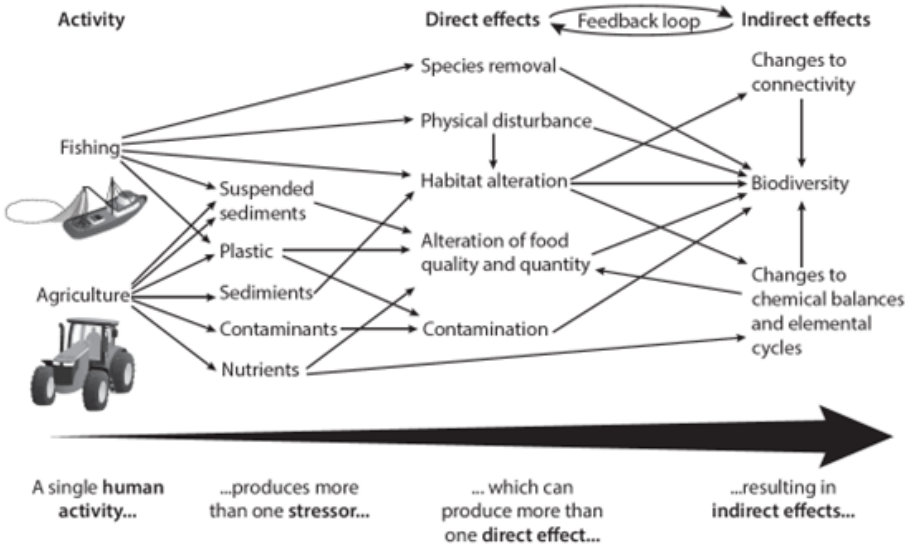
Left: Hewitt, J.E. (2024)

Below: Thrush, S.F., Hewitt, J.E., Lohrer, A.M. (2012) Interaction networks in coastal soft sediments highlight the potential for change in ecological resilience. Ecological Applications 22, 1213–1223.





Above: Thrush, S.F., Hewitt, J.E., Gladstone-Gallagher, R.V., Savage, C., Lundquist, C., O'Meara, T., Viellard, A., Hillman, J.R., Mangan, S., Douglas, E.J., Clark, D.E., Lohrer, A.M., Pilditch, C. (2021) Cumulative stressors reduce the self-regulating capacity of coastal ecosystems. Ecological Applications 31, e02223.



Right: Thrush, S.F., Hewitt, J.E., Pilditch, C.A., Norkko, A. (2021) Ecology of Coastal Marine Sediments: Form, Function, and Change in the Anthropocene. Oxford University Press.