Overarching research principles

In addition to the Roadmap themes, there are overarching research principles that are particularly critical for protecting New Zealand's environment and the future prosperity and well-being of its people.

Collaboration

A culture of collaboration and interdisciplinary research partnerships – both within New Zealand and internationally – is a key to success in providing policy-relevant conservation and environmental science. This includes collaboration between researchers nationally, facilitated by improved data-sharing practices and data infrastructure, as well as more and better use of citizen science.

Mātauranga Māori

Treaty settlements and increased emphasis on collaborative approaches have highlighted the benefit of using mātauranga Māori for informing conservation and environmental policy and management. The Roadmap supports the integration of mātauranga concepts across all themes to provide more system-wide solutions to environmental sustainability, as well as supporting mātauranga Māori in its own right.

Taxonomic collections and expertise

Continued resourcing for discovery, documentation, and improving our knowledge of biota is critical. Up-to-date taxonomic collections and taxonomic expertise are vital to produce the evidence base for conservation and environmental management, as well as having broader cultural and scientific importance.

Environmental monitoring, data sharing, and infrastructure coordination

National data coordination and information exchange needs to be established for all types of environmental data, requiring investment in data infrastructure and management, and establishing protocols for open data access. Ongoing environmental monitoring is imperative, facilitated by technical innovation in areas of big data and remote sensing.

For more information and a copy of the full Conservation and Environment Science Roadmap visit: *www.mfe.govt.nz/about-us/our-policy-and-evidence-focus/conservation-and-environment-science-roadmap.*

Ministry for the **Environment**
Manatū Mō Te Taiao

Department of Conservation
Te Papa Atawhai

Research priorities – first 5 years

The Roadmap sets out research goals and objectives for a 20-year timeframe. This is critical for long-sighted decision-making about research needs. However, it is also necessary to have clear priorities over the shorter term. Owing to limited funding and capability, not all research can be given the same weighting, and critical choices need to be made.

Through in-depth discussion with science and policy experts from the natural resource sector government agencies, regional councils, and other research organisations, the following areas of research from within this Roadmap have been identified as indicative priorities for the next 5 years. These priorities are intended to provide clear direction, but will be refreshed as issues evolve and change.

Environmental monitoring

» New and improved tools for gathering and reporting data on condition and trends for our land, fresh water, air and marine environments.

Climate change

» Adaptation and mitigation scenarios that test and demonstrate the sensitivity of New Zealand's environment, economy, and society to climate-related impacts and extreme events.

» Technologies and practices for reducing greenhouse gas emissions.

» Models that help us better understand how changes to land-based activities that affect greenhouse gas emissions also influence freshwater quality and quantity and biodiversity.

Biosecurity

» Widely accepted and affordable solutions to invasive pests, weeds and diseases that have high-risk conservation, economic or health implications.

Integrated ecosystems

» Models that assess the effectiveness of interventions, particularly freshwater restoration programmes, including whitebait fisheries.

» Improved understanding of how our use of land affects freshwater quality and ecosystems.

» Predicting environmental thresholds and tipping points so we can look after our natural ecosystems better.

» Models and data that help communities make resource management decisions that have implications across our land, freshwater and marine ecosystems.

Fresh water

» A better understanding of how contaminants, including excess sediment, affect ecosystems, human health, and recreation to inform how we manage urban and rural land and water use.

Coasts and oceans

» Identifying key marine habitats that provide for the values we hold for biodiversity, traditional food gathering (kaimoana), recreation, and commercial fisheries.

» Understanding present and future threats to these habitats, including from climate change, and assessing management options.

Species and populations

» Cost-effective technologies to manage the threats to native species, particularly to help achieve the 'predator-free New Zealand 2050' goal.

» Improved tools for completing taxonomic inventories of coastal and oceanic species and land-based invertebrates.

Social and economic factors

» How to build social and cultural capital to manage the environment more effectively (including the acceptance of new technologies).

» Comprehensive models of New Zealanders' values, beliefs and understanding of conservation and the environment.

# Conservation and Environment Science Roadmap

AT A GLANCE

New Zealand Government

The *Conservation and Environment Science Roadmap* identifies the scientific knowledge required in the next 20 years to support decision-making into the future.

The Roadmap identifies research needs across all scientific fields, and aims to strengthen collaboration between them by putting everyone 'on the same page' in terms of the big environmental issues we face in New Zealand.

It provides direction toward a future where our economic, social and cultural well-being is supported by a healthy environment, allowing us to harness the potential of our biophysical resources.

The research questions and priorities identified in the Roadmap are grouped under six themes, which are in turn arranged by four theme groupings: process, pressure, domain and human dimensions. Each of these themes and theme groupings are explained below. However, the Roadmap also recognises that the themes, and issues within them, are all interconnected, and the connections between them must be considered when developing effective solutions.
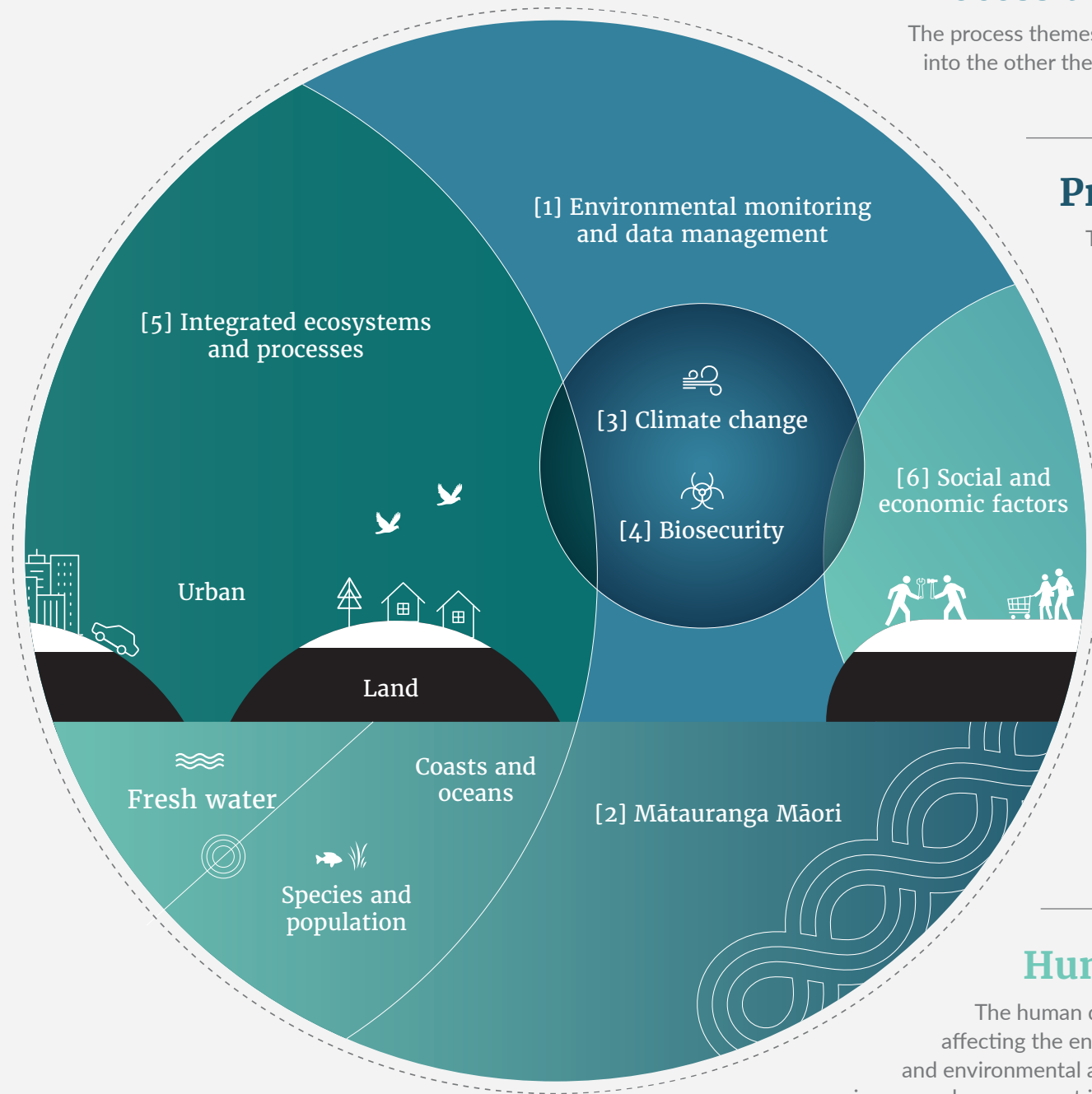
Process themes

The process themes support all areas of research and are interwoven into the other themes, but also stand as themes in their own right.

THEME [1] Environmental monitoring and data management

Developing, improving and integrating systematic observations, tools, databases, modelling and monitoring technologies for understanding and reporting on natural resource management.

THEME [2] Mātauranga Māori

Recognising, developing and utilising mātauranga Māori both alongside and integrated with other science approaches, to improve environmental outcomes and enable Māori to exercise kaitiakitanga (stewardship) and other traditional roles.

Pressure themes

The pressure themes encompass cross-cutting issues across the biophysical domains. Pressures such as population growth, resource consumption, and environmental contaminants are not dealt with as separate themes but are incorporated into research questions within the themes.

THEME [3] Climate change

Improved monitoring and modelling of observed and expected changes and their environmental, social and economic impacts; development of mitigation and adaptation options; tools and approaches to reduce emissions.

THEME [4] Biosecurity

Data, understanding, and tools to help achieve effective and efficient management of risks posed by pests and diseases, including eradication of invasive species.

Domain theme

The domain theme relates to the interactions between ecosystems and processes across all domains – land, fresh water, coasts and oceans, and urban – as well as species and populations.

THEME [5] Integrated ecosystems and processes

Data and tools to inform integrated management of the environment as a whole, understanding complex interactions between land, fresh water, coasts and oceans, urban environments, and species and populations, which also represent sub-themes under this theme.

Land
Data, understanding and tools to guide policy and management approaches to improve conservation and environmental outcomes.

Fresh water
Data, understanding and tools to support policy and management approaches that achieve healthy and resilient ecosystems and habitats, meet cultural and recreational needs and avoid adverse human health impacts, while enabling the efficient, equitable and productive use of water.

Coasts and oceans
Data, understanding and tools to support policy and management approaches that enable coastal and oceanic species, ecosystems and processes to be sustained or recovered, and which support biodiversity and the contribution of our coasts and ocean to the prosperity and well-being of New Zealanders.

Urban
Identifying ways to achieve more resilient and liveable urban environments, maximising their value for people and biodiversity and environmental quality while minimising negative impacts on public health, and on land, fresh water and coastal and marine environments.

Species and populations
Data, understanding and tools to inform management and policy to protect our native biodiversity and habitat quality in the face of multiple and increasing cumulative pressures, such as habitat degradation and reduction, pests and climate change.

Human dimensions theme

The human dimensions theme relates to the 'human' factors affecting the environment, including links between values, beliefs and environmental attitudes, environmental knowledge, social licence issues, and engagement in governance and decision-making.

THEME [6] Social and economic factors

Identifying societal values for the environment and developing effective methods to assess the value of natural capital and ecosystem services to inform environmental and economic decision-making. This theme also includes economic factors including the effect of changes in international market forces.