MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Draft Research, Science and Innovation Strategy and Things

GARY EVANS

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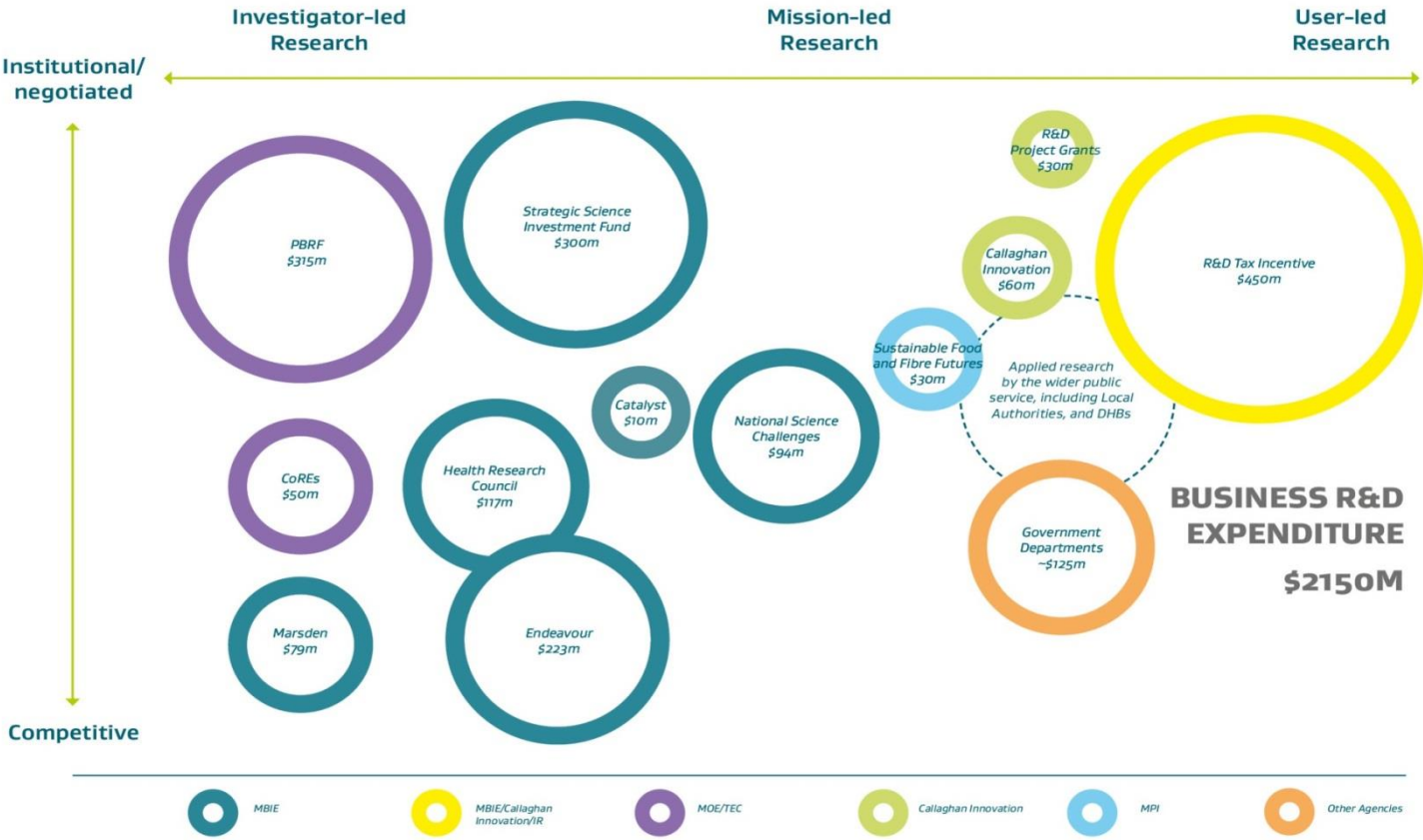
Context

Our Research and Innovation System

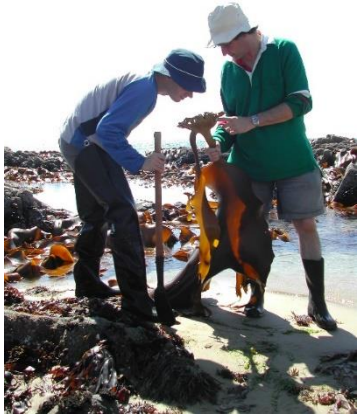
- Our RSI system consists of people, institutions, infrastructure, investment, regulation, and government.
- Research and innovation rely on fluid connections between the components of the systems. Those connections are a key theme of this strategy.
- Our work over the past five years has been ensuring our funding systems are fit-for-purpose and work well together. Our next tranche of work will focus on ensuring the other components of our system are working in concert and set up for success.


Investigator-led Research
Mission-led Research
User-led Research
Institutional/ negotiated
Competitive
PBRF $315m
Strategic Science Investment Fund $300m
CoREs $50m
Health Research Council $117m
Catalyst $10m
National Science Challenges $94m
Marsden $79m
Endeavour $223m
R&D Project Grants $30m
Callaghan Innovation $60m
R&D Tax Incentive $450m
Sustainable Food and Fibre Futures $30m
Applied research by the wider public service, including Local Authorities, and DHBs
Government Departments ~$125m
BUSINESS R&D EXPENDITURE
$2150M
MBIE
MBIE/Callaghan Innovation/IR
MOE/TEC
Callaghan Innovation
MPI
Other Agencies

MBIE Chief Science Advisor & Team

- Provide thought leadership on the delivery of excellence, impact and an agile science system.
- Ensure that the sector's expertise and intelligence are captured in the development of policy and investments.
- Explain MBIE to science sector and vice versa
- Build internal capability in Vision Mātauranga
- Support access to science for other parts of MBIE
- Part of Science Advisor Network chaired by PMCSA

Both Sides



Field Research

vs

Open Plan Research

What science should be funded?

A policy perspective

"RESEARCH, SCIENCE AND TECHNOLOGY IS A SET OF KNOWLEDGE CREATION AND APPLICATION ACTIVITIES THAT ADDRESS THE NEEDS OF OUR NATION."

Scientists' perspective

"SCIENTIFIC PROGRESS ON A BROAD FRONT RESULTS FROM THE FREE PLAY OF FREE INTELLECTS, WORKING ON SUBJECTS OF THEIR OWN CHOICE, IN THE MANNER DICTATED BY THEIR CURIOSITY FOR EXPLORATION OF THE UNKNOWN. FREEDOM OF INQUIRY MUST BE PRESERVED UNDER ANY PLAN FOR GOVERNMENT SUPPORT OF SCIENCE …" VANNEVAR BUSH, 1945

Prime Minister's Chief Science Advisor (PMCSA)

2009: PM JOHN KEY ESTABLISHES ROLE

SENIOR, PRACTISING ACADEMIC SCIENTIST

USE OF SCIENCE IN POLICY MAKING

- Scientific advice to PM
- Public understanding of science
- Promote NZ's interests through science diplomacy
- Chair network of science advisors

SIR PETER GLUCKMAN APPOINTED

PROF JULIET GERRARD REPLACES SIR PETER IN 2018

NZ Departmental Science Advisors (DSAs)

- Senior, practising scientists, seconded to departments
- Ministry of Business, Innovation & Employment (MBIE)
- Ministries of Social Development, Health, Justice, Education, Environment, Primary industries, Transport,
- Department of Conservation, NZTA, NZ Defence Force

Department of the prime minister and cabinet

DPMC

- DPMC's purpose is to advance an ambitious, resilient and well-governed New Zealand
- This means providing high-quality impartial advice and support services to the Prime Minister, Cabinet, and the Governor-General on a daily basis.
- In addition, DPMC helps coordinate core public service departments and ministries.

Policy advisory group

- Provide advice and support to the Prime Minister in all Cabinet Committees, and contribute to policy development across the full range of government issues

Treasury and appropriations

THE TREASURY
Kaitohutohu Kaupapa Rawa

- The Treasury is the Government's lead economic and financial adviser
  - Minister of Finance Grant Robertson
- Appropriations are the basis on which Parliament authorises the executive government to incur expenses and capital expenditure.
- Each appropriation made to the Crown;
  - is the responsibility of a Minister (the **appropriation Minister**), and
  - must be administered by one department (the **appropriation administrator**) on behalf of the appropriation Minister.
- Vote Business, Science and Innovation
  - APPROPRIATION ADMINISTRATOR: Ministry of Business, Innovation and Employment
  - RESPONSIBLE MINISTER FOR MINISTRY OF BUSINESS, INNOVATION AND EMPLOYMENT: Minister for Economic Development

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Research, Science and Innovation Draft Strategy

New Zealand Government

The Draft Research, Science and Innovation Strategy

- The purpose of the Research, Science and Innovation (RSI) Strategy is to:
  - *communicate the government's objectives for RSI in New Zealand*
  - *to highlight priorities for government action within the RSI portfolio*
  - *signal intentions and directions.*
- This will ensure all actors in the RSI system understand the government's direction in advance and are able to act on that information.
- This updates and replaces the 2015 National Statement of Science Investment, which was the previous strategy in this portfolio.

Our vision

- To drive and focus our efforts in research, science and innovation, we have set an ambitious vision:

By 2027, New Zealand will be a global innovation hub, a world-class generator of new ideas for a productive, sustainable, and inclusive future.

- To reflect the importance of RSI in achieving our goals, this government has set a target to raise R&D expenditure to two per cent of GDP by 2027.

Core definitions

Research is the generation, gathering or organisation of knowledge. Science is a particular way of doing this.

- Research activities are systematic, and undertaken with a specific process in mind.
- Generation of knowledge does not have to be the only goal of research activity.
- Our definition of research is intended to include the distinctive ‘ways of knowing’ that make up Mātauranga Māori.

Core definitions

Innovation is the process of doing something new.

- An innovation may be a new or improved product, process, or function.
- Innovation is a process that leads to new or better ways of creating value for society, businesses and individuals.
- The value of innovation arises from the utilisation and implementation of an idea. The value created may be commercial, social, or environmental.
- Innovation may be unplanned or even accidental, but it does not have to be.

Other things we know about innovation…

- **Research and innovation are distinct but related activities**. Innovation takes knowledge as an input and also produces new knowledge as an output. However, not all of the knowledge generated by research leads to innovation; and equally, innovation can occur without research.
- **Innovation is a pervasive activity**. It happens regularly everywhere. Innovation can occur in organisational structures, management techniques, marketing, and many other areas of activity.
- **The most valuable innovation is systematic, continuous, and occurs across multiple domains**. Firms which consistently and systematically innovate across many domains of their business are more successful. We do not have any reason to believe that the same should not be true in our public services.

Our key strategic choice – focussing at the frontier

Innovation at the frontier means introducing products, services, and processes that are new to the world.

By contrast, innovation behind the frontier is about adopting ways of doing things that are new to an organisation but are already known to others.

Innovation at the frontier extends the boundaries of what we are capable of doing. This is activities like –

- solving problems that nobody else in the world has solved
- capitalising on new opportunities where nobody else is yet successful
- making the most of our unique opportunities
- investigating areas where New Zealand is the only country likely to do so

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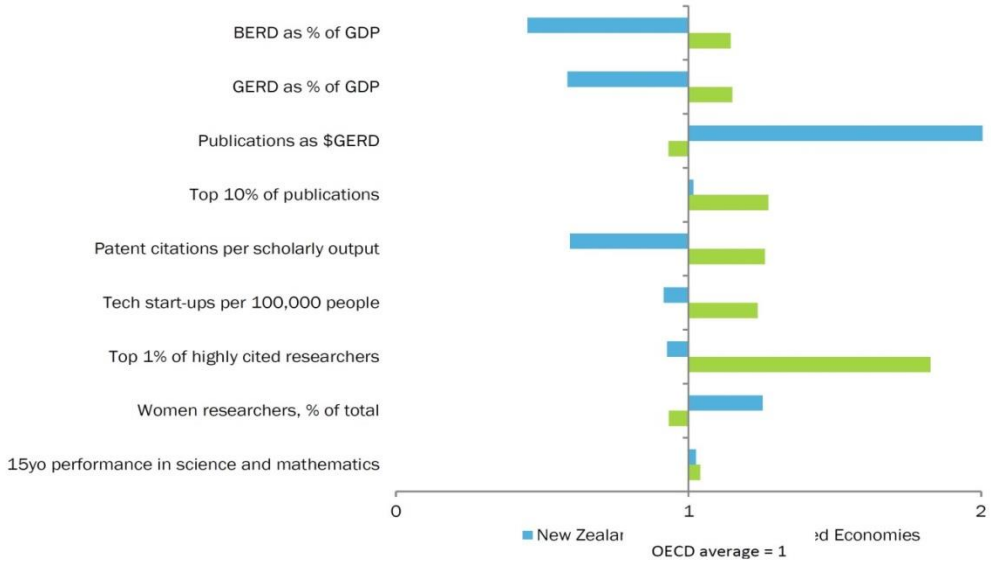
Our Research, Science and Innovation System

New Zealand Government

How our RSI system is going

- Two broad comments tend to apply to New Zealand's RSI activities:
  - ***our scale of activity is small as a percentage of our total activity as a country***
  - ***we do a lot with what we have***

Figure 2: Summary statistics on our research, science, and innovation activity



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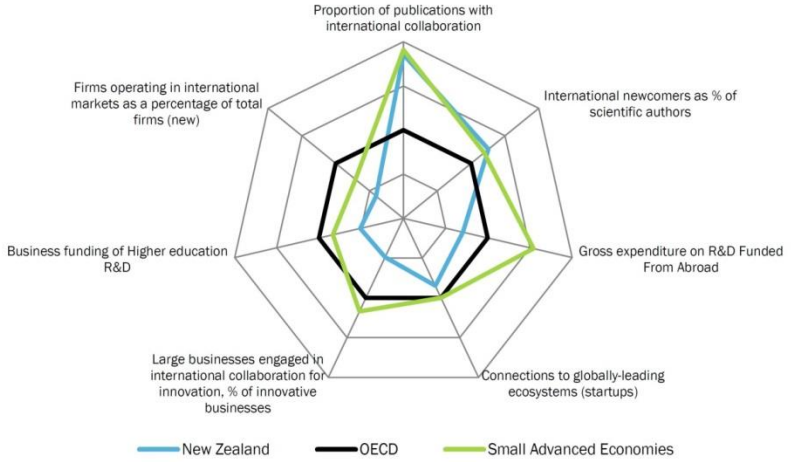
Our Key Challenge

Our key challenge

- We consider that the key, underlying challenge facing the RSI system is building stronger connections within this system and beyond.

- We observe weak connectivity in the following places:
  - *Within parts of the research community*
  - *Between researchers and the potential users of the knowledge they create*
  - *Internationally to global experts, major business communities, and large markets for new innovations.*

Figure 3: Connections in the New Zealand Research, Science and Innovation System



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Guiding Policy

New Zealand Government

Vision and guiding policy for RSI in New Zealand

- Building on the key concepts set out by the National Statement of Science Investment, we propose that the RSI system be guided by the principles of:
  - ***Excellence***
  - ***Connections***
  - ***Impact***

Excellence

- Excellence is the ‘best possible’ in any given situation – it cannot apply to all activities
- Excellence is not just bibliometrics, basic science, investigator-led, or academic research
- We are seeking excellence in innovation as well as research
- Three things are important for excellence
  - People, and within this, diversity
  - Global outlook and context
  - Partnership
- Part of our plan for excellence is extending the Vision Mātauranga policy

Connections

- Stronger connections allow a smoother, easier flow of people, knowledge, capabilities, funding, and capital within and across our RSI system.
- Our activity in this area will focus on enabling fluid connections, and reducing barriers and costs which prevent connections from happening.
- We are seeking to create denser, richer networks of people, ideas, and resources. We need to encourage ease of transaction – between innovators and entrepreneurs, and the beneficiaries or users of the knowledge and innovations they create.
- We want to create a fluid, dynamic marketplace where knowledge is shared and used easily in the right places at the right times. We think dynamism borne of a large number of small, easy transactions is an important feature of the system we are trying to create.

Impact

- We consider impact to be a change to the economy, society or environment, beyond contribution to knowledge and skills in research organisations.
- Impact may be commercial, non-commercial, or both.
- The impact of our research on our health, environment, society and wellbeing is as important as its impact on our economy, as these are inextricably linked.
- There are five key goals that are served by placing impact at the heart of this strategy –
  - enabling researchers to make their research more relevant and connected to end-user needs
  - allowing the government and RSI funders to develop policies which support impact
  - informing the government's future investment decisions
  - enabling public research institutions to demonstrate how they meet their social responsibilities and attract further resources
  - demonstrating to taxpayers the eventual benefits of their investments.

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Actions

Actions

- We propose to take actions in five main areas:

1. **Making New Zealand a magnet for talent**
2. **Connecting research and innovation**
   - Develop a global best-practice research commercialisation system
   - Improve international connections
3. **Start-up^scale-up**
   - Support for start-ups
   - Innovating for the public good
   - Focus areas for scale-up
4. **Towards an extended ‘Vision Mātauranga’**
5. **Building firm foundations**
   - Create a progressive investment programme
   - Ensure future-focused, fit-for-purpose institutions and infrastructure
   - Global quality research infrastructure

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Next Steps

Further questions and inputs

- Consultation is currently open, closing **10 November 2019**.
- Submissions can be made through the RSI Strategy website:

  https://www.mbie.govt.nz/have-your-say/draft-research-science-and-innovation-strategy/

- In-person consultation sessions are scheduled around the country. Please RSVP through the RSI Strategy page on the MBIE website
- Any questions can be directed to the RSI Strategy Secretariat:

  RSI-Strategy@mbie.govt.nz

- Please share this information with other RSI stakeholders.

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Biosecurity and MBIE

Biosecurity and MBIE

Envirolink

Scion

Endeavour Fund

Smart Ideas

1. Sex pheromones of social wasps: From discovery to population disruption (Plant & Food)
2. Enabling possum fertility control and eradication (Otago)
3. Phage-inspired custom antimicrobials to target bacterial pathogens (Otago)
4. Understanding spore/host recognition to prevent plant infection from ascomycete fungal pathogens (Plant & Food)

Research Programmes

1. A toolbox to underpin and enable tomorrow's marine biosecurity system (Cawthron; $10.4 million)
2. Eradication Science: eliminating the last survivors to achieve predator freedom (Landcare; $7.5 million)

Crown Research Institutes

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Biosecurity

Latest news

Come jump in a lake with NIWA

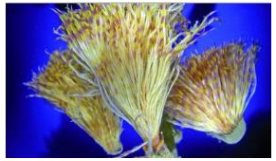
5 June 2019 — Media Release

Visitors to NIWA's stand at this year's Fieldays are invited to go diving into the Rotorua lakes—without having to get wet.

New brains sought to get rid of marine pests

27 March 2018 — Media Release

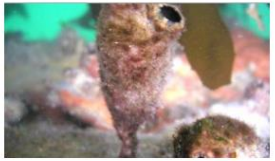
Scientists have launched a worldwide crowdsourcing competition aimed at finding novel ideas to tackle invasive marine pests, with a cash prize of $US10,000 on offer.



Summer Series 2017 - Look out for these marine pests

28 December 2017 — Feature story

Every year NIWA carries out numerous marine surveillance missions, surveys at ports and harbours around the country. Their divers are looking for the pests that have hitched a ride to New Zealand waters and are capable of destroying our unique ecosystems and shellfish industry.

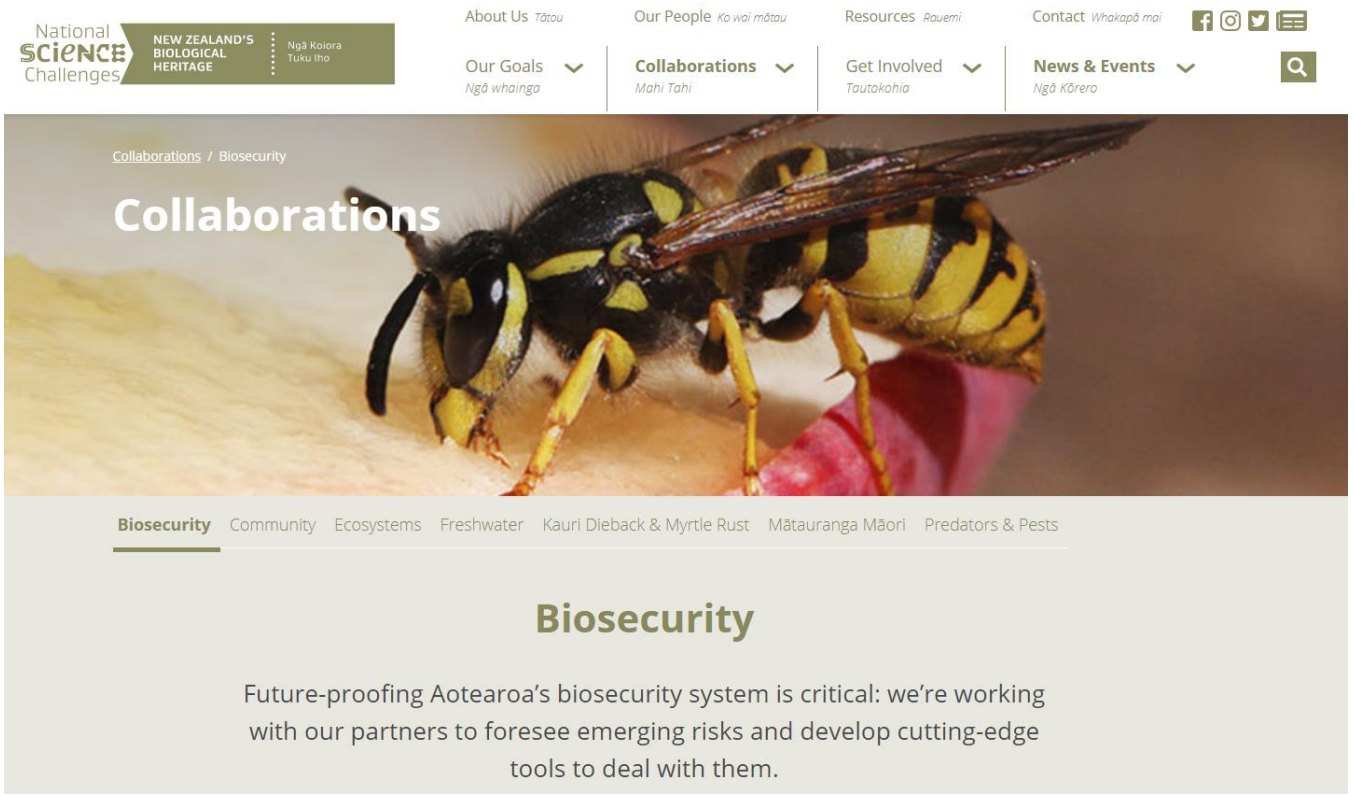


Summer Series 7: Little squirts that hang out around the coast

12 February 2013

When you are at the beach or harbours this summer, don't be surprised if you see sea squirts - marine animals we commonly see attached to rocks and wharf piles that have two siphons on the top of their bodies, one to draw in water and the other to expel it. When disturbed, sea squirts contract their siphons, expelling streams of water—hence their name.

National Science Challenges



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Biosecurity

Cawthron's Biosecurity team works alongside clients to help them navigate through marine biosecurity legislation for New Zealand and overseas locations. This has involved the development of marine biosecurity management plans, rig and vessel inspections for marine pests, as well as advice on managing biofouling accumulation on offshore infrastructure.

In addition to oil and gas work, the team provides expertise and consulting services for all marine biosecurity issues. This includes managing non-indigenous pests and diseases, and assisting with biosecurity regulatory compliance and risk mitigation.

Our capabilities in this area include:

Inspecting a semi-submersible rig prior to transport to New Zealand

OFFSHORE ENVIRONMENTAL

Services

- Biosecurity
- Environmental monitoring
  - > Benthic assessments
  - > Ecotoxicology
  - > Habitat mapping
  - > Marine mammals
  - > Molecular tools
  - > Water column assessment, modelling and remote sensing
- Guidelines, plans and protocol development