

Research for the Environment

2011 Review: Regional Council Research, Science
& Technology Strategy



September 2011

Foreword

Regional and Unitary Councils throughout New Zealand are faced with increasingly complex and critical decision-making, often requiring a balance between conflicting or incompatible expectations around managing, developing, or maintaining natural resources. Sage decision-making requires sound science as input for reference and guidance, and experience has shown that scientific research must be anticipated and planned years if not decades in advance of key decisions being made, if timely, robust, and comprehensive science is best to undergird the decision-making process and thus enhance New Zealand's enduring environmental and economic performance.

In 2007, the Regional Councils' CEO Forum and the Resource Managers Group endorsed the development of a Research, Science & Technology Strategy with the objectives:

- To produce a Strategy that will provide a framework within which Regional and Unitary Councils can pursue the further development of high quality, relevant research and timely and appropriate knowledge transfer mechanisms.
- To provide an overview as to what the Regional and Unitary Councils require in research, science and technology, including a process to achieve goals and objectives contained within the Strategy or formulated from time to time through the pathways set out within the Strategy.

As a consequence, the Science Advisory Group prepared a Strategy that had its final adoption in early 2009. Inherent in the Strategy was a commitment to keep it current, and this has led to its review in mid-2010, to reflect the changing face of the provision of science in New Zealand and evolving issues for councils.

The 2011 update of the Research, Science & Technology Strategy considers the implication of recent science reform in New Zealand and what this means to Regional and Unitary Councils, and it identifies key issues and research priorities to focus on over the next few years. The research priorities have been developed with input from fourteen of the councils' Special Interest Groups and from input from all 16 councils during the course of a science roadshow. There has also been considerable interaction and input from key government departments (e.g., MSI, MAF) and from CRIs and other research providers.

The revised Strategy will continue to provide an influential voice for Regional and Unitary Councils to communicate immediate and longer-term Research, Science & Technology priorities to funding agencies and research providers.

The Science Advisory Group, established by and reporting to the CEO Forum, will keep the Strategy alive and ensure that the processes are followed to achieve the objectives of the Strategy and particularly to review the ongoing effectiveness of implementation.

Gary Bedford

Chairman (2008-present)

Science Advisory Group

Front cover photograph courtesy of Rob Tucker, Taranaki

Executive Summary

The vision of the Strategy is that the profile of Regional and Unitary Councils moves from being end users to being “partners” in research with key Government Departments and research providers. The Research, Science & Technology Strategy provides a process for the combined councils to influence and participate in NZ’s environmental research direction. A key purpose is to ensure that the councils provide a united, influential, and well-regarded front to funding agencies and research providers both for identifying research priorities and also capability requirements for the present and future.

Responsibility for the Strategy rests in the first instance with the Science Advisory Group on behalf of the Regional and Unitary Councils. The Science Advisory Group is mandated by and answers to the Regional Councils’ Chief Executives’ Group.

Since the original strategy was finalised and approved for implementation by the Regional Councils Chief Executive Group in March 2009, there has been considerable progress communicating the strategy to decision-makers in Wellington. The Strategy has also been influential during the Crown Research Institute (CRI) Task Force Review of Crown Research Institutes and has enabled a coordinated response to provide input to the Statements of Core Purpose of seven of the eight CRIs. It has also to date provided coordinated input to the Freshwater Science Strategy, the Land and Water Forum, and greatly influenced the Foundation for Research, Science & Technology Freshwater Science funding round in 2010.

The Strategy has also provided the catalyst to improve coordination between councils in identifying longer-term research priorities and science capability needs, and to share resources between councils. In the last two years, the Special Interest Groups have played a very useful role identifying critical issues and research needs and communicating these to all the Special Interest Groups in the Futures Workshop held in November 2010. The revised 2011 Strategy proposes to continue this role to identify longer-term research priorities and capability needs as well, and to enhance inter-council collaboration and support.

Regional and Unitary Councils have previously had very little formal input to high-level central government science strategy and agendas, but this has changed with the implementation of the Research Strategy. Council representatives have been involved in a number of high-level and influential fora, and this role will likely become even more prominent with the new Ministry of Science and Innovation. The revised Strategy provides the means to continue to influence central government decision-making and to also provide direct guidance to Crown Research Institutes, universities, and other research providers involved in environmental/natural resources and related research relevant to councils.

The Strategy will also continue to provide a process to ensure greater formal involvement by councils in research prioritisation and implementation, and is especially focused on providing a unified voice in Wellington. The Strategy has four main Goals: (1) Providing timely, authoritative and respected direction to science research and funding; (2) Catalysing and enhancing science delivery – capability, capacity, and targeting; (3) Science uptake opportunity and facilitation; and (4) Receiving feedback and updating the Strategy.

It is envisaged that by committing to a process of keeping the Strategy current and specifically implementing key objectives by following an Annual Operating Plan, Regional and Unitary Councils will demonstrate greater leadership in providing research direction; key tasks will be completed within a relevant and acceptable time frame; research will

become more targeted at key long-term as well as short-term priorities; key science capability will be developed and maintained; and stronger partnerships will develop between councils and with other agencies. Implementation is key to the success of this Strategy and the Regional and Unitary Councils will provide a dedicated resource to ensure the Strategy is kept alive, implemented, and reviewed in an appropriate and timely manner.

Research Priorities

The revised Strategy identifies the current high-level research priorities for Regional and Unitary Councils as:

1. Policy Effectiveness

There is a need for better approaches for assessing the effectiveness and efficiencies of policy, including a tool that can model the likely impact of policy options in terms of effectiveness. The opportunity is to undertake research into the challenging area of assessing the efficacy of different policy approaches. Such research would need to be integrated with State of the Environment Monitoring and Long-term Plan monitoring.

2. Freshwater

Water research will remain a high priority for councils as pressure on resources continues to grow. However, the research questions are becoming more complex and the requirement is for both tools to help managers, but also research to determine how to effect behavioural changes. For many issues the research has been done and the answers are known, and now the results need to be carried through into effective policy. Related to this there is also a pressing need, for water and for other resources as well, to research new methodologies to enable Regional and Unitary Councils to place financial and non-financial values on environmental resource services (see Resource Valuation) and on intervention measures. For all water resources – surface, groundwater, estuarine, and coastal ecosystems there is a need to better understand the cumulative impacts of activities on water quality. This relates directly to Ministry of Science & Innovation's target to identify ecological limits. Mechanisms available to address cumulative effects under the RMA are limited and we have only limited scientific knowledge of how stressors interact and how ecosystems respond to multiple stressor exposures and to remediation and mitigation measures.

3. Soil

As for water we require greater research effort to develop methods to enable Regional and Unitary Councils to recognise and place financial and non-financial values on soil environmental services (e.g. health, productivity, ecology, structural integrity, carbon sequestration) for determining tradeoffs for policy formulation. There are also significant needs for improved soil and land use information, particularly if New Zealand is to extract greater productivity from our natural resources. Some soils have become contaminated by heavy metals and other contaminants and research is required to identify areas of contaminant accumulation and methods to reduce these levels. Also with regard to diffuse source pollution, while we know a considerable amount about the impact of land use on water quality, we require more research effort to understand the links between farm scale and catchment scale; cumulative effects; transfer pathways and attenuation of nutrients and contaminants through soil and vadose zone.

4. Resource Valuation

There is a need to better identify tradeoffs and weigh up multiple values of natural resources. Increasingly, environmental management and policy decisions require a 'whole systems approach' based on integrated and cross-disciplinary research. Taking a long-

term and integrated approach to planning and decision-making, where economic development is cognisant of limited resources and the wellbeing of our communities is crucial for NZ's future. Recent emphasis on spatial planning (Auckland, other councils) highlights the importance of linking data and information from various sources across central/local government and linking economic, social/cultural and environmental knowledge. Valuing non-market contributions to wellbeing and understanding behavioural change are essential to achieve the outcomes our society desires.

Research is needed to understand and value the economic and social/cultural dimensions of natural resources, including the implications of market failure. This research would have wide application across all natural resources and all regions, but currently the NZ skill base is very limited (see later under "Science Capability").

5. Hazard Risk Assessment

There is an overall need for better tools to assist with the analysis of, and effective responses to, hazards and consequent societal risks. More research is needed to provide a more robust and defensible position to address hazard risk more effectively, and to give decision makers confidence. The key issue is risk management – how to deal with risk, identifying effective risk reduction measures and balancing risk reduction with acceptable cost. This includes residual risk, which is seen as a critical planning issue around questions of where development is appropriate in relation to our understanding of the various risks.

6. Biosecurity

There are a number of biosecurity issues that need greater research effort including systems (tools and methodologies) to manage multiple pests at sites and across landscapes. Humane and cost-effective alternative toxins are needed to replace 1080 and brodifacoum, as both are under threat as pest control tools. Additionally, there is a requirement for cost-effective performance measurement and outcome monitoring tools for protecting and enhancing biodiversity values through the application of pest management.

Science Capability

Both the Ministry of Science & Innovation and Regional and Unitary Councils view enhancing capability in areas of high priority research need as very important. Regional and Unitary Councils particularly feel that capability needs to be increased in "soils" and in "resource evaluation" – including economic and social research skills.

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1. Introduction

Regional and Unitary Councils are charged with ensuring the sustainable management of New Zealand's resources. According to the Resource Management Act, this means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety, while sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations, safeguarding the life-supporting capacity of air, water, soil and ecosystems, and avoiding, remedying or mitigating any adverse effects of activities on the environment.

Regional and Unitary Councils are established by, and deliver all their functions under, the Local Government Act 2002, which amongst other things requires local authorities to play a broad role in promoting the social, economic, environmental, and cultural wellbeing of their communities taking a sustainable development approach - the so-called four well beings. The Act also requires local authorities to enable democratic local decision-making and action by and on behalf of communities.

Faced with the challenges posed under New Zealand legislation, councils are more than ever being required to make major decisions that will affect the long-term sustainability of their regions. Science-based input into decision-making is an important component of Regional Council functions. Therefore it is critical that New Zealand science and research efforts are targeted at areas that are priorities for councils, and that research results are not only highly credible but that they are also accessible, disseminated, and implemented in a timely manner.

It is important to note that policy is shaped not only by science and knowledge, but also by community values and principles, opinions, statutory drivers, acceptability, and affordability. But it is a fundamental tenet that the better informed a policy decision is, the better policy it should be.

The initial Regional Council Research, Science & Technology Strategy (RS&T Strategy), which was approved for release in March 2009 by the RC Chief Executive Group, proved to be an extremely useful document, both to coordinate internal research effort, but also to influence central government research funding direction. This revised RS&T Strategy continues the process to coordinate and influence environmental research direction.

Purpose of the Strategy

This Strategy is not so much a document but a process that will catalyse and assist in the further development of high quality relevant research and timely and appropriate knowledge transfer mechanisms for the benefit of Regional and Unitary Councils.

The Strategy is owned by the Regional and Unitary Councils and in the first instance it has an internal focus. It provides a mechanism, or a Strategy Process, to get input from all Regional and Unitary Councils on Research, Science & Technology (RS&T) priorities, promote greater collaboration, and enhance communication within the Local Government framework to ensure that good science supports the roles and functions of Regional and Unitary Councils. The Strategy Process also provides a unified and influential voice for Regional and Unitary Councils to communicate immediate and longer-term RS&T priorities to funding agencies and research providers. This will enable Regional and Unitary Councils to be acknowledged as a partner in setting research agendas and to have greater influence on RS&T investment and capability retention and development.

Scope of the Strategy

The Scope of the RS&T Strategy includes:

- (a) Research, science and technology that is necessary to support and inform environmental and sustainable management
- (b) Environmental research and relevant hazard research, and also social, cultural, and economic aspects where they relate to the roles and functions of Regional and Unitary Councils
- (c) The recognition and promotion of sciences that go beyond just the physical to incorporate values and societal effects and values and perspectives
- (d) Science to enable policy issues to be addressed.

For the purpose of this strategy, 'environment' includes:

- Ecosystems and their constituent parts, including people and communities
- Natural and physical resources and processes, including influences and consequences, and uses of those resources
- Amenity values
- Social, economic, aesthetic, and cultural conditions relevant to the above points.

Vision for Regional Council RS&T

The Regional Council vision for RS&T is to be effectively involved in the identification, development, and implementation of research, science and technology to facilitate the functions of Regional and Unitary Councils for the benefit of New Zealanders. We want to see effective communication and collaboration between Councils to avoid unnecessary duplication and to continually improve the management of the environment based on sound science. Additionally, we want to ensure that together we provide a united and influential front to funding agencies and research providers both for identifying research priorities and also capability requirements for the present and future.

The Regional and Unitary Councils also want to see that New Zealand is a world leader in environmental RS&T and that there is a process in place to ensure that science evolves and deals with issues before they become major problems. We also want to ensure that the latest knowledge and technology is appropriately implemented in a timely manner and that decisions are based on readily available sound science.

A component of our vision is to ensure that scientists are adequately rewarded for their efforts in science and that a future in environmental and related sciences is considered an attractive career path for young New Zealanders.

Finally, our vision is to provide a process that will continue to direct RS&T for the benefit of Regional and Unitary Councils well into the future.

(Science Advisory Group, on behalf of Regional and Unitary Councils)

2. Current State

New Zealand has 16 Regional and Unitary Councils (including the unitary councils of Auckland, Gisborne, Tasman, Nelson and Marlborough). The country also has eight Crown Research Institutes (CRIs), eight universities and additional quasi-private research providers such as Cawthron and Lincoln Ventures Limited that conduct Government-funded research relevant to Regional and Unitary Councils. In addition, there are a number of private environmental consulting companies that are also involved research and provide a contract service to Regional and Unitary Councils.

Regional Council science strategy achievements since March 2009

The Regional Council Chief Executive Forum formally approved the initial Regional Council Research, Science and Technology Strategy in March 2009. Implementation of the strategy has been effective in a number of areas as outlined below:

Influencing Central Government decision making and research direction:

Early implementation of the Strategy included key visits with the Minister of Science, the Honourable Wayne Mapp, and also with the Chief Executives and/or senior officials of MRST, FRST, MAF, MfE, and DOC. The influence of the Strategy is very apparent in the "Environment Sector Plan 2010-2012" released by FRST in August 2010. This is covered in detail in the later section "Current Focus of Government-Funded Environmental Science".

Regional and Unitary Councils, primarily through the Science Advisory Group, have worked very closely with the Ministry of Science & Innovation (MSI), (previously FRST and MRST), to provide direction to government-funded environmental research. This will prove even more important in the immediate future as the recommendations from the CRI Task Force are fully implemented. The expected changes to the science system are the most significant in 20 years.

"The Ministry of Science & Innovation (and previously the Foundation for Research, Science & Technology) greatly appreciates the direction Regional Councils have provided to government-funded environmental research since the Council's RS&T Strategy was endorsed by the CEO Forum in March 2009. As the recommendations of the CRI Task Force are implemented, research priorities outlined by key end-users, such as the Regional Councils, will become even more important for ensuring that the government's investment in environmental research is well targeted and achieves benefit to sectors."
Justine Daw, Director Environment, Ministry of Science & Innovation

Freshwater was a very significant political issue in 2010 and will continue to be so in the foreseeable future. FRST and MfE developed a new Water Research Strategy that included significant input from Regional and Unitary Councils, particularly from Gary Bedford (Science Advisory Group Chairman), who was also on the FRST Advisory Panel for determining freshwater science funding priorities. This strategy was used to guide the allocation of \$20M/year of FRST funding to freshwater science. The two Special Interest Groups (SIGs), the Surface Water Integrated Management group and the Groundwater Forum, worked with the Science Advisory Group and the Research Coordinator to evaluate and improve the focus of all research proposals submitted to this fund resulting in much better focused research programmes being approved for long-term funding.

In 2010 there was also a much smaller funding round for Pest Management Research, to which the Biosecurity Managers Group, also with input from the Science Advisory Group and the Research Coordinator, provided significant direction. Rob Phillips (Taranaki Regional Council) participated on the FRST Advisory Panel.

The National Government instigated a review of the CRIs at the end of 2009 and released the **CRI Task Force Report**, which produced a large number of recommendations as to how the function of CRIs could be enhanced. Regional and Unitary Councils had input to this Task Force, through the members of the Science Advisory Group, and these submissions were reflected in the final report.

Envirolink continues to be a major mechanism for the transfer of knowledge from government-funded science to Regional and Unitary Councils, both through the more than 750 advice grant projects that are focused on benefiting the nine smaller councils, but also the 28 resource management tools either completed (9) or in progress since 2006. The Science Advisory Group lobbied for Envirolink to be expanded, to provide greater funding

that could benefit all councils through larger cross-council advice grants, and to support a post-graduate scheme. This has been accepted as a priority by Government as signalled in Budget 2010 and will happen as funds become available.

Influencing CRIs:

As part of the CRI reform process, each CRI has developed a unique Statement of Core Purpose (SCP) reflecting the areas in which the CRI should focus its efforts. Regional and Unitary Councils had input into seven of the eight CRI SCP workshops and had considerable influence ensuring that Regional and Unitary Councils interests were acknowledged, and notably provided additional emphasis in the areas of soil and groundwater. The Science Advisory Group is now working with the CRIs to provide input into their Statements of Corporate intent to assist formulating their strategic direction.

Coordinating Regional Council research thinking:

The Special Interest Groups (SIGs) have been particularly active in the last two years developing their own research priorities under the direction of the Science Advisory Group. The culmination was presentations at the Futures Workshop in November 2010 from 13 SIGs of their longer-term critical issues and research priorities. These priorities form much of the basis of the new research priorities identified in this Strategy document.

Disseminating new science knowledge to councils:

A key challenge, and one of the Goals of the RS&T Strategy, is to see science delivered to councils in a useable form. Therefore, as part of the Regional Council process to evaluate freshwater science research proposals, a key criterion for acceptance was the “useful” delivery of research results. The intention is to ensure that science is delivered to benefit key end-users, not to just to satisfy publication requirements. This requirement has been reflected in the final contracts awarded to the successful research providers.

Science also needs to be accessible, and in the past many CRI and university publications have been inaccessible to council staff or otherwise very difficult to find. A key development in 2010 was a Google-based search engine, which enables quick access to all available CRI, MAF, MfE and Regional Council reports and publications from one central site available on the Envirolink website. This has been well received by both council and non-council audiences, as a comparable search engine did not exist.

Another major initiative in 2010 was the “Science Roadshow”, which took CRI and Cawthron Science around to all Regional Council offices to deliver presentations on recent science relevant to local government. Many councils benefited by being exposed to a large amount of new science in a short timeframe. The presenters appreciated the direct contact with the councils, which helped them develop new Envirolink advice grant proposals and fine tune Envirolink Tools proposals.

Influencing Envirolink Tool development:

Tool development funding is provided by the Ministry of Science & Innovation (MSI) and is used to support development and adaptation of natural resource and environmental management tools for use by all Regional and Unitary Councils and Unitary Authorities. These tools may be physical technologies or something more conceptual, such as a formalised or systematic approach to problem solving or analysis. The selection of priority areas for investment and of the Tools that will deliver the desired outcomes is in the hands of the Envirolink Governance Committee, mandated by the Regional Council Chief Executives’ Group and consisting of selected chief executives and senior managers from Regional and Unitary Councils.

A key component of the annual Envirolink Tool round is achieving consensus from all councils as to the Tool priorities. The RS&T Strategy has greatly assisted this process as Special Interest Groups in particular are now much better prepared to put up project

proposals based on well-deliberated strategies. Each tool project is required to have a council champion and in most cases a sponsoring Special Interest Group. SIGs then take responsibility at their regular meetings to ensure progress is being made in line with the original objectives.

Science Capability and Planning within Regional and Unitary Councils

Regional and Unitary Councils vary in science capability and capacity as a function both of need and resources. While many environmental issues are national in scope, others are often specific to a relatively small number of regions. Larger councils tend to employ scientific expertise to deal with specific ongoing technical issues such as water and soil quality. The smaller councils generally contract scientific expertise as required and as budgets permit. The collective annual science (including monitoring and research) budget within Regional and Unitary Councils is in the order of several tens of millions of dollars annually. Part of this Strategy is thinking around how to maximise the value of this investment for the individual and collective good.

Each of the Regional Councils and Unitary Authorities tends to operate independently in determining research priorities and needs, and although to date there has been some sharing of scientific expertise between councils, a priority for the RS&T strategy is to develop mechanisms that will ensure greater research-based collaboration and transfer of knowledge between councils, as well as to councils from external science providers.

A semi-formal system of sharing knowledge and experiences has been established through Special Interest Groups that are loosely coordinated primarily, but not exclusively, through the Resource Managers Group (RMG), while the Biosecurity Managers Group (BMG) covers biosecurity and terrestrial biodiversity interests. The current structure of the SIGs is shown in Appendix 1. The Special Interest Groups have official mandates from the CEO Forum and in most cases their Terms of Reference include an objective to identify research priorities and possible collaborative research projects. These priorities and projects are generally actioned on an informal or ad hoc basis only.

Special Interest Group Research Priorities

During 2009 and 2010 the Regional Council Research Coordinator worked closely with the Special Interest Groups to develop research priorities following the process outlined in the original RS&T Strategy. In most cases this involved getting external expert input (e.g., from CRIs) as well as canvassing for internal input. For most Special Interest Groups this was the first time they had used a formal process to consider critical issues and research needs and there was general acceptance that the process should be continued. It is particularly useful to form a Regional Council consensus on priority research needs to influence central government research funding and also capability development.

RS&T Providers

The Crown Research Institute structure is well suited to provide relevant research to Regional and Unitary Councils as much of the focus is on research that can be applied to council issues. The National Institute of Water and Atmospheric Research (NIWA) and Landcare Research in particular are very focused on key areas of research relevant to Regional Council needs. The other CRI's, the universities and also research organizations such as Cawthron, provide additional expertise and science programmes, often in very specialised areas beyond the science capability of most councils. This RS&T Strategy seeks to strengthen linkages with the country's research providers and ensure that the current and future needs of the Regional and Unitary Councils are communicated and acknowledged.

3. Government Research Funding

The Ministry of Science & Innovation is the primary funder of environmental research in New Zealand investing in the order of \$100 million annually, mainly to the CRIs and to a lesser extent universities. The amount actually allocated to environmental research no longer shows in Vote RS&T appropriations as 66% of the environmental research funding has gone to “CRI Core Funding”, leaving \$35M as contestable (Figure 1).

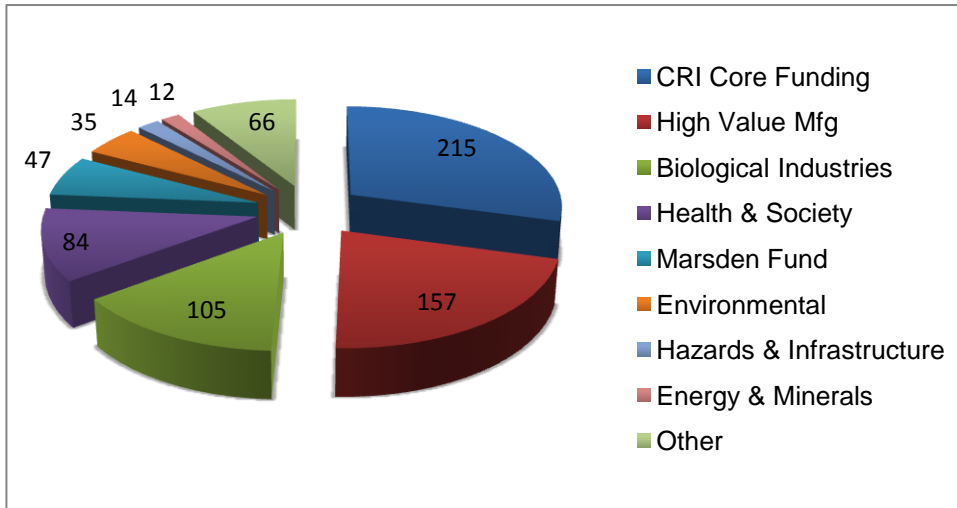


Figure 1. Government investment in research for 2011/12 (Source: Budget May 2011, Vote RS&T Estimates of Appropriations)

The scope of science that Regional and Unitary Councils can directly purchase is much smaller than the above. Councils will therefore influence the research agenda of New Zealand, not by economic force, but by appreciation of their collective insight arising from their unique role as resource managers and policy makers shaping New Zealand’s environment ‘on the ground’, and their understanding of the state of and pressures coming to bear on that environment.

Prior to the development of the RS&T Strategy, Regional and Unitary Councils were not formally involved as a unified voice in influencing Government funding allocations to environmental research or capability development. Today, key senior Regional Council staff are regularly consulted by the MSI, for Regional Council input on research priorities and funding allocation decisions.

MSI has a mandate to develop research priorities for Government science funding and does this in consultation with a wide range of stakeholders, including Central and Local Government, industry and others. MSI has encouraged Regional and Unitary Councils to develop and maintain a RS&T Strategy to provide a mechanism for more formal interaction with them, and particularly to provide a process to identify current as well as future research needs.

As a consequence of the CRI Task Force report recommendations, major changes were introduced in 2010 to the way science is to be directed and funded in the future. CRIs are to be more responsive to New Zealand’s end-user needs and will use advisory panels to guide research direction. There will be less contestable funding and greater core funding provided to CRIs, particularly in their areas of key focus. Contestable bidding will still be used for funds not considered core and the process will operate similarly to the way it did previously.

Current Focus of Government-Funded Environmental Science

There have been major changes in the Government’s focus on environmental science in the last two years and this is highlighted in MSI’s (FRST’s) Environment Sector Plan. It is

clear from this plan that the Regional Council RS&T Strategy has been influential in identifying both challenges and solutions.

Over the past decade, there have been significant shifts in the way the Foundation has operated its environmental research investment. Positive changes include¹:

- Improved engagement in investment strategies and programmes by key end users such as the Ministry for the Environment, the Department of Conservation **and Regional Councils**
- Better knowledge and technology transfer to key end users, with **Envirolink** playing an increasingly valuable role
- More integrated and holistic research programmes created by using outcome-based investments and stable funding investments
- Genuine efforts by major research providers to respond to government policies and priorities and to strategies developed by key end users.

(Source: Environment Sector Investment Plan 2010-2012. FRST Aug 2010)

Challenges

The challenges the Government faces to deliver greater benefit to New Zealand from environmental science, and which are to be addressed in the current Government science strategy include (from the Environment Sector Investment Plan 2010-2012):

- **Better connecting research to users:** To ensure value from the government's investment in environmental research, it is vital that the research is used by those who need it. End-users of environmental research need information that is relevant, easy to use and sufficiently targeted to help feed in to decision-making and policy setting.
- **Greater research linkages to policy:** A major issue noted in the 2004 environmental area review was the low levels of environmental policy-oriented research in New Zealand compared to other (OECD) countries.
- **Greater strategic alignment:** Given the number of other agencies investing in environmental research, it is important that the Foundation's investment does not duplicate or run counter to the strategic direction of other investment.
- **Greater identification of limits of acceptable environmental change:** There is an urgent need to identify ecological limits (tipping points) and other (social and cultural) limits of acceptable change for key natural resources.
- **More integrated and cross-disciplinary research:** Increasingly, environmental management and policy decisions require an understanding of whole systems. Examples of research where improved systems knowledge is needed in New Zealand include:
 - *Interactions between ecosystems*
 - *Cumulative effects*
 - *Weighing up multiple values of natural resources*
 - *Impacts of policy and management interventions*
 - *Data sharing / Open access to research and datasets*
 - *Greater use of new technologies*
 - *More consistent national data collection*

In view of these challenges, MSI is looking to ensure that national capability for environmental research is retained and developed in the following specific areas:

- Predictive science, including modelling and environmental forecasting.
- Developing decision-support systems and tools, including in terms of scenario building and futures thinking, particularly in terms of natural resources facing competition pressures (e.g. fresh water).
- Capability to translate research findings into an applied setting – i.e., signalling the implications of science for key user audiences within a regulatory, planning, policy and management context.
- Environmental economics and social research capability through a lens of valuation and management of natural resources
- Remote sensing and analysis, including in relation to land cover, land use and fresh water quality.
- Carbon flux and stock analysis
- Informatics, including geospatial data analysis and interpretation
- Taxonomy.

Enhancing capability in these areas is seen as a priority in order to help ensure better value is derived from current and future environmental research investment. MSI is also looking to ensure national capability in areas where key researchers will retire in the next few years and succession planning is required (e.g. soils and fisheries).

The government has a particular focus on delivering economic growth and sees “New Zealand’s natural resources having the potential to significantly raise our economic performance”. MSI will support this policy direction with investment in environmental research to:

- Identify and quantify the environmental impacts of economic activities on relevant natural ecosystems.
- Value natural resources, including in terms of setting non-economic (i.e. intrinsic) values alongside economic ones.
- Identify ecological limits or thresholds that ensure the sustainable use of a natural resource, and other limits of acceptable environmental change.
- Enable eco-certification of New Zealand’s products and services.

The Government has identified freshwater and climate change as two priority areas for environmental and other policy development and natural resource management in New Zealand.

Many of these key challenges were also identified in the March 2009 Regional Council RS&T Strategy, which has been referenced in the Environment Sector Plan as follows:

Underpinning these policies, strategies and programmes are a number of national (and sometimes sub-national) science strategies and plans designed to set the direction of supporting research. To the Foundation, these are key end user documents which will increasingly influence the strategic direction of its investment in environmental research. Examples include:

- Ministry of Research, Science and Technology: Environmental Research Roadmap (2007).
- **Research for the Environment: A Research, Science and Technology Strategy for Regional Councils (2009).**

(Source: Environment Sector Investment Plan 2010-2012. FRST Aug 2010)

The revised Regional Council RS&T Strategy endorses the above “challenges” and sees them as significant opportunities for Regional and Unitary Councils and central Government to collaborate.

Government Investment Levels in Environmental Research

- In the 2010/2011 financial year, approximately \$74.25 million + GST will be available for MSI to invest in environmental research. As per Budget 2010 decisions, the amount available for the Foundation to invest in environmental research by the 2013/2014 financial year will be approximately \$73.35 million + GST¹ (approximately \$84 million inclusive of GST).
- A further \$18 million + GST is available annually for environmental “backbone” assets (nationally significant databases, collections and infrastructure), bringing the Foundation’s total level of investment in environmental research to around \$103.8 million (inclusive of GST) in 2010/2011.

Government Investment Outcomes

MSI’s investment in environmental research will focus to a much greater degree in the future on delivering national benefit from high quality research that:

- Meets the priority information needs of key research end users
- Better links environmental research to policy setting and resource management
- Is scoped and delivered in such a way as to increase the uptake of the research findings by key research end users etc.

Government’s Implementation Pathway

To bring about the desired changes, MSI will engage much more closely with key research users to identify priority areas for research investment, including via a new Sector Advisory Group, and will seek increased alignment with the Regional Council’s (and others) science strategy.

Government Proposed Changes to Envirolink

In order to increase the use of the environmental research in which it invests, MSI has proposed to enhance its existing knowledge transfer tool (Envirolink) **as resources allow** to create an “Envirolink Plus” tool. Changes are proposed in respect of:

- A (gradual) increase in total investment allocation.
- An increase in financial thresholds for advice grants.
- Considering the use of access to post-graduate student research capacity
- Considering broadening advice grants to include all Regional and Unitary Councils for cross-council collaborative research.

¹ Budget 2010: Vote Research, Science and Technology: Estimates of Appropriations (2010/2011)

4. Strategic Goals for Regional Council RS&T

Regional Council staff, working with the Science Advisory Group, identified four key goals for the RS&T Strategy:

1. To provide timely, authoritative and respected direction to science research and funding
2. To catalyse and enhance science delivery
3. To facilitate science uptake
4. To ensure an ongoing RS&T strategy process

Goal 1 - To provide timely, authoritative and respected direction to science research and funding. This is mainly about having input to Government science direction, strategic priorities, and funding allocation. It is also about partnering with research providers in RS&T. This Goal recognises the key role that Regional and Unitary Councils play in delivering environmental outcomes.

Goal 2 - To catalyse and enhance science delivery. This Goal focuses on ensuring that Regional and Unitary Councils have the capability and capacity to deliver good science, and also that there is communication with research providers and especially universities as to future skill requirements and with Government on maintaining and enhancing key capability within the science sector generally.

Goal 3 – To facilitate science uptake. This Goal focuses on ensuring that science outputs are useful to Regional and Unitary Councils and that research results are applied in a timely manner.

Goal 4 - To ensure an ongoing RS&T strategy process. This Goal is about providing processes for governance and keeping the strategy alive and regularly updated.

Strategic Objectives under each Goal follow:

Strategic Objectives

Goal 1. To provide timely, authoritative and respected direction to science research and funding

Objectives for Goal 1:

1. To be recognised as a single, representative voice with a long-term focus, that produces robust scientific knowledge and actively drives policy development and implementation
2. To be recognised as a trusted partner, not just an end user, and a unified voice as to how research funding should be allocated
3. To be viewed as real partners by research providers and funders
4. To be integrally involved in MSI negotiated investments
5. To be recognised as an integral component of the science planning and implementation system
6. To secure and direct appropriate funding towards science goals to:
 - i. Understand current issues and cultural values (socio-economic) of the resources and implications to the future

- ii. Develop tools to manage the environment and broader roles and responsibilities of Regional and Unitary Councils
 - iii. Develop new monitoring technologies
 - iv. Develop pragmatic solutions for problems
 - v. Provide for more effective delivery of science
 - vi. Provide more certainty with uncertain information
 - vii. Provide for scenario testing
7. To maximise leverage on existing and new RC research funding to provide greater science direction
 8. To influence research providers and funding agencies on the culture required to meet Regional and Unitary Councils needs
 9. To advocate for multiple-provider team approach for effective use of science capability
 10. To meet tomorrow's problems as well as today's
 11. To foster the optimal use of science between councils
 12. To develop a system for ongoing prioritisation of research for RC's needs
 13. To be a voice to deal with outside agencies - such as MfE, DOC, MAF
 14. To establish clear intellectual property guidelines
 15. In a collegial manner, to systematically and regularly identify knowledge gaps in:
 - i. Characterising NZ's natural resources;
 - ii. Identifying inventories and trends;
 - iii. Improving knowledge of processes and systems that shape the resources;
 - iv. Continually evaluating and updating that knowledge;
 - v. Achieving and sharing consensus on practices that lead to sustainable resource management (while identifying and incorporating regional differences and distinctiveness).

Goal 2. To catalyse and enhance science delivery

Objectives for Goal 2:

1. To maintain and build capability and ensure resources are targeted to most effectively deliver environmental outcomes
2. To identify a process of identifying key Regional and Unitary Councils that are doing things well in some areas and use these councils as a conduit
3. To encourage partnerships and collaborative research effort
4. To empower SIGs to develop and implement research priorities
5. To assess and manage risk associated with the provision of science
6. To set up a system of advocating over public good science for maintaining capability
7. To collectively advocate to MSI, relevant ministries, and Chief Executive Environmental Forum (action - to identify the vehicle to advocate)
8. To establish mechanisms for greater council interaction
9. To establish processes for validation of research results (e.g., peer review vs. contract report)

10. To prioritise and target science that reflects and has regard to:

- Strategic importance for all RC's collectively but also for specific problems of wide significance
- Existing research capacity
- The likely benefits
- The ability of users to capture the benefits.

Goal 3. To facilitate science uptake

Goal 3 Objectives:

1. To encourage the implementation of schemes such as Envirolink
2. To promote the development and utilisation of knowledge management systems
3. To promote effective two-way communication including between science and policy within Regional and Unitary Councils, so that science and research provision remain orientated towards policy and uptake priorities
4. To use the Strategy to advise Regional and Unitary Councils to think about end use before defining product in the contract. Need to consider what the underlying purpose and value of any research really means
5. To influence central govt funding on appropriate output
6. To ensure effective RS&T output
7. To consider a continuum model to work with scientists
8. To advocate to councils that science knowledge is valuable
9. To develop new mechanisms to attract central govt funding for knowledge transfer and implementation
10. To ensure greater transparency and exchange as to who is doing what – e.g., between research providers and councils etc

Goal 4. To ensure an ongoing RS&T strategy process

Goal 4 Objectives:

1. To develop a process to review, refine, and update the strategy
2. To provide the necessary resource to ensure the strategy process if successful
3. To provide a governance mechanism to oversee the strategy process

5. Roles and Responsibilities

The Science Advisory Group (SAG) has been established and endorsed by the CEO Forum to provide a governance function to the development and ongoing implementation of the Research Strategy. A Strategy Coordinator is contracted on a part-time basis to coordinate the implementation of the Research Strategy and reports to the Science Advisory Group. The Resource Managers Group (RMG) and Biosecurity Managers' Group (BMG) oversee the Special Interest Groups (SIGs), who in turn are responsible for developing research priorities for their areas of expertise.

6. Research Prioritisation

Goal 1 of the RS&T Strategy is to “provide timely, authoritative and respected direction to science research funding”. To meet this goal Regional and Unitary Councils are required to have a good understanding of research requirements, both short and long-term. A priority setting process follows (Figure 2).

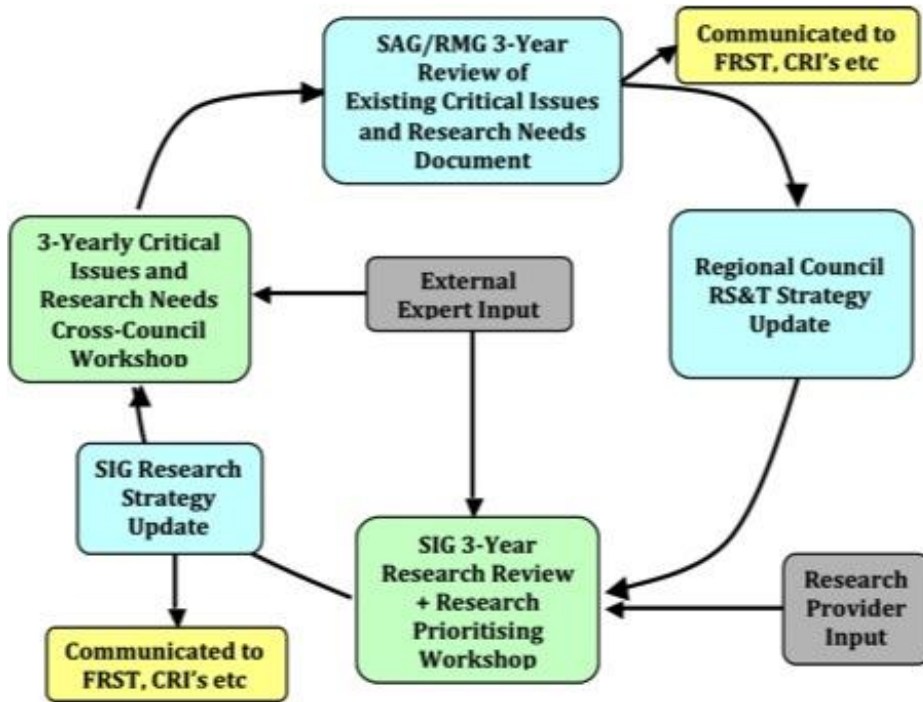


Figure 2. Research prioritisation process – 3-year cycle

The Regional Council SIGs will continue to play a major role in priority setting as they are exposed to the latest research in their areas of expertise and understand what is required, especially in the shorter-term. At the “SIG meeting to review research and identify priorities” it will be necessary for the SIGs to think longer-term in order to identify those areas of the environment that will need greater understanding 10, 20 and even 30 years in advance. It is anticipated that research providers will have significant input at these review meetings, but it will be Regional Council staff that best understand future council requirements.

SIG research priorities need to be communicated both to internal and external audiences: particularly MSI and its Advisory Panels, but also to key research providers to assist them with their strategic planning process. SIG research priorities need to be documented and fed in to the “Critical Issues and Research Needs” workshop. This provides an opportunity for the Science Advisory Group and the Resource Managers Group to develop an overview of all research priorities and to prepare a high level message to present to key government departments, particularly MSI, MfE and MAF. This exercise was conducted for the first time in June/July 2008 and has been repeated again in November 2010. SIG critical issues and research needs are contained in a separate document

7. Implementation

Key to the success of the Research Strategy is ensuring that the strategic planning process is maintained. A three-year rolling planning cycle is followed in line with the three-year cyclic review process for Long-term Plans (formerly Long-term Council Community Plans), including a process for developing an Annual Operating Plan (AOP) (Figure 3).

The AOP will be followed to drive the implementation of the Strategy. The Strategy Coordinator (SC), under the direction of the Science Advisory Group, will be responsible for the development of the AOP and its implementation. The SC will report to the Science Advisory Group (and RMG and BMG) on a regular basis. The AOP will include milestones (updated annually), which will be monitored as a measure of implementation success. The Science Advisory Group in turn reports to the Regional Councils' Chief Executives' Group.

As part of a three-year cycle, each SIG reviews current knowledge, identifies gaps, and holds a workshop to identify future research needs for their area of interest. This information will be communicated to both external parties, including MSI, CRI's, universities, and appropriate Government departments, and will also be fed into the SAG/RMG/BMG process for determining higher-level strategic research needs.

As shown in the planning cycle (Figure 2) a "Critical Issues and Research Needs" workshop will be held every three years to review the current situation and look ahead to future needs. The Futures Workshop held in November 2010 provided this perspective and an update of critical issues and research needs.

It is also intended that SIGs will work closely with key research providers through topical workshops or conferences held on a three-year rolling cycle. What this means is that NIWA, for example, might partner with the Regional and Unitary Councils once every three years to hold a workshop or conference on a particularly relevant topic.

Ensuring an Ongoing RS&T Strategy Process

The planning cycle is shown in Figure 3 below:

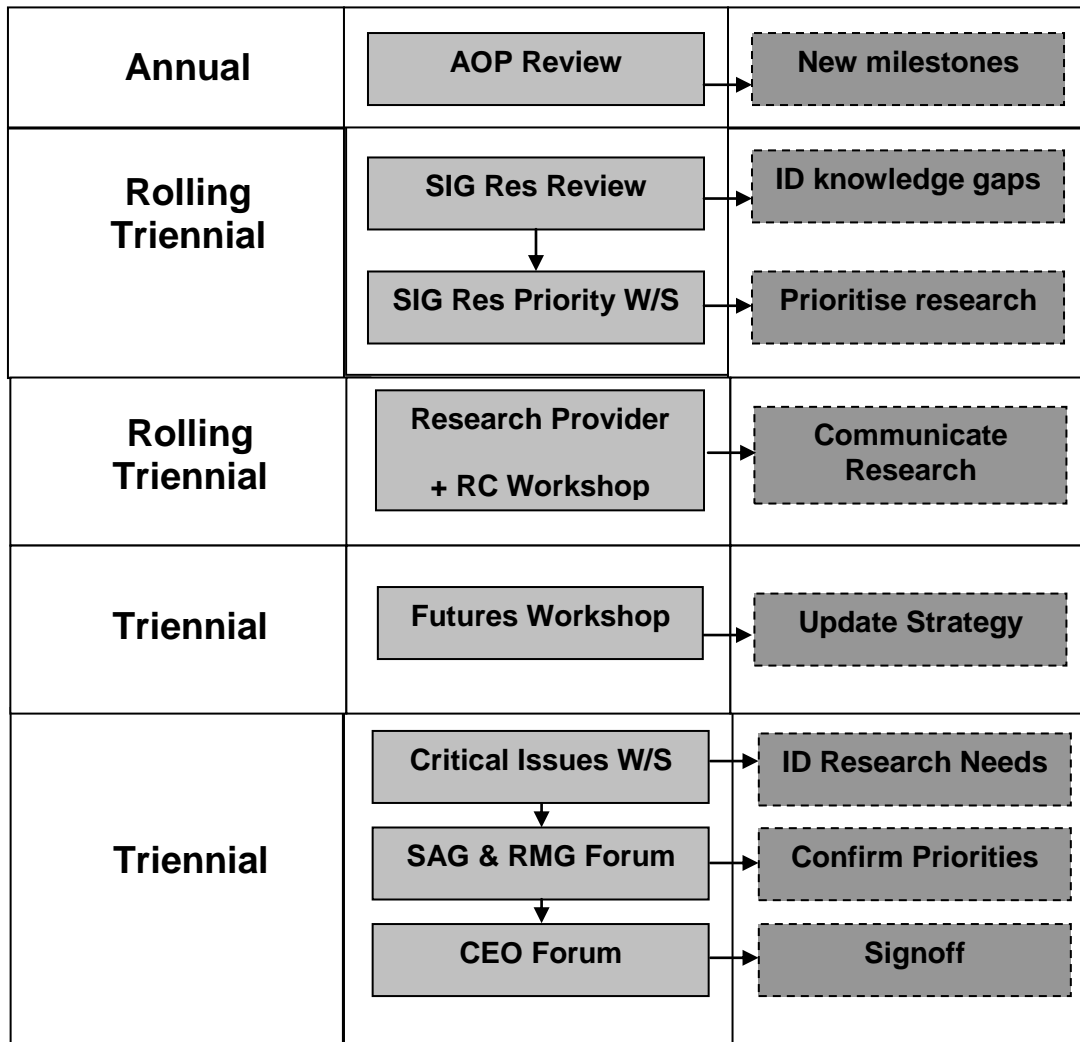


Figure 3. Regional Council RS&T Strategy Planning Cycle

8. Strategic Priorities

Regional Council staff, particularly through the Special Interest Groups, have identified a number of key priorities that need to be achieved by the Research Strategy process. These are:

(1) Provide Research Leadership

Develop key messages and present these to the MSI Minister and CEO in Wellington. This is specifically to ensure that key government departments recognise that Regional and Unitary Councils are serious about taking a much greater role in directing environmental research and will ensure that results are implemented for the benefit of New Zealand.

It is also important that a similar message is delivered to key environmental research providers and that they realise that Regional and Unitary Councils want to have a closer partnership with them in developing research priorities, programmes of work, and implementation pathways.

(2) Take Action

Prepare the Annual Operating Plan each year and deliver on milestones. Delivering the milestones in the AOP is seen as key to implementing the RS&T Strategy. Annual milestones have to be relevant and realistic, and require commitment at all levels within Regional and Unitary Councils. It is also intended to work closely with MSI to ensure that Regional and Unitary Councils are specifically referred to in strategic documents as being key “partners” in environmental research planning and implementation.

(3) Prioritise Research Needs

Develop and implement a research prioritisation process with the Special Interest Groups. The SIGs are key to the development of research area specific priorities. These need to be collated, prioritised and communicated to key government departments. Special Interest Group critical issues and research needs are contained in a separate document.

(4) Develop Partnerships

Identify important RS&T partners and work with them to help develop research priorities and to identify capability needs. There are a number of key research providers that are most relevant to providing research for Regional and Unitary Councils to assist with science-based decision making and to deliver environmental benefit.

(5) Improve the Funding Profile

Determine how Government and Regional Council funds are currently allocated and how this might be improved to deliver greater benefit to New Zealand. In particular, understanding how environmental research funding is prioritised at the highest level and ensuring that the Regional Council RS&T Strategy can influence this decision making.

(6) Maintain focus on solutions to current and imminent resource management problems

Regional councils face ever-increasing pressure to find solutions to increasingly complex resource management issues that arise from the realities of economic drivers vs environmental constraints. Regional Councils are aware that what's invested in strategic science is important, yet they are also aware that there is a need to invest in creating commercial and operational technical solutions to the observed problems. Research must provide useable outcomes and applications if it is to promote community wellbeings. Proffered solutions must always be validated and supported by robust science, but equally, the science must be targeted at providing uptake and application that undergirds and enhances resource management, thus offering value to 'NZ Inc'.

9. Current High Level Research Priorities`

In the two years since the CEO Forum approved the last RS&T Strategy the landscape has changed and there is much greater focus on using science to improve the economic performance of the country and ensuring greater efficiencies in the entire science system. In particular there is a strong focus on delivering enduring economic growth from New Zealand's natural resources. MSI will invest in environmental research to identify and quantify the environmental impacts of key economic activities; value natural resources; identify ecological limits; and enable eco-certification of NZ products.

MSI has identified the key challenges they face to deliver greater benefit from environmental science (see section 3.1 for detail). These are:

- Better connecting research to users
- Greater research linkages to policy
- Greater strategic alignment
- Greater identification of limits of acceptable environmental change
- More integrated and cross-disciplinary research

MSI is clearly signalling a number of key changes in the way science priorities are to be identified and funded. There is now an even better opportunity for Regional and Unitary Councils to influence key research funding decisions than there has been in the past two years. However, this requires having an agreed research strategy with agreed key priorities. In line with these challenges, and in consideration of critical issues and research needs identified by the Regional and Unitary Councils CEOs following preparatory work by Special Interest Groups and the Science Advisory Group, the current high-level research priorities for Regional and Unitary Councils are:

1. Policy Effectiveness

There is a need for better approaches for assessing the effectiveness of policy, including a tool that can model the likely impact of policy options in terms of cost-effectiveness and efficiency. The opportunity is to undertake research into the challenging area of assessing the efficacy of different policy approaches, measured against a potentially large array of criteria. Such research would need to be integrated with State of the Environment Monitoring and Long-term Plan monitoring.

2. Freshwater

Water research will remain a high priority for councils as pressure on resources continues to grow. However, the research questions are becoming more complex and the requirement is for both tools to help managers identify, implement and evaluate preferable management options, but also research to determine how to effect societal behavioural changes. For many issues the research has been done and the answers are known, and now the results need to be carried through into effective policy. Related to this there is also a pressing need, for water and for other resources as well, to research new methodologies to enable Regional and Unitary Councils to place financial and non-financial values on environmental resource services (see Resource Valuation). For all water resources – surface, groundwater, estuarine, and coastal ecosystems, there is a need to better understand the cumulative impacts of activities on water quality. This relates directly to MSI's target to identify ecological limits. Mechanisms available to address cumulative effects under the RMA are limited and we have only limited scientific knowledge of how stressors interact and how ecosystems respond to multiple stressor exposures or to alternative mitigation or remediation interventions.

3. Soil

As for water we require greater research effort to develop methods to enable Regional and Unitary Councils to recognise and place financial and non-financial values on soil environmental services services (e.g. health, productivity, ecology, structural integrity, carbon sequestration) for determining tradeoffs to guide policy formulation. There are also significant needs for improved soil and land use information, particularly if New Zealand is to extract greater productivity from our natural resources. Some soils have become contaminated by heavy metals and other contaminants and research is required to identify areas of contaminant accumulation and methods to reduce these levels. Also with regard to diffuse source pollution, while we know a considerable amount about the impact of land use on water quality, we require more research effort to understand the links between farm scale and catchment scale; cumulative effects; transfer pathways and the attenuation of nutrients and contaminants through soil and vadose zone prior to emergence into ground and surface water.

4. Resource Valuation

There is a need to better identify tradeoffs and weigh up multiple values of natural resources. Increasingly, environmental management and policy decisions require a 'whole systems approach' based on integrated and cross-disciplinary research. Taking a long-term and integrated approach to planning and decision-making, where economic development is cognisant of limited resources and the wellbeing of our communities is crucial for NZ's future. Recent emphasis on spatial planning (Auckland, other councils) highlights the importance of linking data and information from various sources across central/local government and linking economic, social/cultural and environmental knowledge. Valuing non-market contributions to wellbeing and understanding behavioural change are essential to achieve the outcomes our society desires.

Research is needed to understand and value the economic and social/cultural dimensions of natural resources, including the implications of market failure. This research would have wide application across all natural resources and all regions, but currently the NZ skill base is very limited (see later under "Science Capability").

5. Hazard Risk Assessment

There is an overall need for better tools to assist with the analysis of, and effective responses to, hazards and consequent societal risks. More research is needed to provide a more robust and defensible position to address hazard risk more effectively, and to give decision makers confidence. The key issue is risk management – how to deal with risk, identifying effective risk reduction measures and balancing risk reduction with acceptable cost. This includes residual risk, which is seen as a critical planning issue around questions of where development is appropriate in relation to our understanding of the various risks.

6. Biosecurity

There are a number of biosecurity issues that need greater research effort including systems (tools and methodologies) to manage multiple pests at sites and across landscapes. Humane and cost-effective alternative toxins are needed to replace 1080 and brodifacoum, as both are under threat as pest control tools. Additionally, there is a requirement for cost-effective performance measurement and outcome monitoring tools for protecting and enhancing biodiversity values through the application of pest management.

Science Capability

Both MSI and Regional and Unitary Councils view enhancing capability in areas of high priority research need as very important. Regional and Unitary Councils particularly feel that capability needs to be increased in “soils” and in “resource evaluation” – including economic and social research skills.

Soils Capability

New Zealand’s economy is largely based on soils, and any drive for increased economic growth from the primary production sectors must take a strategic view of this valuable resource. Despite the importance of soil to New Zealand, many decisions being made today are costing us million of dollars in lost opportunity and are rapidly degrading the options for future generations. Recent “soil strategy meetings”, hosted by Landcare Research, identified the opportunity for ‘sustainable intensification’, which simultaneously supports higher national yields and better environmental protection. However, science needs to look at the two pillars of (a) environmental integrity and (b) productivity and economic growth – one on its own is untenable. A large part of the challenge is to build capacity around “natural system networks”, with soils at the centre of the picture. A strategic approach is required to identify exactly what is needed and what additional skill sets need to be developed.

Resource Evaluation Capability

There is a skill gap in New Zealand for experts who are able to identify tradeoffs and weigh these up against the multiple values of natural resources. University training is required to produce graduates who can understand and value the economic and social/cultural dimensions of natural resources, including the implications of market failure. They also need to be able to include social/cultural perspectives in research on interventions, including research on behavioural change, social marketing and consumer behaviour. Training should include methodologies and participation processes for balancing economic, social/cultural and environmental values (e.g. deliberation, collaborative governance, incorporation of non-market factors such as effects on ecosystem services,

integrated spatial models and other decision support systems, full-cost accounting, Genuine Progress Index). Graduates from such programmes should be able to identify and clearly communicate trade-offs and/or complementarities between economic and non-market values; contribute to identifying limits or thresholds of acceptable change informed by societal or cultural values (to complement information about ecological tipping points); and be involved in the evaluation of the effectiveness of current policies, programmes and projects using economic and social science methods.

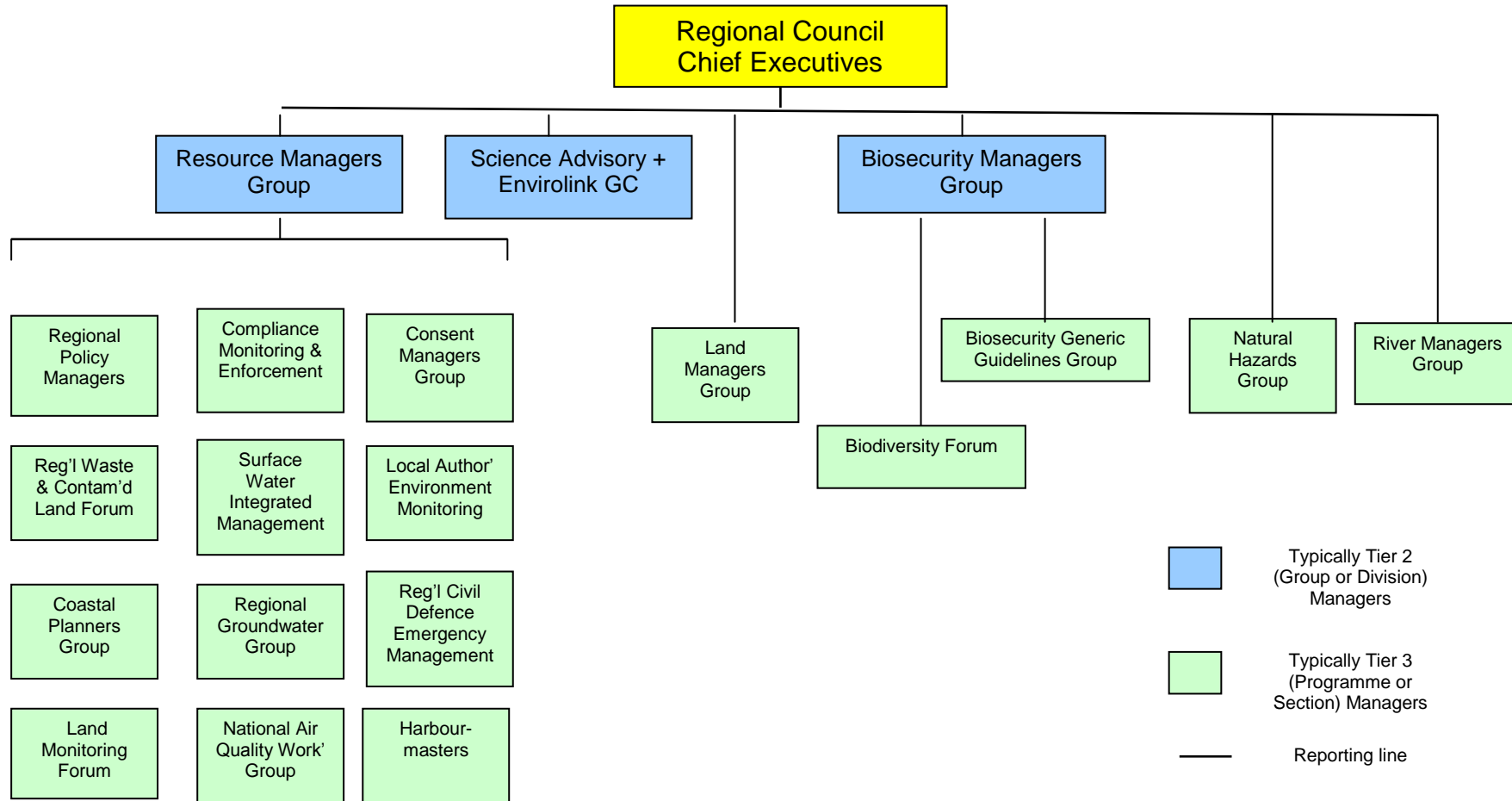
Special Interest Groups Critical Issues and Research Needs

A separate document “Special Interest Groups Critical Issues and Research Needs” highlights those critical issues identified by the Regional Council SIGS. These are primarily research-area specific priorities that indicate where the specific SIGs see the greatest need, primarily in the medium term.

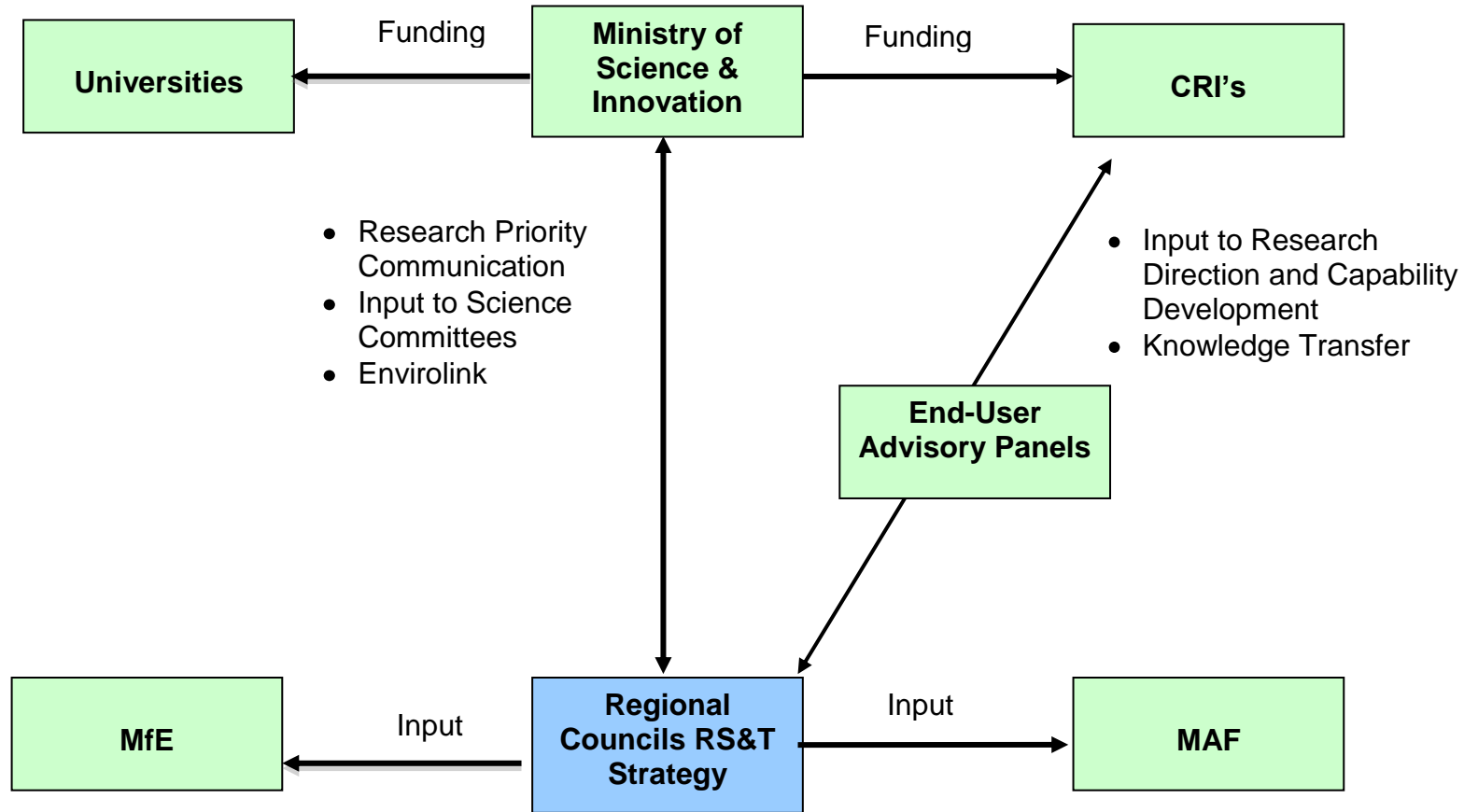
Appendices

- 1 Regional Council Special Interest Groups – April 2011
- 2 Regional and Unitary Councils in the Bigger Environmental and Resource Science Picture
- 3 Draft 2011/2012 – Research Strategy - Annual Operating Plan

Appendix 1 – Regional Council Special Interest Groups – September 2011



Appendix 2 – Regional and Unitary Councils in the Bigger Environmental and Resource Management Science Picture



Appendix 3 – Research Strategy - Draft 2011/2012 Annual Operating Plan

Objective	Action
<p>Goal 1. To provide timely, authoritative and respected direction to science research and funding</p> <p>Objectives for Goal 1:</p> <ol style="list-style-type: none"> 1. To be recognised as a single, representative voice with a long-term focus, that produces robust scientific knowledge and actively drives policy development and implementation 2. To be recognised as a trusted partner, not just an end user, and a unified voice as to how research funding should be allocated 3. To be viewed as real partners by research providers and funders 4. To be integrally involved in MSI negotiated investments 5. To be recognised as an integral component of the science planning and implementation system 	<p>(To be completed by 30 June 2012)</p> <ol style="list-style-type: none"> 1. Visit key Govt CEO's – MSI², MfE, MED and deliver a clear message on priorities and capability needs 2. Visit key Research Provider CEOs and promote RC involvement on key MSI panels 3. Promote RC involvement on key Research Provider advisory panels 4. Promote RC involvement in key MSI negotiated investments 5. Plan meetings with MSI at key budget times

² Acronyms: MSI = Ministry of Science & Innovation; MfE = Ministry for the Environment; MED = Ministry for Economic Development; RC = Regional and Unitary Councils; RP = Research Provider

<p>6. To secure and direct appropriate funding towards science goals to:</p> <ul style="list-style-type: none"> i. Understand current issues and cultural values (socio-economic) of the resources and implications to the future ii. Develop tools to manage the environment and broader roles and responsibilities of Regional and Unitary Councils iii. Develop new monitoring technologies iv. Develop pragmatic solutions for problems v. Provide for more effective delivery of science vi. Provide more certainty with uncertain information vii. Provide for scenario testing <p>7. To maximise leverage on existing and new RC research funding to provide greater science direction</p> <p>8. To influence research providers and funding agencies on the culture required to meet Regional and Unitary Councils needs</p> <p>9. To advocate for multiple-provider team approach for effective use of science capability</p> <p>10. To meet tomorrow's problems as well as today's</p> <p>11. To foster the optimal use of science between councils</p> <p>12. To develop a system for ongoing prioritisation of research for RC's needs</p> <p>13. To be a voice to deal with outside agencies - such as MfE, DOC, MAF</p> <p>14. To establish clear intellectual property guidelines</p>	<p>6. Work with MSI, RPs, and RCs to (i) encourage more socio-economic research on current issues; develop new tool to assist environmental management, including new monitoring technologies.</p> <p>Encourage direct involvement between RC staff and RP scientists to ensure research leads to pragmatic solutions and that science is delivered in a form that can readily be picked up by RCs.</p> <p>7. Work with SIGS and all Councils to avoid duplication</p> <p>8. Develop and promote a clear message on culture to RPs</p> <p>9. Determine what new research projects require a team approach and communicate to RPs</p> <p>10. To continue the process with SIGS to identify future issues</p> <p>11. Develop a process to optimise use of science between councils</p> <p>12. Continue research prioritisation process</p> <p>13. Meet with MfE, DOC, MAF on key issues</p> <p>14. Communicate RC's IP policy to RPs</p>
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<p>15. In a collegial manner, to systematically and regularly identify knowledge gaps in:</p> <ol style="list-style-type: none"> i. Characterising NZ's natural resources; ii. Identifying inventories and trends; iii. Improving knowledge of processes/systems that shape the resources; iv. Continually evaluating and updating that knowledge; v. Achieving and sharing consensus on practices that lead to sustainable resource management (while identifying and incorporating regional differences and distinctiveness). 	<p>15. Continue to work with SIGS and councils to identify knowledge gaps in environmental and resource management science; work with RPs and MSI to encourage greater knowledge dissemination of MSI-funded research on CRI websites etc</p>
<p>Goal 2. To catalyse and enhance science delivery</p> <p>Objectives for Goal 2:</p> <ol style="list-style-type: none"> 1. To maintain and build capability and ensure resources are targeted to most effectively deliver environmental outcomes 2. To identify a process of identifying key Regional and Unitary Councils that are doing things well in some areas and use these councils as a conduit 3. To encourage partnerships and collaborative research effort 4. To empower SIGs to develop and implement research priorities 5. To assess and manage risk associated with the provision of science 6. To set up a system of advocating over public good science for maintaining capability 	<p>(To be completed by 30 June 2012)</p> <ol style="list-style-type: none"> 1. Communicate to MSI etc capability needs in Resource Evaluation and Soils 2. Progress the concept of RCs as key knowledge hubs for areas of expertise 3. Work with RP advisory panels to establish appropriate collaborative research 4. Encourage SIGS to communicate priorities to research providers and "partner" to initiate new projects 5. Work with MSI to develop a mechanism to address risk associated with science 6. SAG to use the Strategy to advocate for key areas of science capability need

<p>7. To collectively advocate to MSI, relevant ministries, and Chief Executive Environmental Forum (action - to identify the vehicle to advocate)</p> <p>8. To establish mechanisms for greater council interaction</p> <p>9. To establish processes for validation of research results (e.g., peer review vs. contract report)</p> <p>10. To prioritise and target science that reflects and has regard to:</p> <ul style="list-style-type: none"> • Strategic importance for all RC's collectively but also for specific problems of wide significance • Existing research capacity • The likely benefits • The ability of users to capture the benefits. 	<p>7. SAG to continue in its key advocacy role</p> <p>8. Continue to promote greater interaction on key topics, and focus on Resource Evaluation</p> <p>9. Continue to work with research providers and SIGS to establish and implement a process for validation of research results</p> <p>10. Promote the research priorities from the current Strategy to MSI and RPs, as well as to Regional and Unitary Councils.</p>
<p>Goal 3. To facilitate science uptake</p> <p>Goal 3 Objectives:</p> <p>1. To encourage the implementation of schemes such as Envirolink</p> <p>2. To promote the development and utilisation of knowledge management systems</p>	<p>(To be completed by 30 June 2012)</p> <p>1. Work with MSI to develop Envirolink Plus in the anticipation of new funding</p> <p>2. Continue to promote the Envirolink Search Engine to RPs and others</p>

<ol style="list-style-type: none"> 3. To promote effective two-way communication including between science and policy within Regional and Unitary Councils, so that science and research provision remain orientated towards policy and uptake priorities 4. To use the Strategy to advise Regional and Unitary Councils to think about end use before defining product in the contract. Need to consider what the underlying purpose and value of any research really means 5. To influence central govt funding on appropriate output 6. To ensure effective RS&T output 7. To consider a continuum model to work with scientists 8. To advocate to councils that science knowledge is valuable 9. To develop new mechanisms to attract central govt funding for knowledge transfer and implementation 10. To ensure greater transparency and exchange as to who is doing what – e.g., between research providers and councils etc 	<ol style="list-style-type: none"> 3. Continue to involve the Policy SIG in identifying critical issues and research opportunities; implement suggestions 4. Continue to promote this message to RC staff 5. Continue to make the case to MSI and TEC that output needs to be appropriate in order to be implemented 6. Continue to communicate to NIWA, Landcare, and others as to what effective RS&T is 7. Provide a continuum model to NIWA and Landcare to test 8. Continue to demonstrate the importance of science to decision making 9. Part of Envirolink Plus 10. Develop a page for the Envirolink website showing linkages
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<p>Goal 4. To ensure an ongoing RS&T strategy process</p> <p>Goal 4 Objectives:</p> <ol style="list-style-type: none"> 1. To develop a process to review, refine, and update the strategy 2. To provide the necessary resource to ensure the strategy process is successful 3. To provide a governance mechanism to oversee the strategy process 	<p>(To be completed by 30 June 2012)</p> <ol style="list-style-type: none"> 1. SAG to review before 30 June 2012 2. Research Coordinator on board 3. SAG to provide governance and report to CEO Forum