National
SCIENCE
Challenges

RESILIENCE
TO NATURE'S
CHALLENGES

Kia manawaroa
– Ngā Ākina o
Te Ao Tūroa

2022 - 2023
Annual Report

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Our Challenge

Whiti Ora

Kimihia te pō,
Rangahaua te ao,
Kia Io Rangi, kia Io Whenua.
Kei ngā mata o te ariki,
Kei mata nuku, kei mata rangi,
kei reira koe e Tāne Te Waiora!
Ko ngā maunga Rū,
ko ngā awa Parawhenua,
here uta ki tai ki a Tangaroa e!
Ko koe ko au ko tāua nei,
Whiti ao, whiti whiti ora!
Ara mai te toki!
Haumiē hui ē tāiki ē!

Explore the unknown
Investigate the known
Search heaven and earth
Physical and metaphysical.
Celestial and terrestrial.
From the turbulent realm of
unknown potential, gaining
enlightenment, emerging life!
The roar of mountains and
overflowing rivers, bind land
to sea.An intrinsic connection,
bind you and I together.
We re-emerge, resilient,
with continuing influence!
We call to action!
In this we are united,
collected and agreed.

This karakia was gifted to us by Josh Te Kani (Ngāi Te Rangi, Ngāti Ranginui, Ngāti Pūkenga)

Image above and on cover: Taranaki, New Zealand. Credit: Yoann Laheurte

Ngā Mātāpono
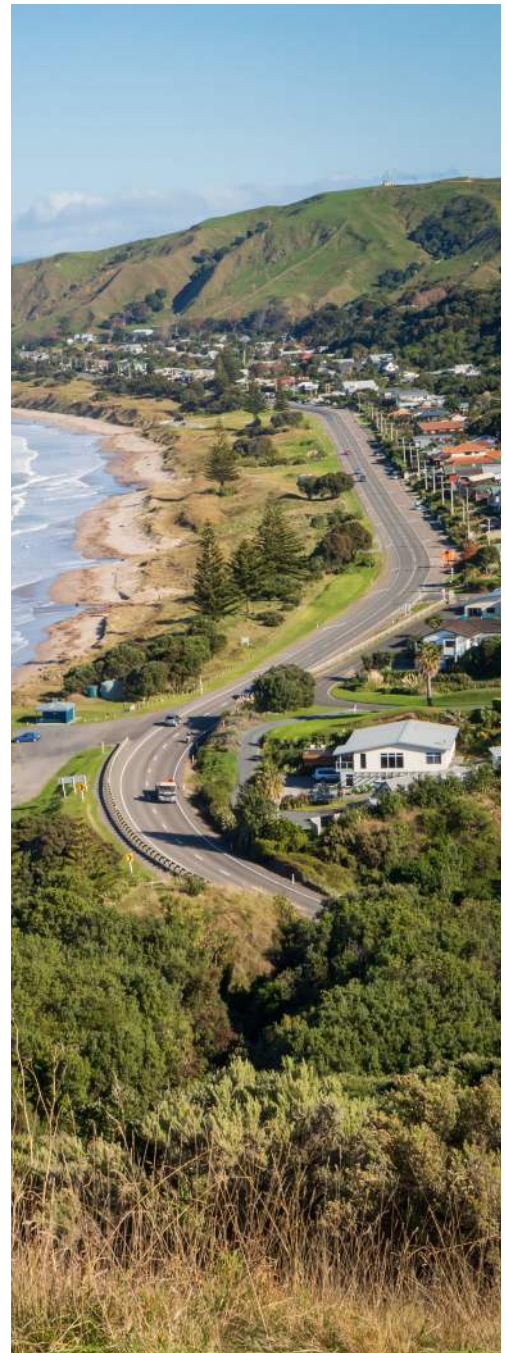## Principles

Mana motuhake

We believe Māori should be in control of shaping their own resilience to natural hazards, according to kaupapa and informed by mātauranga Māori. The Resilience Challenge supports 'by Māori for Māori' research that addresses the resilience needs of Māori communities. In this way we support mana motuhake which describes mana through self-determination and control over one's own destiny.

Rangatiratanga

In accordance with *rangatiratanga*, we respect the mana of leaders from communities and groups we work with and aspire to earn their respect by demonstrating open, inclusive leadership.

Kaitiakitanga

Creating a more resilient Aotearoa New Zealand for future generations evokes the concept of *kaitiakitanga*. In particular, we recognise Māori hold an important role as kaitiaki of their local environments and communities. Māori knowledges of natural hazards and their impacts can inform responses that build resilience for tangata whenua and wider Aotearoa New Zealand.

Ngā Mātāpono
Principles

Manaakitanga

We are motivated and guided by our care for communities at risk from natural hazards. We aspire to embody the concept of *manaakitanga* in our engagement with communities.

Whanaungatanga

We achieve our aims through collaborating with others, for mutual benefit. In keeping with *whanaungatanga,* we are committed to fostering meaningful and respectful relationships with knowledge-holders, communities we are working with, and the people and groups using our research.

Whakapapa

We learn from the concept of *whakapapa.* We look to the past to understand the future. We learn from traditional knowledge-holders, research leaders, affected communities and from the whenua. In turn we enable and nuture the next generation of leaders.

Tauututu

The concept of *tauutuutu,* or reciprocity, underpins all of these mātāpono. Tauututu is cyclical, whereby an act of good will is returned, and through these repeated acts, relationships are deepened and enriched.
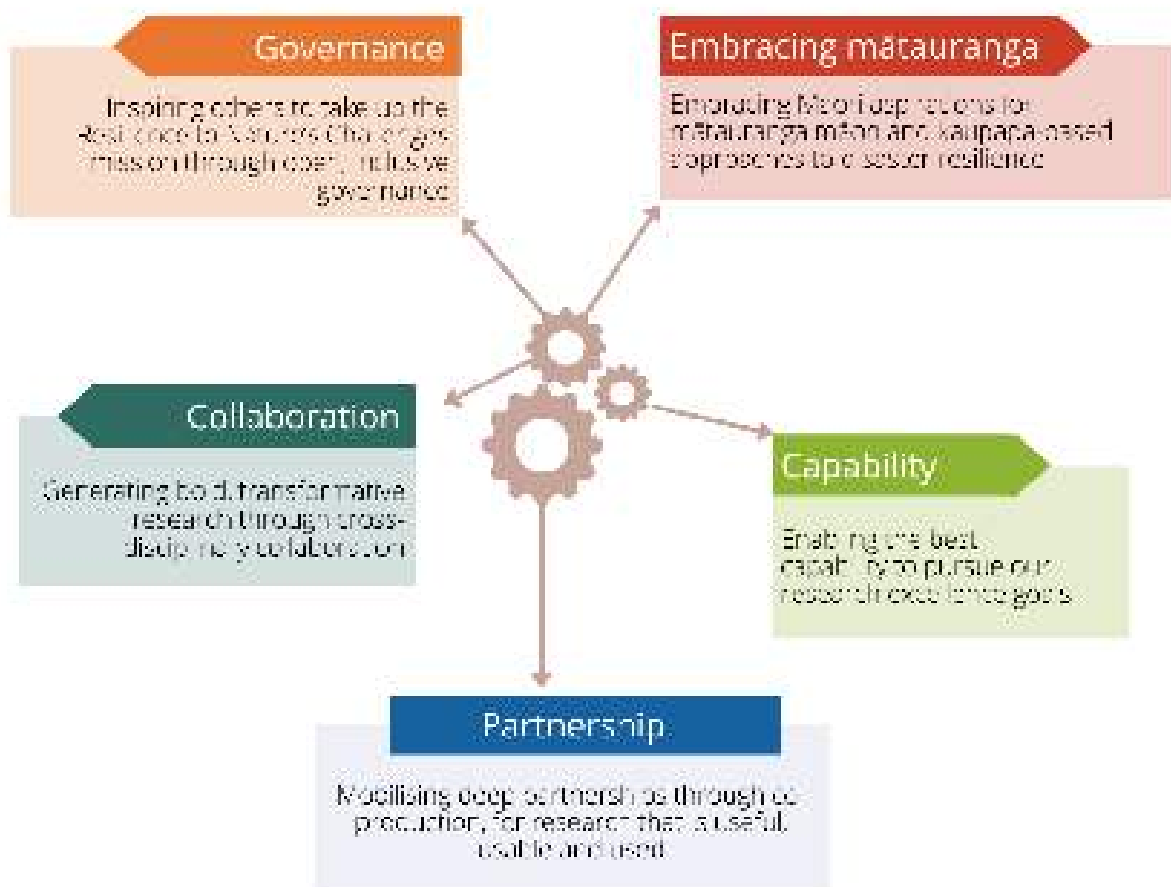
Our Challenge

Our Mission

To accelerate Aotearoa New Zealand's natural hazard resilience through innovative, collaborative science

Our Vision

Aotearoa New Zealand has fully embraced natural hazard resilience and actively manages disaster risk, enabled by new knowledge, mātauranga, tools, and ways of working

How we work

Our Research

Our work is organised around two central themes: **Understanding Hazard and Risk** and **Accelerating Resilience.**

These themes address the National Disaster Resilience Strategy and harness the combined research strengths of Phase 1 (2015 - 2019) of the Resilience Challenge and the Natural Hazard Research Platform. Within these two central themes are ten research programmes, which continue to evolve and adapt.

The **Understanding Hazard and Risk** theme comprises new modelling to advance our understanding of natural hazards (such as earthquakes and tsunami, volcanoes, coastal hazards, high impact weather, and wildfires).

Multi-Hazard Risk	Earthquake & Tsunami	Volcanoes	Coastal Environments	Weather and Wildfire

The **Accelerating Resilience** theme comprises mātauranga Māori, social science, and engineering research to develop policies, tools and methods to ensure new resilience knowledge becomes part of daily decision making in Aotearoa New Zealand.

Resilience, Policy & Governance	Whanake te Kura i Tawhiti Nui	Built Environments	Rural Communities	Urban Communities

Research Structure

Understanding Hazard and Risk

Multi-Hazard Risk
- Multi Hazard Risk Case Study
- Dynamic Assessment of Impacts
- Multi-hazard Forecasting and Impact Modelling
- Embedding Models within Robust Decision Making
- Maori Perspectives on Risk

Earthquake & Tsunami
- Fault Model Construction
- Catalogue Testing and Verification
- Ground Motion and Co-seismic Landslides
- Testing Early Warning Systems
- Probablistic Tsunami Model

Volcanoes
- Time Varying Multihazard Forecasting
- Volcanic Impact Model - the eVolcano Testing Lab
- Volcanic Resilience

Coastal Environments
- NZ's Changing Coastline
- Coastal Flooding
- Integrated Scenario

with Weather & Wildfire
- Quantification of Urban Flooding Resilience

Weather & Wildfire
- Very High Resolution Future Case Studies
- Improving Weather and Wildfire Communication
- Better Protection of Maori Cultural Footprints

Accelerating Resilience

Resilience, Policy & Governance
- De-risking Resilience
- Enhancing Resilience and Well-being
- Building Resilient Futures

Whanake te Kura i Tawhiti Nui
- Whāinga Tuatahi
- Whāinga Tuarua
- Whāinga Tuatoru

Urban Communities
- Smart Resilience Cities
- Pathways to Urban Resilience
- Inclusive Urban Communities

Rural Communities
- Disaster Resilient Outcomes for Rural NZ
- Rural Disaster Risk Decision Making
- Understanding Our 21st Century Rural Communities and Industries
- Disaster Resilient Rural Aotearoa - NZ Co- Creation

Built Environments
- Horizontal Infrastructure
- Vertical Infrastructure
- Intergrated Scenario

with Weather & Wildfire
- Performance & Management of Infrastructure Networks

Challenge Management
2022 - 2023 at a glance

Directorate & Governance

Dr. Richard Smith *Challenge Director*

Erica Crouch *Challenge Manager*

Caitlin Carew   *Senior Science Communications Advisor*

Jenny Stein *Science Communications Advisor*

Hautapu Baker *VM Knowledge Broker*

Nicky Smith *Challenge Coordinator*

Melanie Mark-Shadbolt *Chair*
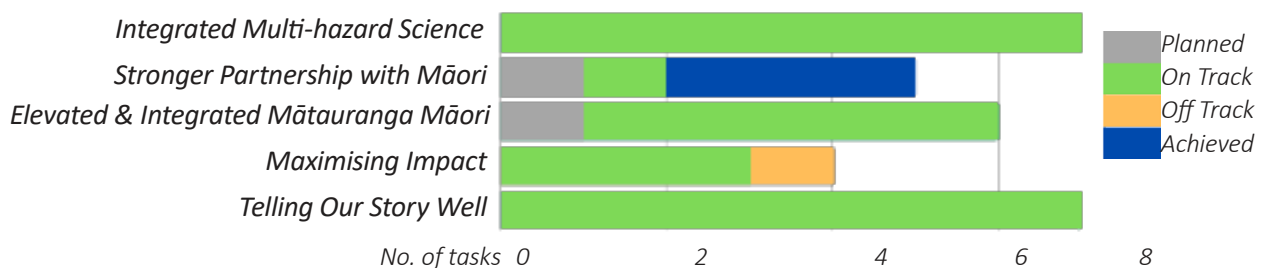
Jessica Hutchings

Greg Orchard - *term ended 30/6/2022*

Peter Benfell - term ended XX

Chelydra Percy - term began XX

63% *identify as women*

30% *identify as Māori*

Strategic Priority Area Progress

Integrated Multi-hazard Science
Stronger Partnership with Māori
Elevated & Integrated Mātauranga Māori
Maximising Impact
Telling Our Story Well

Planned
On Track
Off Track
Achieved

No. of tasks 0   2   4   6   8

Our Challenge Parties
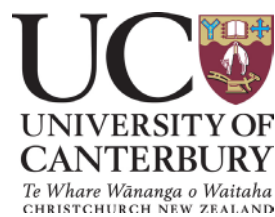
Our research partners include...

- Ministry of Business, Innovation and Employment
- Ministry for Primary Industries
- National Emergency Management Agency
- Ministry for the Environment
- The Treasury
- Te Puni Kōkiri
- Earthquake Commission

- Alpine Fault Magnitude 8 (AF8)
- DEVORA
- QuakeCoRE
- Tonkin + Taylor
- Te Pūnaha Matatini
- Health Research Council
- Royal Society
- World Meteorological Organisation

- Transpower
- International Rescue Committee
- University of Oxford
- Auckland Transport
- Environment Canterbury
- Building Better Homes, Towns and Cities NSC
- Sustainable Seas NSC
- The Deep South NSC

Partnerships with iwi & hapū include:

- Ngāi Tahu
- Ngāti Rangi
- Ngāti Tūwharetoa
- Ngāti Mutunga Ki Parihaka
- Ngāti Kahungunu Ki Wairarapa
- Te Taiwhenua o Heretaunga
- Ngāi Tai ki Tāmaki

- Ngāti Porou
- Ngāti Awa
- Ngāi Tūhoe
- Ngāti Apa
- Ngāti Kuia
- Rangitāne o Wairau
- Ngāti Koata

- Ngāti Rarua
- Ngāti Toa
- Ngāti Kuri
- Taranaki Iwi
- Ngāti Wai
- Te Arawa
- Ngāti Ruahine

Local Government partnerships include:

- Waikato Regional Council
- Queenstown Lakes District Council
- Hawke's Bay Regional Council

- Nelson City Council
- Tasman District Council
- Whakatāne District Council
- Northland Regional Council

Our research partnerships generated:

in cash co-funding

$843k

in-kind co-funding

$14.3M

2022 - 2023 Impact Case Studies

These impact case studies were submitted to the Ministry of Business, Innovation and Employment as part of our 2022-2023 annual reporting.

Models and tools for decision-making

Over the last ten years of RNC funding, researchers from our Volcanoes team have developed strong relationships with iwi partners and other important stakeholders in both Taranaki and the Central Plateau. There are numerous work programmes underway in both regions where our science can feed directly into emergency planning, public education, and other processes.

In October 2022, our team co-led a Coordinated Evacuation Hui at the Taranaki Emergency Management Office, with key stakeholders, the Taranaki Civil Defence Group, and other important partners including NEMA, Fire & Emergency NZ, Department of Conservation and Police. This was a great opportunity for the team to build on previous engagement and direct their research toward useful and useable outcomes for emergency management practitioners. Ongoing work includes developing a suite of dynamic evacuation scenarios for the region and identifying evacuation decision-making tipping points. During the last quarter, the team has also worked with the Department of Conservation to support the development of the department's emergency response plan in the event of an eruption of Taranaki Mounga.

Kristie-Lee Thomas of the University of Canterbury (supported by Prof Tom Wilson and Prof Jon Procter) is working with Te Āti Awa to provide high-level science information to support the redevelopment of the North Egmont Visitor Centre, at 978m on the north-eastern slopes of the mounga. This project involves supporting local iwi to reconnect with their whenua and tīpuna by constructing a new wānanga centre that is also informed by appropriate hazard information.

In central North Island, research outputs are communicated regularly with end-users through the Central Plateau Volcanic Advisory Group and through other meetings and direct interactions. In particular, MSc student Charles Ching's research on Ruapehu crater lake colour was valuable to GNS Science and GeoNet for their monitoring of the Ruapehu Volcano unrest in 2022, as well as to the Department of Conservation and iwi in interpreting and managing the unrest.

Our Rural team provides science support to the Alpine Fault earthquake preparedness and response planning programme AF8 (Alpine Fault magnitude 8), a cross-boundary organisation

funded by six South Island CDEM groups, QuakeCoRE and Toka Tū Ake EQC. This year, Assoc Prof Caroline Orchiston and AF8's Alice Lake-Hammond have provided science support for a Taumata Arowai exercise scenario. The new water services regulator is developing a South Island Alpine Fault exercise, with the aim of understanding consequences for community access of safe drinking water following a major earthquake. In an October webinar with exercise participants, members of the AF8 science team presented the Alpine Fault scenario, its impacts and consequences, and provided context and guidance for the exercise.

Our Changing Coastlines team have made data from their coastal mapping project publicly accessible via data.coastalchange.nz. There have been 883 views and 22 downloads of data from the Coastal Change website since 9 March 2023.

South Taranaki District Council and New Plymouth District Council are using data from the Changing Coastlines mapping project in their adaptation planning work. In addition, consulting firms Jacobs, Tonkin and Taylor and 4Sight have all requested and used our coastal change data from Pakiri Beach north of Auckland, for use in their contributions to and evidence for an Environment Court hearing.

In September 2022 the revised National Seismic Hazard Model (NSHM) was released by GNS Science. An important part of New Zealand's hazard-scape toolkit, the NSHM provides an estimate of the likelihood and strength of earthquake ground shaking at any given site in New Zealand, and considers how different parts of the country might behave in the event of large magnitude earthquakes. This

information is used by government and industry to help manage risks from seismic events and improve national resilience.

Our Earthquake-Tsunami team contributed some of the underpinning science for the revised model. New knowledge derived from our synthetic earthquake catalogue contributed to the NSHM team's understanding of the relationship between large subduction earthquakes and co-seismic triggering of crustal faults.

Modelling work led by Dr Garry McDonald of our Multihazard Risk programme is supporting climate mitigation activities led by Auckland Council. In the latter half of 2022, Garry developed a Consumption Emissions Calculator for Council that will be used in various programmes including Future Fit, and the global C40 Cities reporting that Council is part of.

The modelling approach used in the team's Consumption Emissions Modelling report for Council has been endorsed by the Ministry for the Environment in their 2023 Measuring Emissions: A Guide for Organisations.

Impacts from extensive flooding in Hawke's Bay. Credit: GNS Science.

Responsive science for national emergencies

Following the Auckland Anniversary Weekend floods, the RNC directorate engaged with our research leaders to identify the response activities they were involved in, and how we could support them.

Our Weather & Wildfire co-lead Dr Richard Turner and colleagues at NIWA began analysing how the event differed to previous modelling of a severe storm directly hitting the city.

The GNS Science Landslides team, including Dr Andrea Wolter of our Weather & Wildfire team, began to undertake reconnaissance trips to assess landslides in impacted areas.

Our researchers were also in demand for media commentary. Built Environment team members at the Civil and Environmental Engineering Department at the University of Auckland wrote an op ed for Newsroom with recommendations on how we could upgrade our stormwater systems as part of our adaptions to climate change.

Our director Richard Smith wrote an op ed for Stuff, in which he called for more investment in resilience

initiatives, to ensure future floods do not turn into disasters. We received positive feedback, and heard the article was being widely shared within relevant government agencies.

Sixteen days after the Anniversary weekend event, Cyclone Gabrielle hit Northland and over subsequent days brought devastating impacts to Northland, Tāmaki Makaurau, Coromandel, the Bay of Plenty, Te Tairāwhiti, Hawke's Bay and eastern Wairarapa.

Our researchers began to expand their activities. Once again, the GNS Landslides team mobilised around the North Island, with Dr Andrea Wolter deployed to Tairāwhiti. The team used a new tool, co-developed with RNC, which forecasts where landslides are most likely to have occurred. Data collected will be used to further train the Rainfall-Induced Landslides tool, to improve its accuracy in future heavy rainfall events. RNC produced a short video with Andrea explaining the tool and its role in the response.

Dr Sally Potter of GNS Science is an expert on impact-based forecasts and warnings. Sally is based at Emergency Management Bay of Plenty, and was able to connect their Emergency Coordination Centre to real-time rainfall-induced landslide impact forecasts crafted by the GNS Landslides team.

Our Changing Coastlines team are mapping the entire coastline of Aotearoa, drawing on over half a century of aerial photographs and satellite images to identify erosion trends and hotspots. Led by Prof Mark Dickson and Assoc Prof Murray Ford of the University of Auckland, the team pivoted to examine how Cyclone Gabrielle altered North Island coastlines. They obtained extra satellite imagery, revealing stark contrasts before and after the cyclone.

Truck and trailer unit trapped by landslips at "The Devil's Elbow" Hawke's Bay following Cyclone Gabrielle. Credit: GNS Science.

Following the Kaikōura earthquake Dr Sarah Beaven of the University of Canterbury and our Rural Communities team developed Ethical Guidelines for Post-Disaster Research, for researchers, scientists and engineers going into disaster-impacted areas to collect data. Sarah updated the guidance and in March we re-released it through our channels, where it was widely shared.

Our research and researchers continued to feature in numerous media stories. Prof Mark Dickson spoke to NZ Herald about the extent of coastal cliff erosion in Tāmaki Makaurau. Writing for The Conversation, Dr Raven Cretney, Dr Christina Hanna and Prof Iain White examined past managed retreats to inform how we move forward. Stuff featured PhD student Muizz Shah's modelling of extreme wind gusts in Auckland's CBD. And as more heavy rain headed towards eastern Aotearoa, Dr Lauren Vinnell of Massey University shared her concerns about disaster fatigue in the NZ Herald.

Prof Liam Wotherspoon of our Built programme was appointed to the Waka Kotahi External Technical Panel to review post-Cyclone Gabrielle recovery planning and guidance, and brought in as a member of the Engineering Leadership Group

that organises the Hawke's Bay Technical Clearinghouse, a forum for disseminating information to the engineering community. Prof Christine Kenney of Massey University advised NEMA on the tangata whenua response to Cyclone Gabrielle, and helped develop the terms of reference for the Government Inquiry into the Response to the North Island Severe Weather Events.

In February MBIE announced $10.8 million for urgent scientific research and data collection. RNC research leaders Prof Liam Wotherspoon and Dr Charlotte Brown are developing an evidence-base to support critical infrastructure recovery decisions and provided policy briefs on recovery and resilience of infrastructure. RNC was also funded to develop summaries of key lessons for different stages of recovery management.

The RNC directorate has provided coordination across the new Extreme Weather Research Platform. With the assistance of Climate Sigma, we quickly developed a new website with information about the funded projects, and we've run two webinars for relevant stakeholders, with more events and initiatives planned.

RESILIENCE TO NATURE'S CHALLENGES
ANNUAL REPORT
2022- 2023

RESILIENCE TO NATURE'S CHALLENGES
Kia manawaroa –
Ngā Ākina o
Te Ao Tūroa

Partnerships as the pathway to impact

In December 2022, a significant exhibition opened at Rangitāne House in Blenheim, the culmination of a longstanding collaboration with Rangitāne o Wairau that has brought kōrero tuku iho to life through art and science.

A pūrākau relating to Te Pokohiwi-o-Kupe (Wairau Bar) led to geological research by Dr Darren Ngaru King (Ngāti Raukawa), formerly of NIWA. The results of the research aligned with the pūrakau – it is likely that at least three tsunami events have occurred at the site over the last 2,000 years. The mātauranga and scientific research has inspired artworks crafted by Israel Tangaroa Birch (Ngā Puhi, Ngāi Tawake, Ngāti Kahungunu, Ngāti Rakaipaaka).

Corey Hebberd, Rangitāne o Wairau Kaiwhakahaere Matua said: "The opportunity to partner with NIWA in the delivery of this project and these artworks has enabled us to record our history in a new way – by bringing the kōrero to life through the scientific findings." The exhibition is still open to the public and has been covered in the media and captured in a short video (embedded in linked media story). The project is part of

AGMARDT chairman Nick Pyke (left), Minister Meka Whaitiri, MPI Director-General Ray Smith (second from right) with Tāne Mahuta NZ Ltd representatives Vivian Hahipene, Wini Geddes, Simon Geddes, and Marama Moses. Credit: MPI.

our Whanake te Kura I Tawhiti Nui programme and received additional support from our Ākina Te Tū – Kaupapa Māori Resilience Fund.

Prof Christine Kenney (Te Āti Awa, Ngāti Toarangatira, Ngāi Tahu) of Massey University has been working with Tāne Mahuta NZ Ltd, a forestry business based in Whakatāne which is Māori-owned and underpinned by Māori kaupapa. Christine and Kaitohu (Director) Mrs Wini Geddes have developed a case study looking at cascading hazards in the eastern Bay of Plenty (flooding, the Whakaari eruption and Covid-19), and the response of Tāne Mahuta that

showcases best practice in Māori resilience.

Tāne Mahuta has nurtured employees and their whānau during Covid, through working with Ngāti Awa hauora (health) providers. During lockdowns, business owners arranged for their forestry trainees to be deployed as essential workers on iwi-owned farms. The trainees were often the only members of their whānau bringing in income during the lockdowns. In addition, all employees complete their qualifications on the 'learn while you earn' model, as well as receiving emergency management, first aid and fire training.

The case study formed the basis for a successful application to MPI for recognition and support, and Tāne Mahuta won the MPI 2022 Good Employer Award in the Māori Agribusiness Category. A video has also been produced to share the company's story and highlight the positive impact they've had on the lives of their young employees.

Prof Regan Potangaroa (Ngāti Kahungunu ki Wairarapa) of Massey University is working with select marae communities to develop affordable, whānau-based solutions to upgrading marae deemed

Artwork inspired by Pokohiwi-o-Kupe created by Israel Tangaroa Birch
Credit: Anthony Phelps, Stuff

earthquake-prone.

While some older marae may exceed the new threshold for structural safety (34% of New Building Standards), this cannot be determined without a structural engineer's report. The high cost of obtaining these reports means many marae communities may not meet the deadline prescribed by the Building Act, so their pre-1976 buildings will be designated 'earthquake-prone' by default. It's a difficult issue facing many whānau and hapū, given their deep ancestral, spiritual and emotional attachment to these buildings.

Regan is also investigating this attachment by 3D-scanning marae and letting community members explore the resulting simulations using virtual reality headsets. By tracking people's movements and responses to the differences in what they see and feel, Regan can quantify people's attachment to different spaces.

A webinar in September 2022 featured Regan and representatives from two case-study marae sharing their stories and perspectives

(Demetrius Potangaroa, Te Ore Ore Marae marae committee chair and Boy Thomson, Chair of Trustees of Te Kainga marae, Wellington). The webinar led to media coverage and Regan reports he had a fantastic response and increased interest in his work.

Since Cyclone Gabrielle, Regan has pivoted to working with communities facing climate-related damage to their pā. Engagement and attachment activities developed in the earthquake workstream are proving useful in the climate change space. We will have more to report on both workstreams next year.

Science for resilience policy and practice

We have previously reported on our input into the development of legislation replacing the Resource Management Act. This engagement has continued in 2022/23.

Recommendations from the 2021 report Enabling Coastal Adaptation: Using current legislative settings for managing the transition to a dynamic adaptive planning regime in New Zealand were an input in the

development of the Ministry for the Environment's paper Community-led retreat and adaptation funding: Issues and options which is relevant to the drafting of the Climate Adaptation Bill. The report was co-authored by Dr Judy Lawrence of Te Herenga Waka Victoria University of Wellington as part of our Coastal Adaptation workstream.

In March, Dr Lawrence organised a symposium marking 10 years since New Zealand introduced dynamic adaptive pathways planning approaches to climate change decision-making. The event brought together practitioners and experts to share lessons learned over the last decade of research and practice using Dynamic Adaptive Pathways Planning and associated tools. The symposium was a collaboration between Deltares Institute in the Netherlands and the Climate Change Research Institute at Te Herenga Waka, with support from RNC, the Deep South National Science Challenge and MfE. A report has been released summarising key learnings.

Timely new research on managed retreat from our De-risking Resilience team, led by the University of Waikato's Prof Iain White, has been able to inform public discussions in the aftermath of the extreme weather events earlier this year. The team wrote an op ed in The Conversation and the NZ Herald featured Q&A with Dr Christina Hanna. By analysing academic research, government reports, and policies, the researchers traced the historical and political context in which managed – and unmanaged – retreats have evolved in Aotearoa. The researchers suggest a close examination of these past events will help guide the difficult decisions ahead. The team have also been providing advice to government officials involved in drafting the new legislation.

Crews clean up landslips.
Credit: Dave Allen, NIWA.

Aerial view of Ohaki pā in Waikato   *Credit: Ariki Creative*

Independent kairangahau Lara Taylor (Te Arawa, Kahungunu) of our Whanake te Kura I Tawhiti Nui programme has been working with Papa Pounamu (the Māori Special Interest Group of the New Zealand Planning Institute) to progress Māori resistance and resilience through the planning reforms. The collective is working to bring about a Te Tiriti-centric planning system that works for te taiao and communities. Last year we reported on submissions made by the collective during consultation processes.

This year Lara has convened a series of online wānanga, and a noho wānanga held at Ohaki pā in Waikato, for the group to support each other and workshop experiences, ideas and aspirations. The group has also engaged with MfE, but on their terms. Lara convened a half-day online hui in May between MfE officials and Papa Pounamu members, with close to 100 attendees. Lead officials presented on key topics of interest to Māori, with space created for breakout room discussions amongst the Māori attendees, and open kōrero with all attendees.

Built Environment team researchers led by the University of Canterbury's Prof Tim Sullivan are actively supporting the New Zealand Seismic Risk Working Group (SRWG) as it works to propose changes to

earthquake loadings requirements for buildings. The benchmarking work undertaken by the team is being referred to by the SRWG, as are research findings into soil-structure interaction and the seismic performance of non-structural elements.

In addition, a new method for simplified estimation of seismic losses has been formulated by Prof Sullivan and Amirhossein Orumiyehei. This tool enables code and guideline writers to quickly gauge the impact of changing design criteria on seismic losses. It is already being used to assist the Engineering NZ Low-Damage Design group in setting suitable performance objectives for low-damage buildings.

Gradon Diprose of Manaaki Whenua and our Enhancing Resilience and

Wellbeing workstream has been researching food security and food resilience as it relates to disasters. The Aotearoa Food Rescue Alliance has drawn on the team's research on the social return on investment (SROI) for food rescue to demonstrate the social, economic and environmental impacts of food rescue in Aotearoa.

The SROI demonstrates that for every $1 invested in food rescue, $4.50 of social value is created in return. The results have been shared extensively across the food rescue/food security sectors, and with the Ministry of Social Development and the Office of Prime Minister's Chief Science Advisor. The finding is also featured in infographic form on the Alliance's website. This work is also feeding in to cross-NSC advocacy for a National Food Strategy, and we'll have more to report on this next year.

Community food parcels   *Credit: Kaibosh*

In the 2022- 2023 year, the Challenge funded:

113 full-time equivalent researchers and students

23 percent of this time was dedicated to Kaupapa Māori research

Understanding Hazard and Risk

2022 - 2023 at a glance

153 researchers
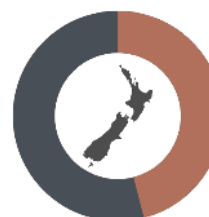
34% *identify as women*

26% *are students*

9% *identify as Māori*

43 publications

51% *published in top 25 journals*

70% *international collaborations*

46% *domestic collaborations*

17 projects

currently underway across programmes in this theme.

60% *of projects are dedicated to empowering and embedding mātauranga Māori.*

Accelerating Resilience

2022- 2023 at a glance
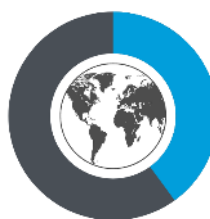
169 researchers

45%
identify as women

32%
are students
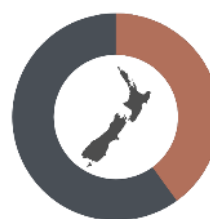
15%
identify as Maori

37 publications

51%
published in top 25 journals

40%
international collaborations

40%
domestic collaborations

20 projects
currently underway across programmes in this theme.

30% *of projects are dedicated to empowering and embedding mātauranga Māori.*

Strategic Priority Areas

Looking ahead to 2023 - 2024

Weaving the Threads of Knowledge

To connect and coordinate across RNC Programmes to ensure our portfolio of multi-disciplinary science and Mātauranga Māori is woven together to create the widest possible benefits and opportunities.

### Advancing Māori Aspirations in Disaster Resilience

To advance our collective journey towards Te Tiriti-centred resilience science, continue to enhance Mātauranga Māori leadership in disaster resilience, and enable Te Ao Māori perspectives within local and national resilience frameworks

Maximising our Impact

To ensure our research is useful, useable, and used, by collaborating and engaging with users and through telling our story well.

Enduring Legacy and Post-NSC transition

To ensure the on-going value of RNC research and support for a smooth transition to National Research Priorities.

National SCIENCE Challenges

RESILIENCE TO NATURE'S CHALLENGES

Kia manawaroa – Ngā Ākina o Te Ao Tūroa
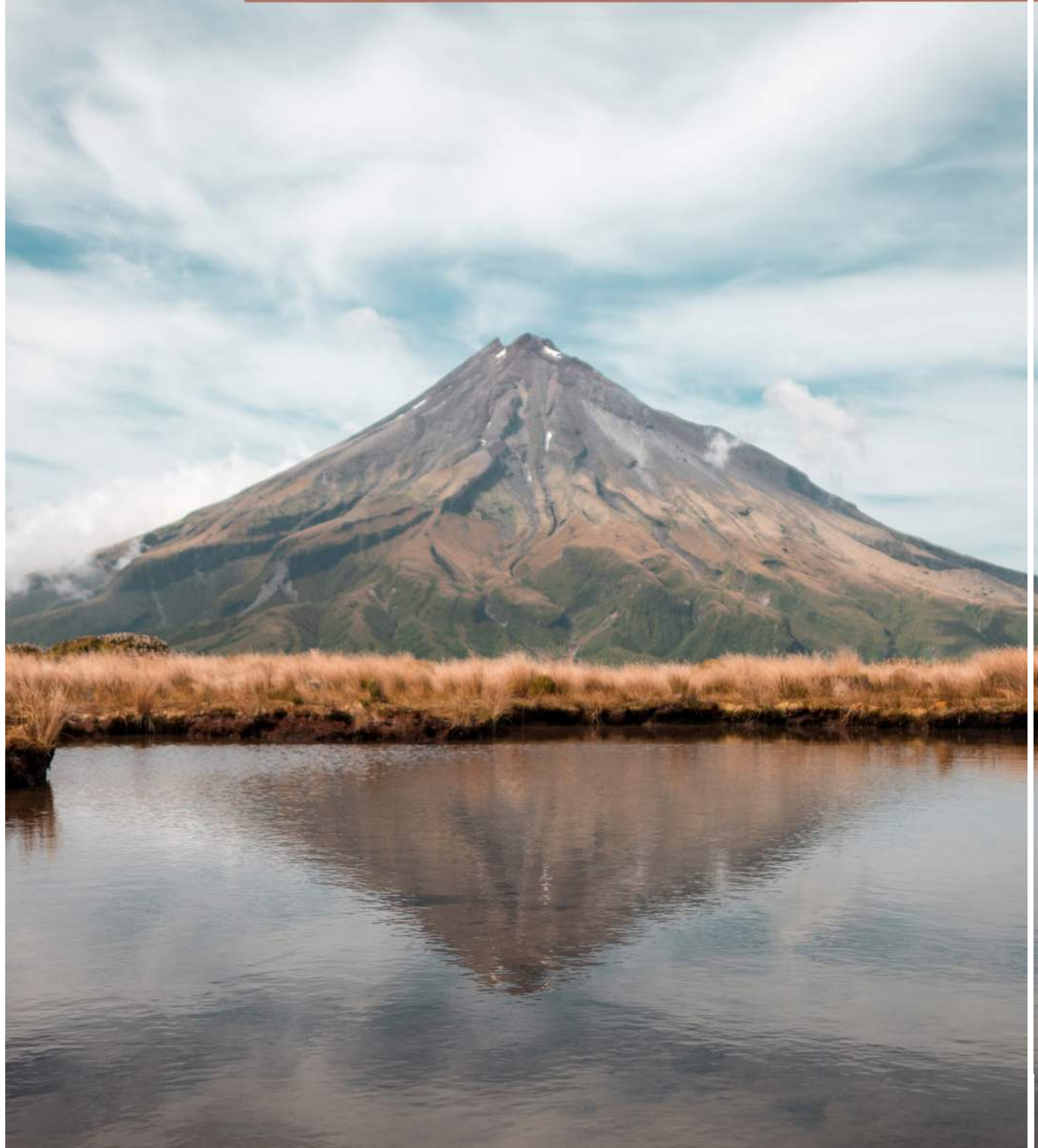
Contact us

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