



National SCIENCE Challenges | SUSTAINABLE SEAS | Ko ngā moana whakauka

Sustainable Seas
Ko ngā moana whakauka
National Science Challenge

CAWTHRON INSTITUTE | GNS SCIENCE TE PŪ AO | NIWA Taihoro Nukurangi | THE UNIVERSITY OF AUCKLAND NEW ZEALAND | UC UNIVERSITY OF CANTERBURY Te Whare Wānanga o Waitaha CHRISTCHURCH NEW ZEALAND | THE UNIVERSITY OF WAIKATO Te Whare Wānanga o Waikato | UNIVERSITY of OTAGO Te Whare Wānanga o Otāgo NEW ZEALAND | VICTORIA

Aims of Workshop

- Present Draft Research Plan to Māori and stakeholders
- Gather input from Māori and stakeholders regarding the draft Research Plan
- Improve our understanding of research programmes and activities that are being undertaken by Māori and stakeholders that could contribute to the Challenge.
- Explore the best options for ongoing interactions between the Challenge and Māori, and stakeholders

Challenge Objective

Enhance utilisation of our marine resources within environmental and biological constraints.

How do we achieve this?

The Challenge objective will be met by developing strategy and tools for the integrated management of the sea and its resources that recognizes the full array of interactions, including human, within the marine ecosystem and promotes conservation and sustainable use in an equitable way.

Ecosystem Based Management

Sustainable Seas will

- Be participatory, with different levels and forms of involvement resulting in co-production and co-learning throughout.
- Develop frameworks to identify and integrate the values, aspirations and bottom lines of all sectors of society.
- Develop tools for balancing good environmental stewardship, the enhancement of existing uses and the development of new profitable marine resource uses, while meeting the aspirations and rights of society including Māori.
- Develop tools for assessing risks and uncertainty in a changing world.
- Develop a tool box of Ecosystem Based Management approaches for managing activities in our marine estate as one approach will not fit all situations.
- Undertake innovative science that is focused on the objective.
- Be open to creativity and innovation to ensure success.

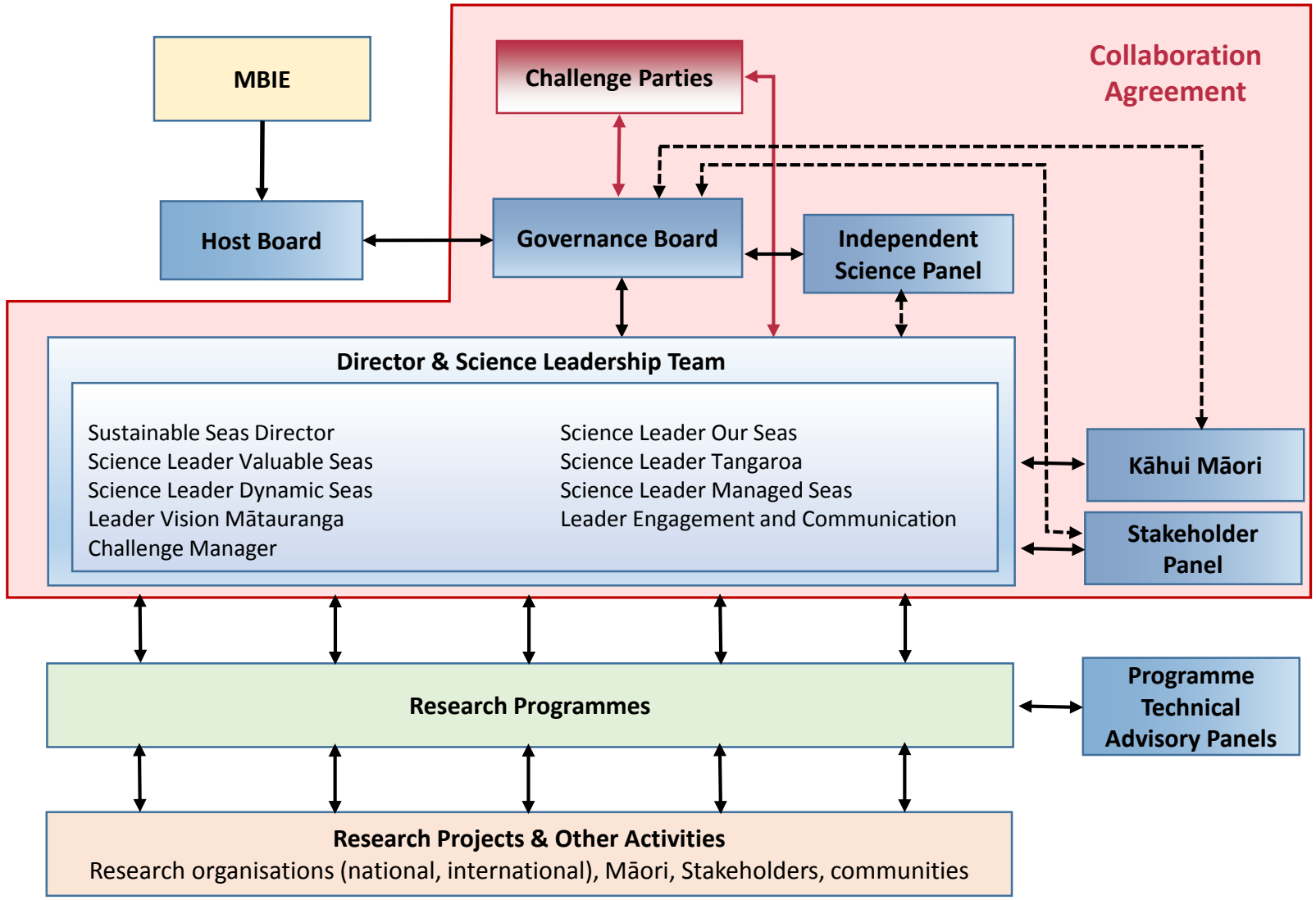
Since the last workshop

- Science Leadership Team
  - Science Programme Leader Our Seas – Carolyn Lundquist
  - Science Programme Leader Valuable Seas – Judi Hewitt
  - Science Programme Leader Tangaroa– Linda Faulkner
  - Science Programme Leader Dynamic Seas – David Schiel
  - Science Programme Leader Managed Seas – Alistair Dunn
  - Leader Vision Mātauranga – James Whetu
  - Leader Engagement and Communication – TBC
  - Challenge Manager – Kate Bromfield

Since the last workshop

- Independent Science Panel
- Kāhui Māori
- Stakeholder Panel

Sustainable Seas Governance



Stakeholder panel

- Aquaculture
- Central Government
  - DOC, EPA, MFE, MPI
- Communities
- Fishing Industry
- Marine Mining
- NGO’s
- Oil and Gas
- Regional Government
- Tourism

Todays Workshop

Presentation Vision Mātauranga

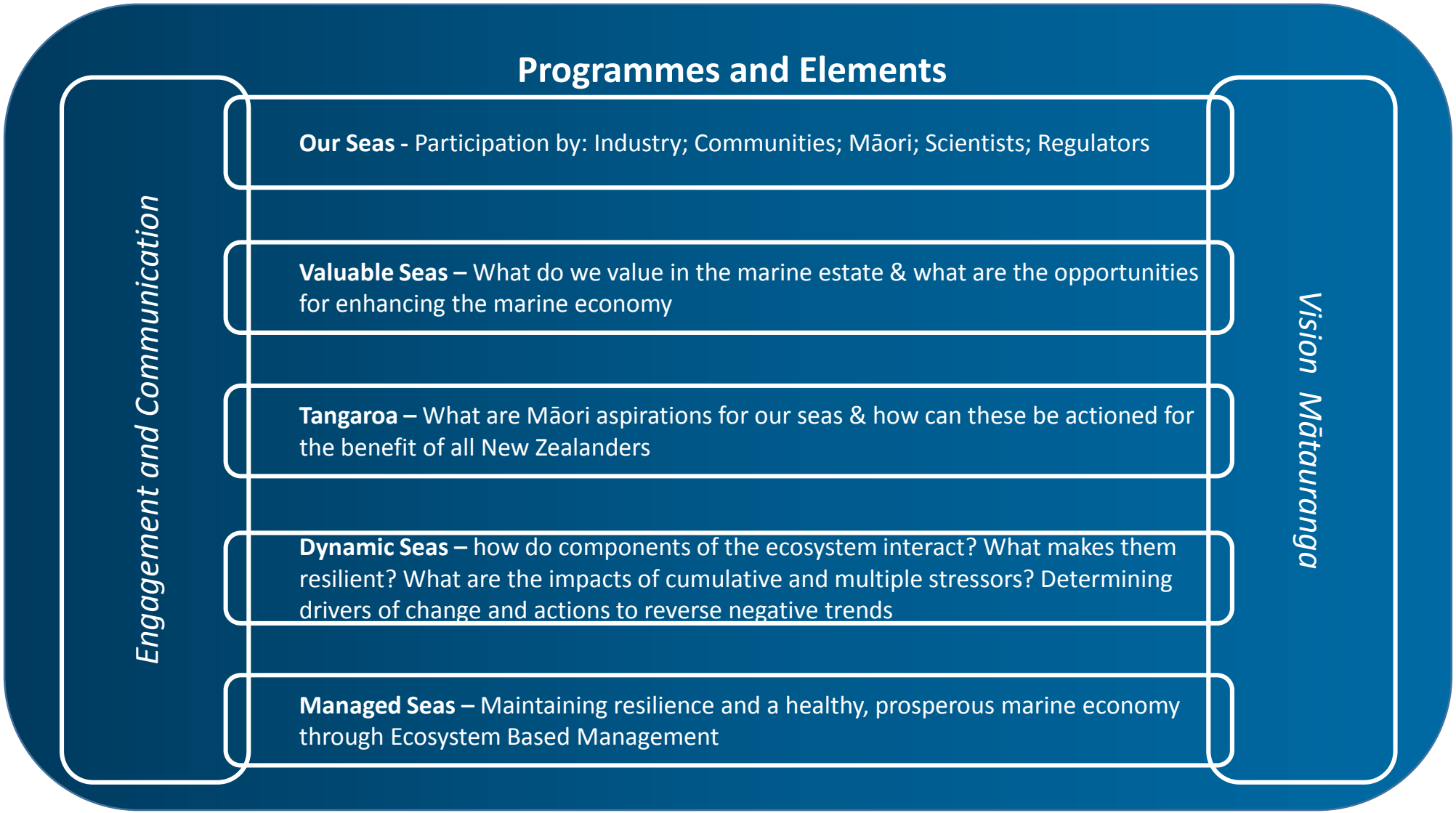
Presentation each Programme

Break out sessions

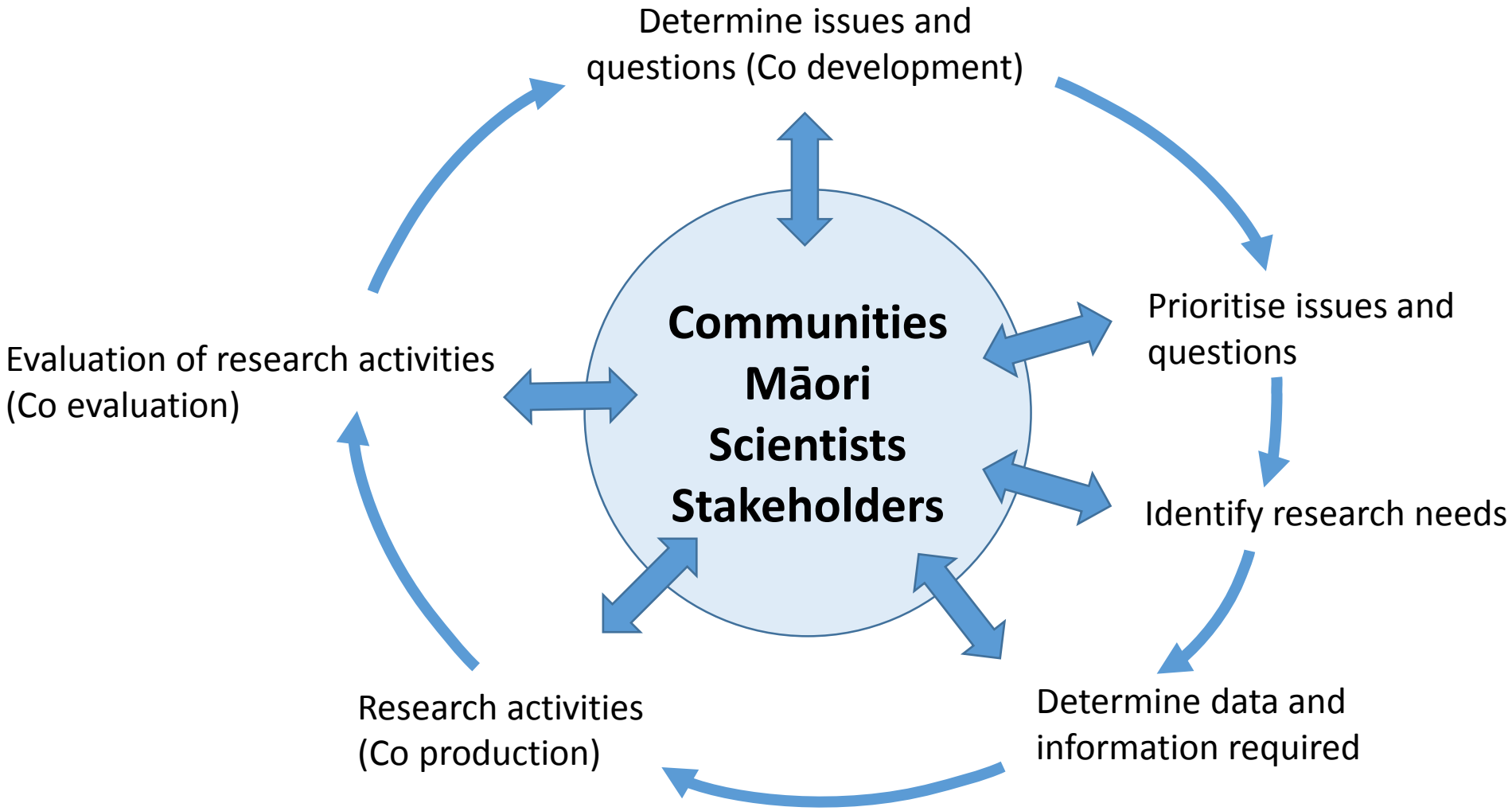
Report back session (have we got all the messages?)

Comment regarding wider Challenge issues

Sustainable Seas structure



Research Plan



Vision Mātauranga – Shaun Ogilvie

What is Vision Mātauranga?

"unlock the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create a better future"

- Seek practical responses
- Increase understanding of Māori knowledge in New Zealand's marine estate
- Acknowledge the distinctive experiences of whānau, hapū, iwi and Māori entities
- Identify contributions to national economic growth
- Ensure engagement and activities are implemented in a holistic and coherent manner

Vision Mātauranga is not…….

- Programme Three - Tangaroa
- Only about mātauranga Māori or traditional knowledge itself
- Kaitiakitanga
- Just consultation or engagement

Vision Mātauranga in Sustainable Seas to date

- New to the kaupapa
- The first phase - to immediately invest into foundational projects within the four Vision Mātauranga theme areas:
  - Indigenous Innovation,
  - Taiao/Environment,
  - Mātauranga,
  - Hauora/Oranga
- These projects/outputs are to inform the rest of the challenge

Vision Mātauranga workstream

Will seek to:

- Uphold Maori perspectives
- Resist the misuse of mātauranga Māori
- View mātauranga Māori as its own theory. It doesn't have to match or link or be the same as anything else
- Work with Kāhui Māori and work to frame collective agreement
- Work with the engagement and consultation leader once appointed

Vision Mātauranga within the programmes

The Vision Mātauranga workstream will:

- Aim to influence all five programmes equally
- Ensure that research agendas incorporate Vision Mātauranga as they propose to (make the Challenge Leaders and their teams accountable and/or well supported/guided)
- Trust that the work to date has firm rationale and been informed by Vision Mātauranga

Vision Mātauranga Lead Role

- *Whanaungatanga – Build trusting relationships (internal and external)*
- *Kotahitanga – Promote and encourage working together*
- *Manaakitanga – Give extra and be patient*

- Contribute, encourage, enquire and challenge each programme lead and team as to how they are/will incorporate Vision Mātauranga within their Challenge, now and into the future.
- Develop and promote key messages and a unified voice across the programme for the benefit of all those involved, both within the programme and with those whom we engage with.
- As it relates to Vision Mātauranga, identify synergies early in the programmes and avoid duplication across the Challenge.

Programme 1: Our Seas – Kate Davies

Our Seas

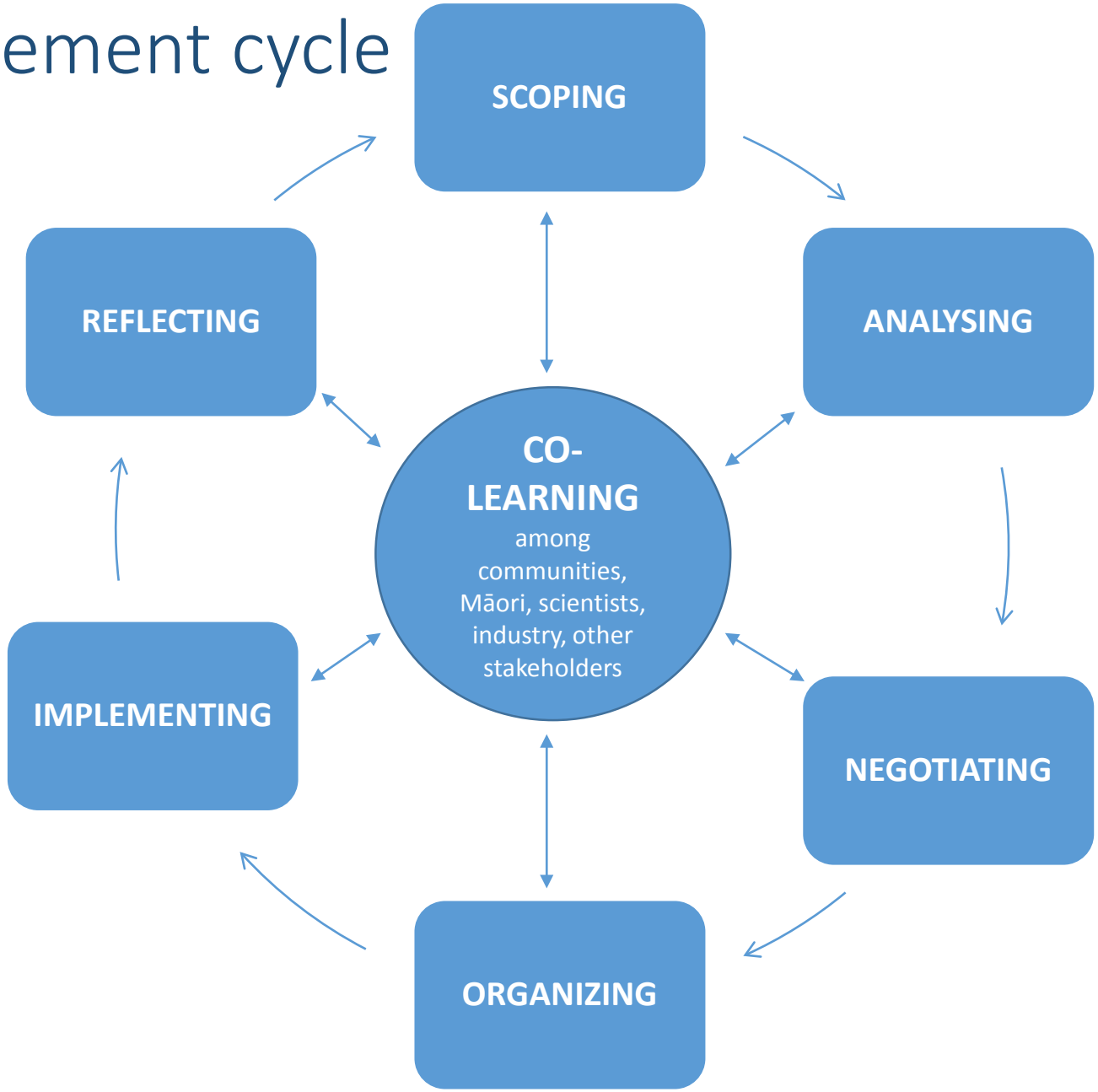
Transformational projects involving Science and Society; socio-ecological engagement in EBM

Science mandate
Solution focus
Problem ownership

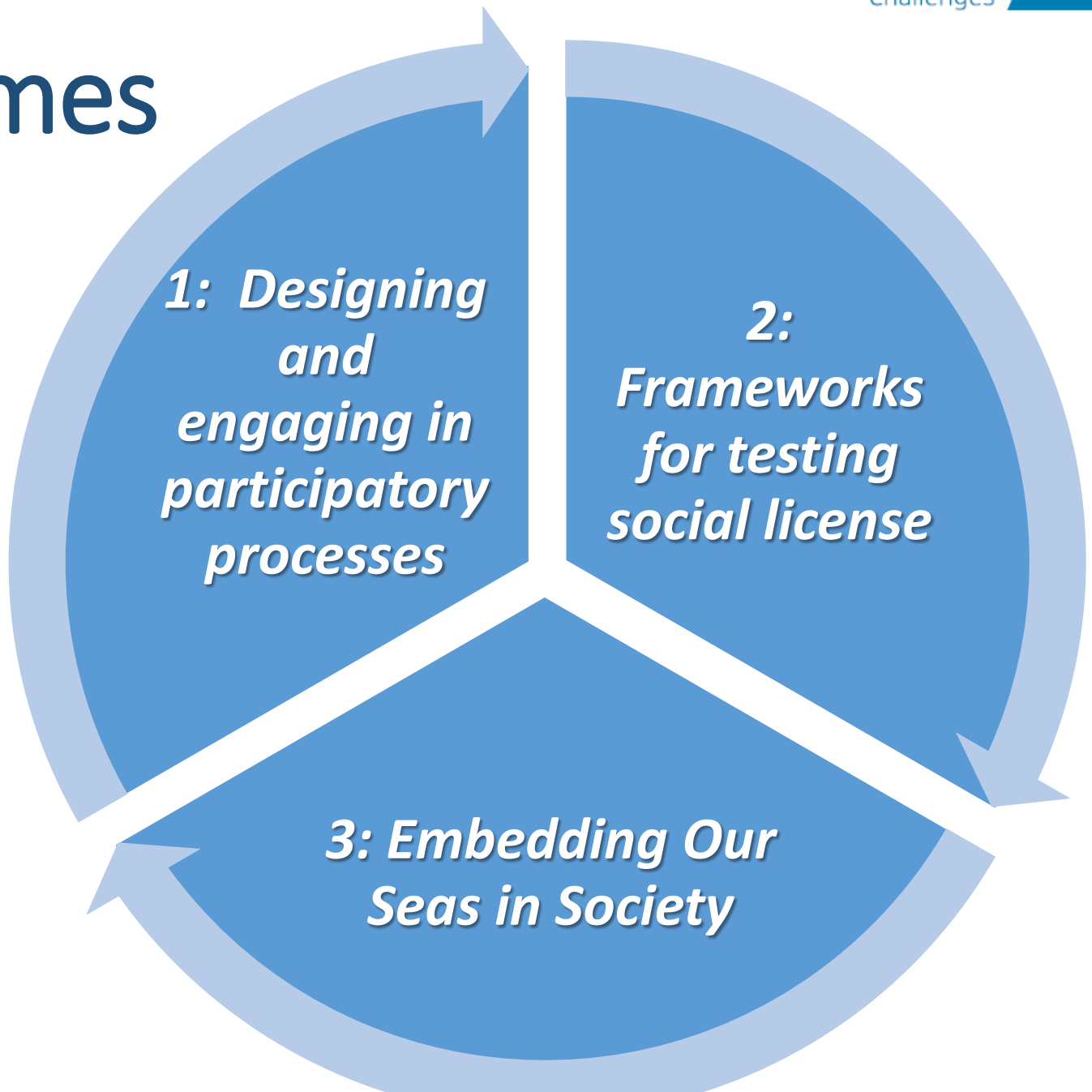
How do we…

- incorporate different values and world views?
- make science do work in society?
- develop effective participatory processes?
- define the future(s) we want?
- develop and adapt governance structures?
- build trust in science and other forms of new knowledge?

Our Seas co-learning & adaptive management cycle



Our Seas: Themes

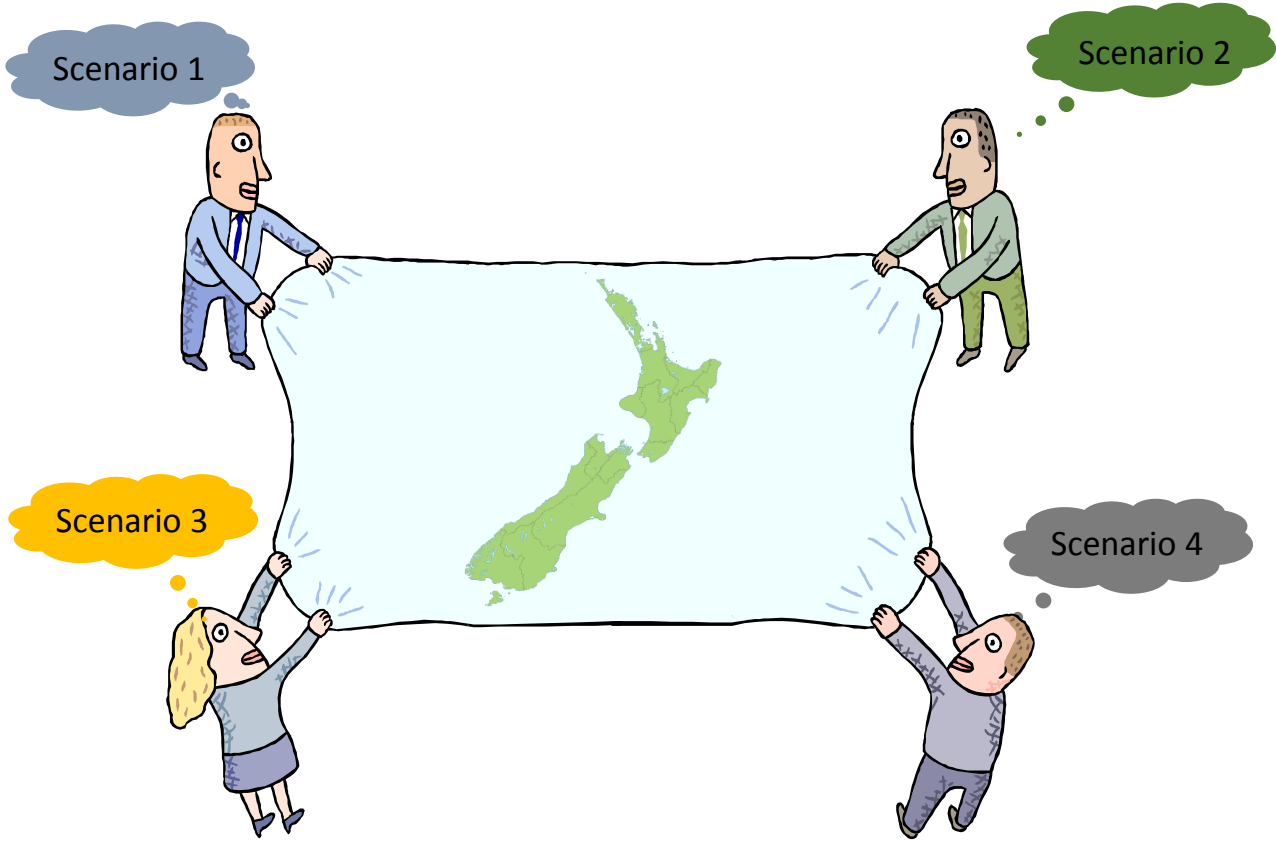


Our Seas: Research Theme 1

Designing and engaging in participatory processes

Potential projects include:

- Case studies of current and past NZ stakeholder-driven decision-making
- Best practice from international participatory processes
- Scenario workshops on cumulative impacts across multiple sectors; understanding risk and uncertainty in decision-making



Our Seas: Research Theme 2

Frameworks for testing social license

Potential projects include:

- Case studies of EEZ and RMA consents
- Develop open access database for sharing of case studies and other relevant socio-ecological research
- Develop strategies for building trust in scientific evidence
- Develop social, ecological and cultural indicators that help build SLO

Our Seas: Research Theme 3

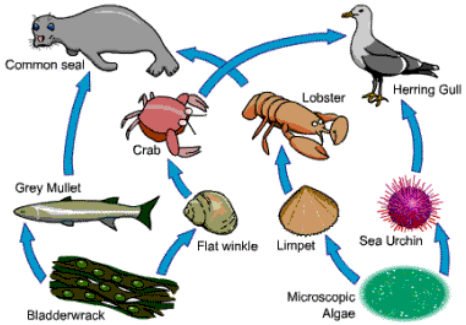
Embedding Our Seas in Society

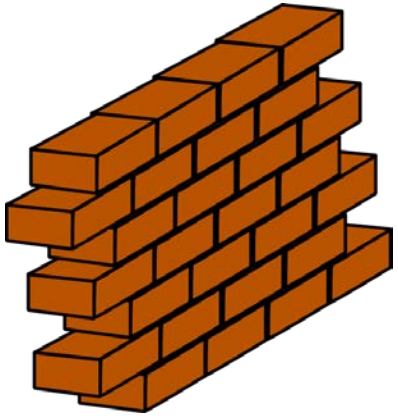
Potential projects include:

- Document and map science communication practices and judge against international best practice
- Establish kaupapa and model best practice in science-iwi relations for marine environments
- Monitor and document science communication in relation to Sustainable Seas
- Develop and test models for evaluating social impact of Sustainable Seas science

How do we break down the barriers?

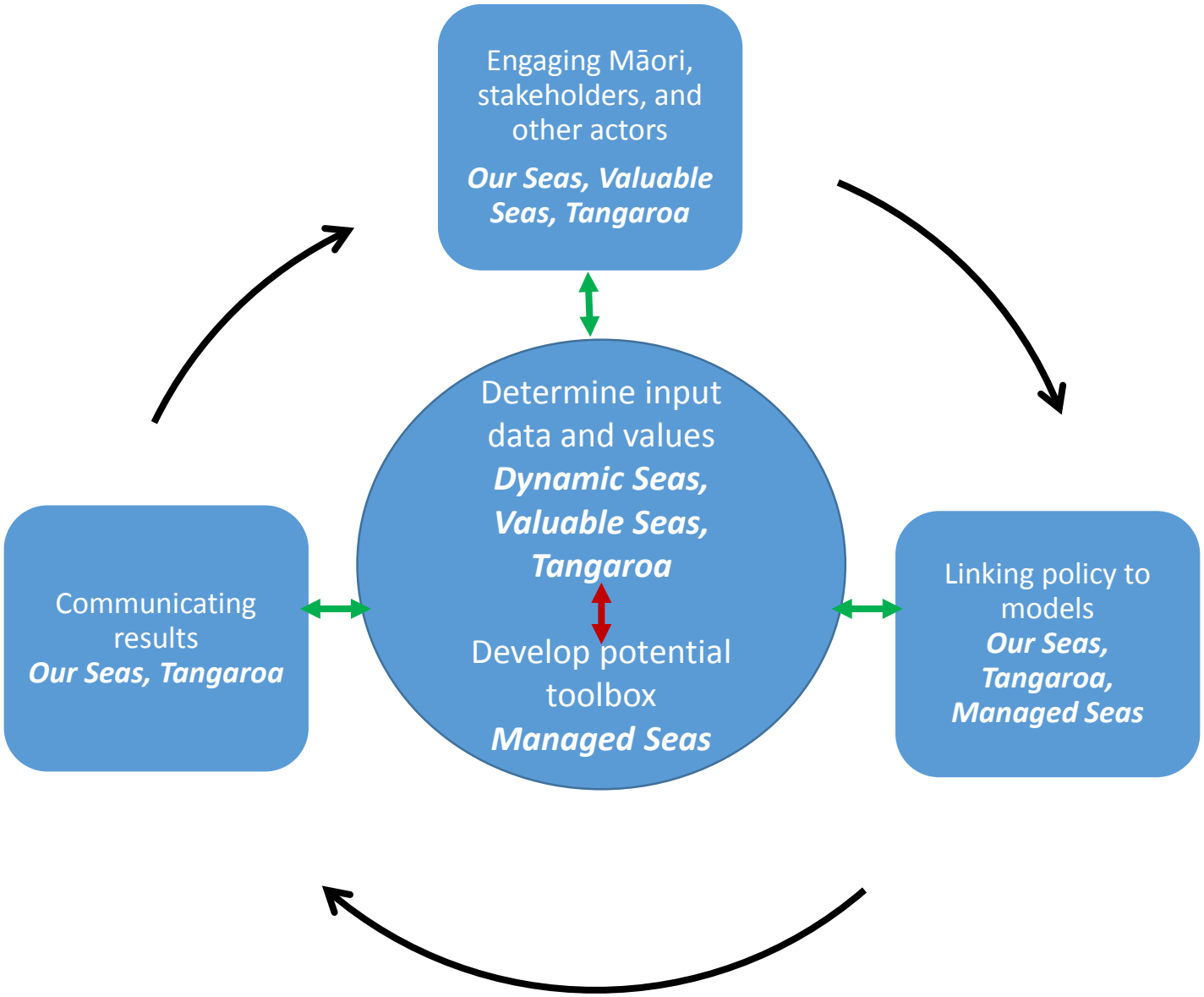
Science Concepts & Information





Stakeholders

Our Seas within Sustainable Seas



Programme 2: Valuable Seas – Judi Hewitt

Valuable Seas

Valuing marine systems

Adding monetary value

Values- aspirations that humans hold for ecosystems

- economic (those derived from direct production or extraction of goods)
- cultural/spiritual/social

Environmental values- ecosystem naturalness and integrity, existence values

Categories overlap

Research areas/projects- Valuing marine systems

1. Documenting information on how NZers value marine systems
   - Assess human needs, values (cultural/spiritual/social) and preferences
     - Utilise past and present studies
     - Fill gaps especially within case study area
     - Cross project with Tangaroa

2. Quantify and assess risks to values
   - Utilise ecosystem services (ES) approach
     - Link specific ES to individual values
     - Develop data collection methods for selected ES
     - Risk assessment initially theoretical

Research areas/projects - Putting values into decision making

3. Supporting relative comparisons of values
   - Conversion of all values to monetary values?
   - Multi-criteria (monetary and non-monetary) assessments

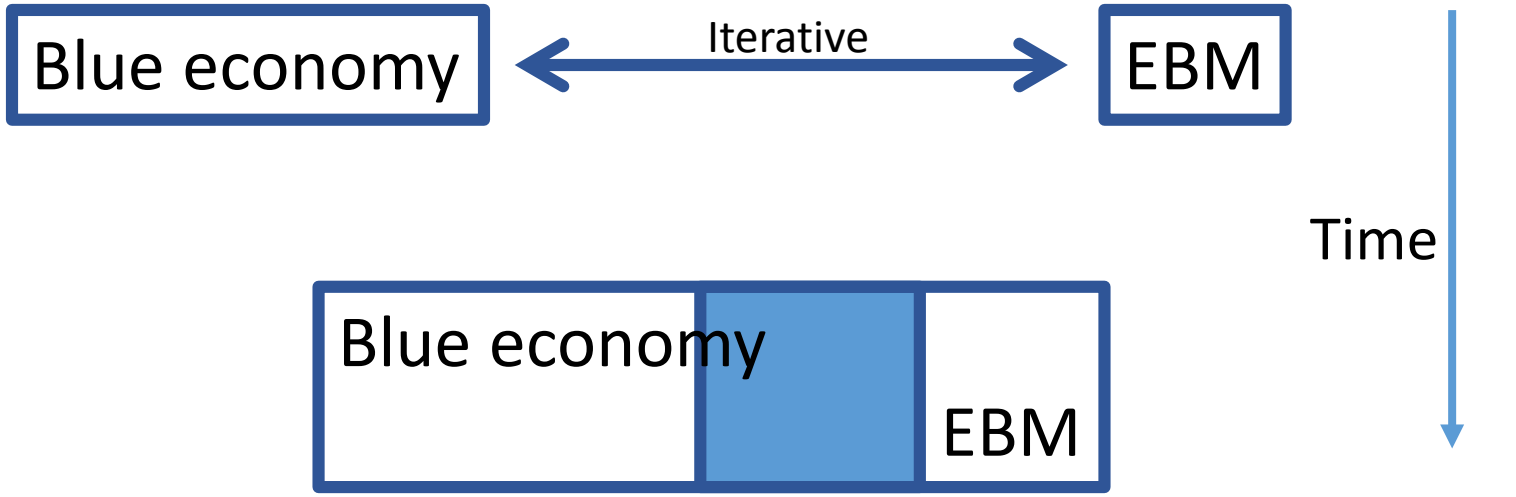
4. Marginal valuation
   - Hidden costs and how do they change with interventions

5. Development of valuation frameworks and principles

Not in this time period of the Challenge

Research areas/projects- adding value

6. Making and stewarding a prosperous blue economy
   - develop understandings of blue economy
     - link to Māori marine economy project
   - build capability to produce initiatives
   - develop methodologies to assess trade-offs for use in Managed Seas tools



Research areas/projects- adding value

7. Reporting framework for stocktaking of marine resources
   - Why is assessment of present natural capital hard to find?
     - Assessment produced for case study area
     - Future methods and frameworks

8. Methods to increase diversification in marine economies
   - Identifying barriers
     - Understanding reasons behind recent decisions
     - Understanding how to gain social license to operate
   - Call for new projects that will add value

Programme 3: Tangaroa – Linda Faulkner

Tangaroa

Themes:

- Exploring kaitiakitanga, science and mātauranga Māori
- Enabling kaitiakitanga and economic development
- Informed & integrated management

Applying the partnership:

- Co-design / co-development from conception to delivery – ‘iwi inspired’ approach
- Tikanga Māori founded

Outcome & challenges

- A **culturally and economically thriving** marine environment underpinned by **kaitiakitanga and EBM**

- Understanding the relationship between kaitiakitanga and EBM
- Using this relationship to develop innovative mechanisms to add value to decision making and management

Kaitiakitanga, Science & Mātauranga Māori

- **Kaitiakitanga within a marine context**
  - Understanding a whakapapa (intergenerational) basis
  - Recognising and enabling interfaces and interdependencies
- **Revitalising indicators to anticipate changing conditions**
  - Examining Māori examples of EBM tools
  - Incorporating mātauranga based indicators into EBM tools & frameworks
- **Providing for sustainable use and restoration of marine ecosystems**
  - Exploring indigenous based sustainable use & restoration successes
  - Offering practical support to kaitiaki intiatives (mutual benefits)
- **Marine environmental resources and strategies for Māori society**
  - Collating, consolidating, rationalising & developing resources and tools for effective partnership & participation

Kaitiakitanga & Economic Development

- **Defining the Māori Marine Economy**
  - Identifying and understanding what makes the Māori marine economy distinct (i.e. beyond financial value) to fully understand ‘value’ in Māori terms

- **Tools in the Māori Marine Economy**
  - Identifying and developing tools to better support decision-making and management in the marine environment

The ‘lore’ – ‘law’ dynamic

- **The relationship between Māori Lore and Law**
  - Assessing the relationship and interface between Māori Lore and Law
  - Developing frameworks that provide for the integrated management of marine resources and interests (customary, non-commercial and commercial)
  - Developing innovative pathways and practice for EBM implementation

Programme 4: Dynamic Seas – David Schiel

Dynamic Seas

Dynamic Seas focus - *the science to*:

- understand critical ecosystem functions and processes;
- determine effects on ecosystems interacting with and affected by human activities;
- underpin Vision Mātauranga and the values, aspirations and management tools in Sustainable Seas;
- take account of key interdependencies among components of the ecosystem and a changing climate.

Dynamic Seas: Goals

- New Zealand has a **solid base of science** for increasingly effective, collective, sustainable management by **understanding the ecological consequences of marine resource use**.
- Creating an '**environment for winning**' (rather than 'picking winners') in the Blue Economy.
- Understanding of **ecosystem connectivity and resilience** linking activities to **ecological footprints and consequences** across their spatial and temporal scales
- Enabling and **empowering** new forms of societal **behaviours** and **management** of a sustainable marine economy.

Dynamic Seas: Themes

- ***Ecosystem Function and Dynamics****:* critical habitats and the processes that support them.
- ***Connectivity***: relationships between sources, impacts and habitats; scale and critical connections of organisms across habitats; the physical basis for connectivity and transport of materials relevant to EBM.
- ***Stressors and Impacts***: tipping points from multiple stressors; cumulative change; resilience.
- ***Mitigation and Restoration***: restoration research → inclusion of communities, Māori, society, industries and management agencies in the selection of restoration aims, objectives and locations

Dynamic Seas: Research

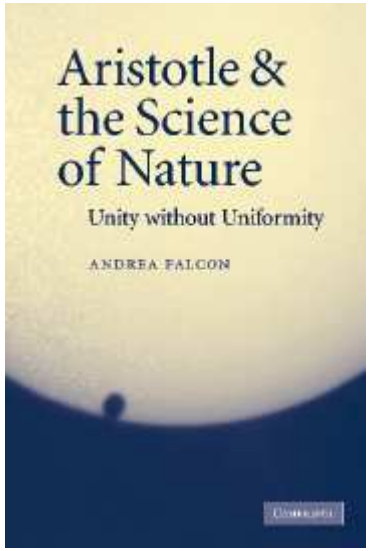
Dynamic Seas Projects	Linkages	
	Dynamic Seas Themes	Sustainable Seas Programmes
4.1 How far can the science take us? Biophysical science necessary to resolve risks and uncertainties in decision-making.	1, 2, 3	1, 2, 3, 5
4.2 Tipping points in structure, function & services. Gradient and threshold responses to stressors	2, 3, 4	2, 3, 5
4.3 Ecosystem connectivity . Functional connectivity among components of the ecosystem.	1, 3, 4	2, 5
4.4 Stressor connectivity . The spatial and temporal context and impacts of stressors across ecosystems, and functional resilience.	1, 2, 4	1, 2, 3, 5
4.5 Restoration, mitigation and offsets . Reversing degraded ecosystems to functional and resilient states; dealing with functional trade-offs	1, 2, 3	1, 2, 3, 5
Dynamic Seas Themes: 1. Ecosystem Function & Dynamics, 2. Connectivity, 3. Stressors & Impacts, 4. Mitigation and Restoration		
Sustainable Seas Programmes: 1. Our Seas, 2. Valuable Seas, 3. Tangaroa, 4. Dynamic Seas, 5. Managed Seas		

Dynamic Seas: Research

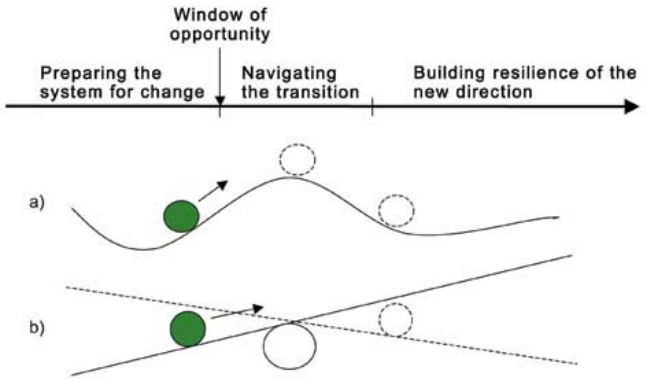
Project 4.1 – How far can science take us? Biophysical science to reduce impact uncertainty of innovative marine activities

Key research questions include:

- How should "best available information" be defined for novel activities?
- How are risk and uncertainty interpreted, communicated and used by scientists, in case law, and by potentially affected parties?
- How can the spatial and temporal context of an activity and its effects be described when data are scarce?
- What novel assays, models or empirical approaches can be used to for understanding local and far-field impacts?
- When, and what level of short-term investment in scientific information will add significant value to the decision outcome?



Dynamic Seas: Research

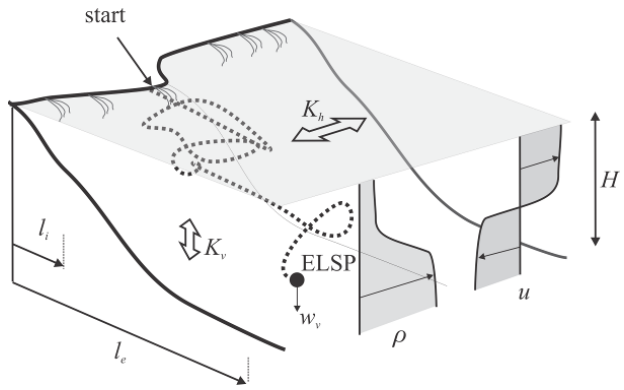


Project 4.2 – Tipping points in ecosystem structure, function and services

Key research questions include:

- What are the functional responses in key ecosystem components to varying levels of stressors?
- Can transition points be identified and quantified for a range of ecosystem components, including estuaries, rocky reefs, soft sediments and deep sea hard substrates?
- What are the best indicators of function in different components of the ecosystem?
- What are the varying sensitivities of different ecosystem components to the same stressors of different combinations of stressors?
- Can tipping points be identified around marine economic activities such as aquaculture and fishing?
- How are these sensitivities related to key climate change variables, such as temperature and exposure to wave forces?

Dynamic Seas: Research



4.3 Project – Ecosystem Connectivity

Key research questions include:

- How are key ecosystem components connected through ocean flows?
- What is the extent and rate of flux of nutrients, detritus, sediments and organisms among nearshore, shelf and deep sea environments?
- How is functionality in each of these ecosystem components affected by nutrients, detritus or organisms transported from other components?
- How connected are populations of long-lived, habitat-forming species in the deep sea?
- What novel approaches can be used to understand the connectedness of deep sea communities and their likely resilience to local and far-field stressors?
- What are the locations, scales and timing of use of critical marine resources by marine mammals and how do they move between these areas?
- What novel research methods can be used to identify these patterns?

Dynamic Seas: Research

Project 4.4 – Stressor connectivity: the dynamics of stressors and drivers of change

Key research questions include:

- How can we measure the spatial and temporal footprint of overlapping multiple stressors?
- How do the effects of multiple stressors on ecosystem function interact and accumulate within and across the nearshore-offshore gradient?
- What large-scale ecosystem processes enhance resilience (or, alternatively, increase sensitivity) to multiple stressors?
- How is ecosystem service provision (e.g., cultural, societal, economic, ecosystem) affected by multiple overlapping stressors?
- How are the ecosystem services required to sustain and enhance marine values and activities affected by different, overlapping stressors?

Dynamic Seas: Research

Project 4.5 – Restoration, mitigation and offsets

Key research questions include:

- How can critical functionality that has been lost from marine ecosystems be restored?
- What are the key staging points in restoring degraded parts of the marine ecosystem?
- Can critical stressors be reduced so that restoration is viable?
- Can restoration be used as a mitigation option for resource uses that degrade components of the marine ecosystem?
- What new tools can be developed to inform best-practice in restoration?
- What other forms of mitigation, trade-offs and offsets could be practicable where resource use degrades parts of the marine ecosystem?
- In collaboration with other Programmes in Sustainable Seas, what ways can new processes of engagement, collaboration and interactions with Maori, stakeholders, management agencies and citizens contribute most profitably to restoration?

Programme 5: Managed Seas – Alistair Dunn

Managed Seas - Objective

- The Managed Seas programme will
  - bring the EBM components together
  - provide integrated decision support tools

- Develop tools and decision frameworks to maintain ecosystem resilience and a healthy prosperous marine economy
  - integrate the impacts of activities
  - provide strategic and tactical advice
  - support decisions

Managed Seas - Themes

1. Ecosystem model toolbox
   - EBM advice is required across a range of spatial and temporal scales
   - a range of different EBM tools or frameworks required.
   - this theme will develop, validate and compare EBM tools and frameworks of a range from simple to complex

2. Policy facilitation for EBM
   - how do national, regional and local governance systems integrate
   - this theme will review statutory/regulatory and governance frameworks through an EBM perspective

Theme 1: *Ecosystem model toolbox*

- Objective
  - New Zealand employs a suite of EBM tools to maintain resilience and a healthy, prosperous marine economy in the context of social, economic and environmental change

- 4 key projects
  - “End to end” models
  - Spatially explicit decision support tools
  - Risk assessment tools
  - Participatory tools

Theme 1: *Ecosystem model toolbox*

Project 5.1 – 'End-to-end' models

- End-to-end models
  - Provide a framework for linking and integrating data and knowledge
  - Allow for the comparison and evaluation of trade-offs
  - Used to provide strategic and sometimes quantitative advice
  - Can include both the biophysical and social/economics

- Objective
  - What decision support tools are appropriate and useful for different questions and situations

- Tasks
  - Develop validated models of marine ecosystem dynamics
  - Compare model outcomes, utility, and implications of each

This project will validate and compare ecosystem model frameworks and assumptions across the range available, including complex "end to end" ecosystem models through to simpler modelling frameworks

Theme 1: *Ecosystem model toolbox*

Project 5.2 – Spatially explicit decision support tools

- Spatially explicit decision support tools
  - Provide tactical advice with a focus on spatial management and decision-making
  - Encompass a range of complexity including
    - visualisation tools (NABIS, eAtlas, DOC GeoPortal)
    - spatial scenario analyses (SeaSketch, SCP plugin for QGIS)
    - implications of different spatial management actions and optimisation analyses (Zonation, Marxan)
- Objective
  - What spatially explicit decision support tools are appropriate and useful for different questions and situations

- Tasks
  - Develop and adapt spatially explicit decision support tools
  - Compare tool outcomes, utility, and implications of each

Focus on methodologies for weighting different spatial management or resource uses and impacts on biodiversity; Incorporate quantitative and qualitative components; and incorporate uncertainty

Theme 1: *Ecosystem model toolbox*

Project 5.3 – Risk assessment tools

- Risk assessment tools
  - Quantification of uncertainty and risk assessment are key components of EBM
  - Consideration of multiple stressors and cumulative uncertainties

- Objective
  - What risk assessment decision support tools are appropriate and useful for different questions and situations

- Tasks
  - Risk assessment methods will be developed for single to multiple stressors across single or multiple ecosystem components
  - Compare tool outcomes, utility, and implications of each

This project will develop methods to undertake risk assessments within a multiple stressor framework, to allow for the integration of multiple components to be simultaneously considered and evaluated

Theme 1: *Ecosystem model toolbox*

Project 5.4 – Participatory tools

- Participatory tools
  - Assist the engagement process by enabling understanding of
    - the linkages within marine ecosystems
    - the effects of cumulative multiple stressors on multiple ecosystem components
    - the consequences of alternative management choices.
- Objective
  - What participatory tools support tools are appropriate and useful for different questions and situations

- Tasks
  - Develop and evaluate effective participatory tools support tools to
    - communicate models outcomes and results effectively
    - Allow for effective engagement and feedback with Māori and stakeholders

This project will develop participatory tools to suit the case studies and issues identified through engagement processes. Specific tools will be determined by the audience and key issues raised, and could range from simple report card approaches and mapping and visualisation tools, to “toy” or “cartoon” models and more complex approaches such as Bayesian Belief Networks

Theme 2: *Policy facilitation for EBM*

- Objective
  - Identify the policy tools and innovations to enhance EBM in New Zealand
  - Evaluate the consequences of potential policy change based on national and international best practice
- 2 key projects
  - Review EBM Policies
  - Policy innovation

Theme 2: *Policy facilitation for EBM*

Project 5.5 – Review EBM Policies

- Review EBM policies
  - Assist the engagement process by enabling understanding of
    - the linkages within marine ecosystems
    - the effects of cumulative multiple stressors on multiple ecosystem components
    - the consequences of alternative management choices
- Objective
  - Review and summarise the national, regional, and local frameworks, statutes, and institutions that manage New Zealand's estuarine, coastal and ocean ecosystems
- Tasks
  - Review existing policy approaches to identify similarities, inconsistencies and limitations to implementation of EBM

This project will review existing policy approaches and use case studies to identify how our current frameworks have been applied in decision-making about resource use

Theme 2: *Policy facilitation for EBM*

Project 5.6 – Policy innovation

Policy innovation

- Ocean policy is continually evolving through case law, regulation, Treaty settlements and regional policies.
- Innovative approaches in international ocean management can be identified (e.g., the TEEB4OC programme) and evaluated to see if they have been successful nationally or internationally

- Objective
  - Develop potential policy innovations and evaluate their consequences from an EBM perspective

- Tasks
  - Explore different policy scenarios, both within and outside of the current framework, and evaluate consequences of each scenario for EBM

Innovative policy approaches will be developed, evaluated, and applied to the case studies and issues identified through the engagement process

Todays Workshop

• Our Seas	Main
• Valuable Seas	Main
• Tangaroa	Main
• Dynamic Seas	Main
• Managed Seas	Upstairs

Next Steps

- Research and Business Plan to ISP and Board end of August
- Research and Business Plan to MBIE end of September

Timetable

- *10.40am* *Morning tea*
- 11.00am Small group discussion of Research Plan - Session 1
  - Our Seas Main
  - Valuable Seas Main
  - Tangaroa Main
  - Dynamic Seas Main
  - Managed Seas Upstairs
- *12.00pm* *Lunch*
- 12.45pm Small group discussion of Research Plan – Session 2 as above
- 1.45pm Small group discussion of Research Plan – Session 3 as above
- *2.45pm* *Afternoon tea*
- 3.00pm Plenary report back and discussion of overall Research Plan
- 4.20pm Close of meeting

Next Steps

- Research and Business Plan to ISP and Board end of August
- Research and Business Plan to MBIE end of September

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