



# From funding instrument to boundary organisation: Insights from a science policy interface in-the-making

Research to address societal challenges requires thinking about ‘impact’ in a purposeful and integrated way from the outset. In addition to producing in-depth biophysical knowledge about the state of Aotearoa New Zealand’s marine ecosystem, the Sustainable Seas National Science Challenge also produced evidence-based tools, frameworks, training, policy guidance and strategic relationships to help embed evidence-informed and localised sustainable marine management. This summary reports on research that traced the changes in how Sustainable Seas research was performed in terms of who was involved, what was produced, and efforts to ensure purposeful impact.

## The project examined the evolution of research processes undertaken by Sustainable Seas.

Sustainable Seas was designed to generate new knowledge to enhance marine management in Aotearoa, and to promote the uptake of research into policy and practice in both the near and longer terms. The approach to knowledge generation and processes to translate research into policy evolved from a novel funding instrument in the natural sciences, to an exemplary boundary organisation that produced actionable knowledge and boundary-spanning capabilities for sustainable transitions in marine stewardship. Sustainable Seas became a vehicle for learning and innovation in science policy and research practice, not least in the development of transdisciplinary practices, supporting kaupapa Māori research, and research at the intersection of science and mātauranga (Māori Indigenous knowledge).

## A boundary organisation to support ecosystem-based management

Boundary organisations were initially conceptualised as mediating relationships and brokering expert knowledge between scientists and decision-makers, while maintaining a science/non-science boundary to protect scientific integrity. Over time, conceptualisations regarding the purpose and functions of boundary organisations have evolved, wherein boundary 'making' has been replaced by boundary-spanning. Boundary-spanning describes an ongoing process of negotiating knowledge legitimacy and relevance arising from differing expectations and assumptions at science policy interfaces. In responding to societal challenges, boundary-spanning work is underpinned by normative assumptions and a directional agenda for sustainability transitions beyond a generic 'impact agenda' for public research. Boundary spanners also play a more active role in identifying and determining policy prescriptions, and facilitating these by engaging with publics, particularly in socio-ecological contexts.

## First steps to doing research differently

Phase 1 research projects were ambitious in scale but not necessarily in terms of how the research was done. Collaboration across disciplines (interdisciplinary research) was encouraged, though projects were often anchored in discipline-based approaches to research design and implementation. The relative freedom given to Sustainable Seas by the Ministry of Business, Innovation and Employment (MBIE) to define its own research remit, while innovative and conducive to experimentation, generated confusion among some researchers regarding what type of research ought to be pursued.

## Problem identification: Avoiding the "wrong problem problem"

Early in Phase 1, there was consensus on ecosystem-based management (EBM) as the keystone concept for Sustainable Seas; however, EBM was the solution, but the real problem, left unarticulated at the time, was (at least) threefold:

1. The technical problem of 'how' to practice EBM – the data, criteria, standards and practices that would need to be developed.
2. The implementation problem of coordinating policies and practices across jurisdictions, scales, sectors and policy domains.
3. The political problem of making the case for EBM – overcoming inertia and the influence of pressure actors with an interest in maintaining the status quo.

As Sustainable Seas evolved, a shared understanding of the multi-faceted problem started to consolidate. Specifically, a perception of the problem as a socio-ecological issue was emerging, tentative though it was.

## Problem structuring: Aligning research with goals and means

The development of a formal 'theory of change' to guide Phase 2 research helped to clarify the 'problem' that Sustainable Seas research was seeking to address. The theory of change was significant for two reasons.

1. It offered a more structured and coordinated perspective of how all the themes linked.
2. It rendered visible the implicit assumptions held by different disciplines and non-science actors about the nature of the problem Sustainable Seas was trying to address.

The theory of change thus unblocked an unspoken ideational impasse and generated shared understanding of purpose, which could then be drawn on to structure everything else. The research that would be undertaken, the relationships that needed to be established or strengthened, and how the resources (time, money, personnel) would be allocated, were all structured according to the newly developed theory of change.



Image: Hamish McCormick

## Knowledge selection: Resolving epistemic tensions

Boundary organisations have a role in structuring multiple perspectives on issues and helping knowledge producers and users to become aware of potential blind spots or unintended consequences. This can be contested work, requiring trusted relationships. For Sustainable Seas, it took time and self-reflection to understand and embrace this role. By mid-point in the programme, there was an emerging realisation that conventional research practices and the nearly singular focus on the relevant natural sciences was not going to be the difference maker in meeting the Sustainable Seas remit. Co-design became an important way that Sustainable Seas would “connect the dots” in Phase 2.

## Mediating and coordinating relationships: Resolving epistemic tensions and enabling change

The role that boundary organisations play with respect to research relationships may be one of their most important. Arguably, all other boundary-spanning functions hinge on having established strategic, generative relationships. At its most basic, the relationship function is twofold.

1. Operationally, it coordinates across diverse actors, each with strategic roles to play in generating or using knowledge or enabling desired change.
2. Politically, it mediates across actors who may hold very different perceptions of purpose or ideas about the nature of issues or the means to address them.

As an emerging boundary organisation, Sustainable Seas not only mediated relationships between science and non-science actors, it also demonstrated that mediating relationships across disciplines and with mātauranga Māori was just as important. Moreover, Sustainable Seas mediated relationships for new forms of research governance that created space for Māori leadership in research decision making.

## Building capacity for boundary spanning

Sustainable Seas played an important role in capacity building for boundary-spanning work to the benefit of Aotearoa New Zealand's public research system as well as the marine stewardship sector. Sustainable Seas generated an emerging group of researchers with new skillsets for negotiating the interfaces between science, policy and societies, and who have “grown with the Challenge and are now well-placed to pick up the reins in leadership roles”. These are the boundary spanners. In addition to researchers' own boundary-spanning attributes and competencies, Sustainable Seas was helping to develop those of collaborators on local projects as well.

## Directionality of impact: Recognising political contexts

As Sustainable Seas evolved and came to exemplify the functions of a boundary organisation, perhaps one of its more significant changes was cultural. It shifted from a culture of developing and passively disseminating knowledge products, to one that recognised both the political contexts of its work and the politics of knowledge. Sustainable Seas came to recognise the uncertainties, relationalities and political complexities of resource management decision-making, and what is required of science communities to influence it in an evidence-informed way and in the context of Treaty partnership. This changing direction was a marked departure from the linear ‘produce and push’ model of knowledge generation in Phase 1. A second major lesson was to recognise (and accept) that aiming at a changed paradigm for resource management is ultimately a political act, albeit evidence-based.

## From funding instrument to boundary organisation

In Phase 1, Sustainable Seas was a natural science-led initiative that produced and pushed knowledge ‘outputs’ to largely presupposed but unexamined policy and stakeholder audiences. By Phase 2, it was a policy- and community-engaged platform that exemplified Treaty-informed leadership in research governance. It recognised tensions and worked to balance them. It developed a shared understanding of EBM by articulating its principles and using these to guide research. It began to co-produce actionable knowledge in ways that could engage change-makers.

Sustainable Seas moved from presupposing research locations based on scientific justifications, to an approach that leveraged community relationships and emphasized co-development with communities and groups that had already begun to organise themselves for action. In this sense, Sustainable Seas adopted a place-based, co-designed approach to demonstrate and document local evidence-informed marine stewardship practices. Co-design, while not always interpreted in a unified way, became institutionalised as an integral practice, as Sustainable Seas leadership came to require and enabled it in project proposals.



## Building successful boundary organisations

We drew specific structural, operational and epistemic lessons for building successful boundary organisations as a key component of future mission-oriented research.

### Structural

#### 1. Long-term resource commitment

Actionable knowledge for transformative change requires effort by multiple knowledge producers, knowledge holders, stakeholders, rights holders, and responsibility holders. It takes time to convene, build trust, scope and frame questions and agree on the range of acceptable solutions. This cannot be done without sustained funding and a long time horizon.

#### 2. Policy support and coordination

Societal challenges and the boundary-spanning work necessary to address them must be carefully scoped, structured and supported by dedicated and sustained policy-work. Currently, Aotearoa lacks any purposeful and well-supported mechanisms that formally connect policy and research communities to frame and inform complex societal problems across sectors, scales and jurisdictions. The National Science Challenges programme went some way to addressing this gap but lacked the public policy connections at the outset. A decade on, such built-in linkages have emerged as a key component for purposeful impact.

#### 3. Theory of change

Societal challenges and the boundary-spanning work necessary to address them must be carefully scoped, structured and supported by dedicated and sustained policy-work. Currently, Aotearoa lacks any purposeful and well-supported mechanisms that formally connect policy and research communities to frame and inform complex societal problems across sectors, scales and jurisdictions. The National Science Challenges programme went some way to addressing this gap but lacked the public policy connections at the outset. A decade on, such built-in linkages have emerged as a key component for purposeful impact.

### Operational

#### 4. Relationships

Research for actionable knowledge starts with relationships. Even before there is a research question, relationship-building is essential. From a Te Ao Māori perspective, this approach is second-nature and hardly a 'lesson.' Yet, the prevailing practice and incentives in academic research does not give priority to the time and resource required to develop essential and lasting relationships. Relationships must be maintained beyond one-off research projects to realise their potential for long-term societal transitions.

#### 5. Connectors and boundary spanners

There is an expertise to identifying, establishing and maintaining relationships for actionable knowledge. Priority should be given to well-supported roles that recognise competencies of connectors and boundary-spanners. Sustainable Seas has developed leaders with these skills and competencies who now constitute a cadre of expertise and an asset to the Aotearoa science and research system.

#### 6. Built-in iteration, process as output

The focus on research outputs, even with an identified "end" user, presupposes a terminal, linear process from question to solution. For complex societal problems, however, enduring solutions will require collective action across multiple sectors, jurisdictions and scales. Time and resources for iterating, testing and feedback will be needed. This iterative approach is best encapsulated in a transdisciplinary research paradigm.

### Epistemic

#### 7. Shared understanding of the problem

Across disciplines and sectors, a problem can be framed and structured in multiple ways. Implicit assumptions need to be revealed and perspectives openly negotiated. The greater the diversity of disciplinary and non-science relationships at the outset, the wider input into framing the question so that solutions actually have the best chance of meeting the intended audience, while reducing potential blind-spots or unintended consequences. Epistemic assumptions have real-world consequences which can limit actionability of knowledge produced.

#### 8. Knowledge pluralism

Just as a broad range of perspectives are necessary to frame issues and questions, so too is a broad range of expertise necessary to help answer them. But knowledge selection is not a neutral exercise. What counts as evidence for a problem and potential solution is often the proxy site for broader values-based contestation. Commitment to knowledge pluralism is foundational for evidence-informed and just societal transitions. In particular, local and indigenous perspectives can be transformative for socio-ecological issues, if access is possible in respectful, non-extractive and culturally safe ways.

#### 9. Creative tension, ambiguity, directionality

There is inherent tension in boundary-spanning work. Any mission that is aimed at promoting a specific policy prescription, such as EBM, makes normative choices, yet must maintain the integrity of research to avoid confirmation bias and interested influence. Knowledge selection must nonetheless be values-informed because what counts as evidence for policy recommendations can (and likely will) be contested. An important attribute of boundary-spanning personnel is thus comfort with this ambiguity of position, and the ability and willingness to harness it for reflexive change.