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Statement of Corporate Intent 2019/20

NIWA
Taihoro Nukurangi

SCIENCE GUIDING OUR FUTURE

CLIMATE, FRESHWATER & OCEAN SCIENCE

CLIMATE SCIENCE

230 SCIENCE STAFF

New Zealand's largest team dedicated to research and applied-science services in weather and climate and associated hazards.

$42M INVESTED ANNUALLY

For research and applied-science services.

HIGH PERFORMANCE COMPUTING FACILITY (SUPERCOMPUTER)

Producing precise, highly localised forecasts.

THE NATIONAL CLIMATE DATABASE

Holds information from 7,500 monitoring stations around New Zealand, the South-West Pacific and Antarctica.

EXTENSIVE GLOBAL COLLABORATIONS

Improving our understanding of the changing climate.

Inside front cover: NIWA's annual aerial survey of more than 40 glaciers in the Southern Alps confirmed the overall trend of ice loss. *(Hamish McCormick)*

Cover: Working with iwi. Estuary toolkit training at Umupuia, Maraetai coast, in collaboration with Ngāi Tai Ki Tāmaki, as part of NIWA's Managing Mud Programme. *(Stuart Mackay)*

FRESHWATER SCIENCE

240 SCIENCE STAFF

New Zealand's largest team dedicated to the sustainable management of our freshwater resources.

$40M INVESTED ANNUALLY

Increasing our knowledge of freshwater quantity and quality.

NATIONWIDE NETWORK OF HYDROLOGICAL & SOIL-MOISTURE STATIONS

NATIONAL FLOOD FORECASTING SERVICE

River flow forecasts made possible for 66,000 catchments by use of the High Performance Computing Facility.

SNOW & ICE MONITORING NETWORK

Measures the water stored as snow & ice.

Arawhata River.
(Dave Allen)

OCEAN SCIENCE

260 SCIENCE STAFF

New Zealand's largest marine science organisation.

$67M INVESTED ANNUALLY

Coast and ocean, fisheries and aquaculture science.

WORLD-CLASS FLEET OF RESEARCH VESSELS

Tangaroa, Kaharoa and *Ikatere.*

HIGH PERFORMANCE COMPUTING FACILITY

Running sophisticated ecosystem models and oceanographic processes.

NORTHLAND MARINE RESEARCH CENTRE

New Zealand's leading finfish aquaculture facility.

NIWA's world-class deepwater research vessel, *Tangaroa.* *(Dave Allen)*

NIWA
Statement of Corporate Intent
2019/20

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Chairman and Chief Executive's overview

We are pleased to present NIWA's 2019/20 Statement of Corporate Intent (SCI) describing our strategy for meeting the obligations outlined in our Statement of Core Purpose. This SCI reaffirms NIWA's commitment to deliver the best science for the nation's benefit in collaboration with others, continuing to invest in its people and assets, and sustaining our financial performance.

Over the period of this SCI we foresee an operating environment of expanding opportunities for NIWA as the nation's need for freshwater, climate and ocean science has never been greater. The biggest opportunity (and challenge) lies in the rapid advances in digital technologies that are increasingly altering the way science is done, what is possible, how it is communicated and consumed by others, and the staff capabilities and capital investments required. While our strategy in recent years sees us well-positioned, this SCI addresses the need to accelerate the building of our digital capabilities and integrating that effectively with our science.

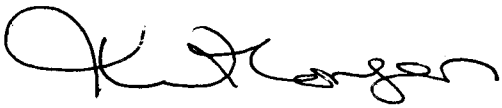
NIWA's strategic priorities in freshwater, climate and ocean science outlined in this SCI are well-aligned with Government priorities to:

- improve the quality and ecosystem health of New Zealand's freshwater
- understand and adapt to climate change and its impacts on New Zealand and the Pacific
- build resilience to weather-related hazards
- improve our understanding and sustainable use of New Zealand's marine resources
- predict and manage biosecurity incursions
- transition to a low carbon economy
- grow regional economies

NIWA maintains nationally-important climate, atmospheric, marine and freshwater databases, deepsea research vessels, high performance computing and big data analytics facilities and the nation's finfish aquaculture research centre.

NIWA's Board and Executive are committed to continued strong financial performance so that investment in our people, these national science assets and leading-edge technologies can be maintained, while also enabling an upgrade of our properties to bring them up to contemporary standards.

NIWA has a long-established record of delivering excellent and relevant science that benefits all in Aotearoa-New Zealand, and this Statement of Corporate Intent outlines how we will further enhance that reputation.



Barry Harris
Chair

John Morgan
Chief Executive

1. Operating environment

1.1. Our purpose

As a Crown-owned research institute NIWA is expected to provide national benefit through delivering science that supports New Zealand's economic growth, enhances human wellbeing and safety, and enables good stewardship of the country's natural resources and biodiversity, as defined in its Statement of Core Purpose (SCP).

This SCI describes how NIWA will deploy its staff and assets, leverage its national and international science collaborations, and utilise its partnerships with stakeholders to deliver its contribution to the following outcomes in its SCP:

- Increase economic growth through the sustainable management and use of aquatic resources.
- Grow renewable energy production through developing a greater understanding of renewable aquatic and atmospheric energy resources.
- Increase resilience of New Zealand and South-West Pacific islands to tsunami and weather and climate hazards, including drought, floods and sea-level change.
- Enable New Zealand to adapt to the impacts and exploit the opportunities of climate variability and change and mitigate changes in atmospheric composition from greenhouse gases and air pollutants.
- Enhance the stewardship of New Zealand's freshwater and marine ecosystems and biodiversity.
- Increase understanding of the Antarctic and Southern Ocean climate, cryosphere, oceans and ecosystems and their longer-term impact on New Zealand.

1.2. Ensuring relevance

NIWA's science supports those developing and implementing policies on how New Zealand uses, manages, and conserves its natural resources. The Government's priorities in this area include:

- Improving the quality and ecosystem health of New Zealand's freshwater.
- Understanding and adapting to climate change and its impacts on New Zealand and the Pacific.
- Building resilience to weather-related hazards.
- Improving our understanding and sustainable use of New Zealand's marine resources.
- Predicting and managing biosecurity incursions.
- Transitioning to a low carbon economy.
- Growing regional economies.

NIWA is well-positioned to inform and contribute to these government priorities and New Zealand's commitments to the United Nations sustainable development goals. We have much of the nation's expertise in climate change, freshwater, and marine sciences, as well as strong science collaborations nationally and internationally. Our connections with iwi, local government, sectors and businesses ensure that what we do is well-targeted and relevant.

1.3. Collaborating to add-value

Collaboration with other science and stakeholder organisations, both nationally and internationally, is an essential element of NIWA's strategy to ensure the full benefits of our science are realised. This enables NIWA to:

- Undertake the breadth and depth of the science we do.
- Deliver benefit to widespread communities and sectors.
- Build the 'best teams' based on multiple disciplines and skills.
- Leverage the expertise, knowledge and technologies developed by others.
- Develop the future science capability the nation will need.
- Ensure that key science assets are used efficiently and effectively.

NIWA has over 1000 active collaborations, developing and conducting nearly all its science in collaboration with others and jointly publishing 90% of its research outputs. Collaborations continue to grow, and those that are particularly important to strengthen and deepen over the period of this SCI include:

- Central and local government agencies, as they develop and implement policies related to climate change, water quality and marine resources.
- Māori tribal authorities and businesses, as we seek to develop enduring partnerships to co-develop and undertake research together that is better targeted to their priorities.
- Key business sectors, as they seek to adjust their activities to be more resilient to the effects of a changing climate and comply with requirements to operate within environmental limits.
- CRIs, universities, and other research organisations (nationally and internationally), as we deliver our science objectives across marine, freshwater and climate domains. This includes our Joint Schools with the Universities of Auckland and Otago in marine science, and the University of Waikato in freshwater science.

1.4. Being ready, able and agile

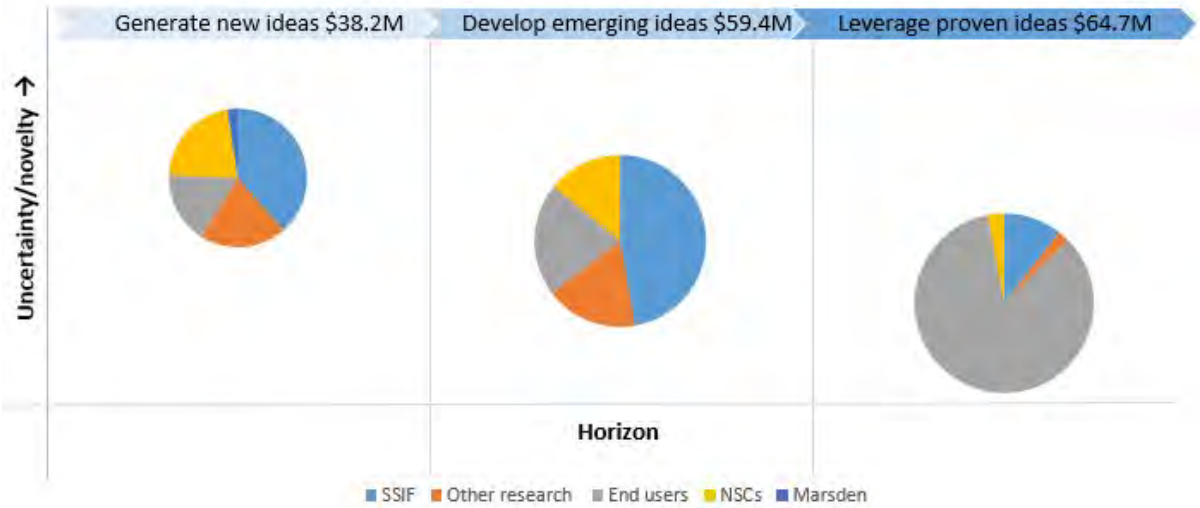
Section 3 details the enabling strategies that ensure organisational readiness, capability, and agility to deliver our science. NIWA will continue to place priority on the health and wellbeing of its people, providing a workplace that values diversity, and enabling staff to perform to their potential by investing in facilities, technologies and scientific equipment. Organisational priorities over the period of this SCI include embracing the opportunities provided by new digital technologies and strengthening our capability and capacity to build partnerships with Māori.

A key focus over the 5-year period of this SCI will be a significant upgrade of NIWA's ageing property assets to make them fit-for-purpose, designed for future flexibility and able to attract and retain the very best talent. These upgrades are following a timetabled property renewal plan that is dependent upon sustained financial performance.

This SCI budgets revenue of $165M for 2019/20 rising to $182M in 2023/24, operating surpluses (EBIT) between $7.9M and $14.7M per annum, and annual operating cash flows between $30M and $37M. NIWA's budgeting has been robust, and we are of the view that there is equal downside risk and upside opportunity.

2. NIWA's science

In meeting its core purpose outcomes, NIWA conducts science over a range of horizons, from longer-term science that generates new ideas through to short-term science that leverages proven ideas and delivers impact through a variety of knowledge exchange mechanisms. The distribution of NIWA's current revenue sources across these horizons is shown below:



Horizon profile and revenue sources for NIWA's science.

Contestable research programmes and National Science Challenges (NSCs) are largely used to generate new ideas and develop emerging ones, whereas Strategic Science Investment Funds (SSIF) are primarily used to develop emerging ideas (applied research). End users are the primary funders of applying our science to deliver impact.

NIWA undertakes its science across three platforms – ocean, freshwater and climate. In addition to the science themes specific to each platform, there are three cross-platform priority themes that will influence the science we do and how we go about it – embracing new technologies, partnering with Māori, and supporting New Zealand's initiatives in the Pacific.

2.1. Cross-platform themes

2.1.1. Embracing technology

Situation analysis
Globally, environmental science is increasingly making advances on the back of new technologies. These new technologies are enabling collection of data at finer temporal and spatial scales, and providing information of system structure and processes that was previously not possible. New data analytics, visualisation and virtual reality technologies are providing the opportunity for abstracting new insights from that data and presenting it more simply.

NIWA is already at the forefront of developing and utilising technology and we have been an early adopter of high-performance computing, remote sensing, real-time data collection and communications, intelligent control systems, remotely operated vehicles and environmental isotope technologies, for example. These technologies continue to advance in capability, and completely new technologies continue to become available – both at an accelerating rate.

These advances present NIWA with significant new opportunities, and in 2018/19 we responded with the appointment of a General Manager – Technology & Innovation and the development of a set of strategic priorities to accelerate technology uptake and innovation within the organisation and with our collaborators.

Strategic priorities
The priorities of our technology strategy are to:

- Maintain our capital investment in new technology that advances our science.
- Support a 'One NIWA' approach to technological innovation through the creation of hubs to share knowledge, co-develop ideas, and rapidly apply technology advances across the organisation.
- Create more opportunities for our staff to explore the application of emerging technologies to deliver our science strategies.
- Increase staff capability in digital technology, data analytics and machine and deep learning.
- Continue to support the operation of the High-Performance Computing Facility, and provide expertise to the collaborative National e-Science Infrastructure initiative.
- Further pursue opportunities for bringing industry and environmental data together to enhance business performance, lower environmental footprint and increase resilience to environmental risks.

2019/20 KPIs

1. Develop a Technology & Innovation plan and create a leadership team to implement it.
2. Create technology hubs as incubators to share knowledge, co-innovate, and speed uptake.
3. Scope the needs and infrastructural requirements to develop a 'National Environmental Data Centre', in association with key collaborators and stakeholders.

2.1.2. Partnering with Māori

Situation analysis
Māori are key participants in the co-governance and co-management of Aotearoa-New Zealand's natural resources. Additionally, Māori are developing their own resources (human and natural) to improve economic prosperity, social wellbeing and environmental outcomes for whānau, hapū, and iwi. Māori are seeking a more holistic approach to how natural resources are managed and, in particular, an inter-generational perspective and the inclusion of mātauranga Māori into local, regional and national decision-making processes.

NIWA has a successful track record in working with Māori across our climate, freshwater and ocean platforms. Te Kūwaha, a unique team of researchers, will continue to play a key role by combining their scientific expertise with expertise in mātauranga Māori and tikanga Māori to influence science planning and execution and oversee relationships with Māori partners using the following guiding principles:

- Treaty of Waitangi principles of partnership, participation and protection underpin our relationships.
- Whanaungatanga (fostering relationships), kotahitanga (partnership), manaakitanga (reciprocity and generosity), and kanohi kitea (becoming a familiar face) are fundamental to how we do what we do.
- Empowering Māori interests and mātauranga Māori by bringing knowledge systems together to inform their unique responsibilities as kaitiaki and managers of environmental resources.
- Co-developing research priorities and working together to undertake them, utilising Māori knowledge and methodologies where appropriate.
- Building science capability and capacity for the benefit of whānau, hapū, iwi and Māori.

Strategic priorities
The priorities of our strategy are to ensure our science responds to the following aspirations of our Māori partners:

- Water quantity and quality provides for the cultural, environmental, social and economic needs of Māori.
- The capacity and capability of whānau, hapū, iwi and Māori business to respond and adapt to climate change risks and impacts is strengthened.
- The health and wellbeing of tāonga species, aquatic (freshwater and marine) environments, mahinga kai and Māori livelihoods are safeguarded.
- Māori have the knowledge and tools required to restore degraded freshwater and marine ecosystems and associated tāonga to provide for their cultural, social, environmental and economic needs.
- Whānau, hapū, iwi and Māori enterprises have the tools to sustainably develop and manage their natural resources to improve economic wellbeing and prosperity.
- Hapū, iwi and Māori enterprises are advancing their interests, participation and aspirations in the aquaculture sector.

2019/20 KPIs

1. A new approach to embed Māori research priorities at the forefront of NIWA's science planning process is successfully implemented.
2. Relationships with Māori are strengthened through the execution of new partnership agreements and the co-development of new research opportunities.

2.1.3. Supporting Pacific nations

Situation analysis
The government has significantly realigned New Zealand's foreign policy, including an increased investment in the Pacific region through its *Pacific Reset* initiative. *Pacific Reset* aims to embed New Zealand as an integral partner in building regional stability and economic integration in the Asia-Pacific region, supporting a stable, prosperous and resilient Pacific, and promoting sustainable international solutions to global environmental challenges that particularly impact on Pacific island nations.

NIWA contributes significantly to supporting New Zealand's foreign policy. We provide evidence-based information and advice to support New Zealand's international obligations on climate change, Antarctica, fisheries and biodiversity.

We are particularly active 'on the ground' in the Pacific region, where we have a reputation for developing deep relationships with our Pacific partners and conducting work that supports local needs and builds local capacity.

Strategic priorities
The priorities of our strategy are to ensure that our science contributes to the government's *Pacific Reset* strategy to meet the following needs of our Pacific neighbours:

- Increasing resilience to tsunami and weather and climate hazards.
- Improving sustainable management of fisheries and providing for aquaculture opportunities.
- Improving the understanding of marine resources and their vulnerability to exploitation.
- Enhancing water security and sanitation.

2019/20 KPIs

1. Strengthen relationships with the Ministry of Foreign Affairs & Trade to ensure our capabilities and capacity meets the needs of the *Pacific Reset* strategy.
2. Continue to foster relationships with key agencies in the Pacific to maintain NIWA's (and New Zealand's) reputation in the region and ensure that NIWA's contribution is maximised.

2.2. Oceans

Expected outcomes
NIWA's ocean science will contribute to the following outcomes:

- Enhanced stewardship of New Zealand's marine estate, so that ecosystem integrity and biodiversity are conserved, and resources are sustainably used.
- New Zealand maximises sustainable, long-term economic benefit from its fisheries and associated ecosystems through a science-informed management system accepted as international best practice.
- New Zealand aquaculture will be a financially and environmentally sustainable billion-dollar industry by 2030.

Dimensions
NIWA is New Zealand's largest marine science organisation, with 260 staff who contribute to the c. $77M of coast and ocean, fisheries and aquaculture science conducted annually within this platform. These experts and their collaborators are supported by the fully-equipped research vessel *Tangaroa*; other smaller vessels; specialist remote, onboard, and at-base analysis equipment; the High-Performance Computing Facility and the Northland Marine Research Centre.

Horizon profile and revenue sources for NIWA's ocean science.

Relevance
Engagement with government agencies, Māori and relevant sectors has yielded a set of key issues across the three areas of aquaculture, fisheries and coasts and oceans, which collectively determine the external drivers for the ocean platform strategy:

- The government has prioritised safeguarding the healthy functioning of marine ecosystems, protecting indigenous biodiversity, promoting sustainable and abundant fisheries, and including aquaculture within the strategy for regional economic growth. There is an emphasis on taking action to meet the targets in the United Nations Sustainable Development Goal 14: (Conserve and sustainably use the oceans, seas and marine resources).
- Māori are seeking to grow returns from their marine assets (e.g., fisheries, aquaculture) and co-govern and co-manage the marine estate.
- The needs of industry for premium quality seafood products with environmental credentials, for the realisation of industry growth strategies (particularly for aquaculture) and to manage business risk associated with climate change.
- An increased government focus on New Zealand being a leading global citizen in understanding and responding to the impacts of global environmental change.
- An increasing need to secure the social licence to operate for industry, a public and Māori desire for restoration of degraded systems, and growing tension between customary, recreational and commercial access to coastal resources for fisheries or aquaculture.

Strategic priorities

The strategic priorities for this platform over the next five years are to:

- Improve understanding of marine ecosystems and resources, to inform options for protection and sustainable use.
- Develop enhanced fisheries monitoring, modelling and ecosystem-based approaches to underpin sustainable management, particularly for fisheries and aquaculture.
- Better understand marine hazards (e.g., undersea faults, landslides, volcanoes).
- Develop tools to mitigate, manage or reduce biosecurity threats on the marine environment.
- Develop high-value and environmentally-friendly opportunities for expansion of the aquaculture sector.
- Continue to provide dedicated research vessels and leading-edge technology to support marine research and surveying. Over the period of this SCI, this will include completing a review of the future demand for a medium-sized vessel to replace the ageing RV *Kaharoa* and then deciding on an appropriate course of action from the review's conclusions (which may include non-replacement, chartering, leasing, or purchasing a replacement).
- Continue to support the Sustainable Seas National Science Challenge by providing science capability and infrastructure (including vessels), capital investment in science equipment, international collaborations, stakeholder networks, data, models and tools.

Impacts

Over the period of this SCI the science NIWA undertakes in the ocean platform, along with the actions of our partnering agencies, is expected to have the following beneficial impacts:

- New Zealand has improved systems for management of marine resources that have reduced the conflict among multiple users, protected vulnerable components and realised economic, social and environmental benefits.
- Māori needs, aspirations and priorities for marine resource protection, restoration and use are enhanced by specifically targeted co-developed research.
- Biodiversity metrics are used routinely to identify and manage representative and unique examples of marine communities.
- The biological, oceanic energy and mineral resources within New Zealand's EEZ are better understood, allowing for science-informed decisions on their conservation and utilisation that align with the government's commitments towards the United Nations Sustainable Development Goal 14.
- Border surveillance and incursion response tools reduce the biosecurity risks to industry and New Zealand's marine ecosystems from the adverse impacts of aquatic pests.
- New Zealand fisheries are recognised by the New Zealand public and by international markets as well managed and sustainably used.
- Industry farming of additional species of finfish has been successfully established and is making an increased contribution to regional economic growth.
- The environmental footprint of marine farming activities has been minimised and the product quality improved, such that New Zealand's aquaculture industry meets eco-certification and quality criteria for discerning markets.

2019/20 KPIs

NIWA's strategic priorities and contribution towards achieving impacts are delivered through meeting the following annual KPIs:

1. Research linking terrestrial processes and climate change to coastal marine ecosystems has highlighted key impacts on fisheries and determined priority areas for new research.
2. Fisheries ecosystem approaches to management have been enabled by development of ecosystem information and modelling tools.
3. Relationships with Māori seafood companies have been strengthened and their priority research needs included in our science strategies.
4. Seafloor fluid seepage on the New Zealand margin is better understood through regional mapping and plume quantification to reveal sensitive habitats and inform marine environmental management.
5. An overview of the diversity of coralline algae in the New Zealand region is published.
6. Methods for incorporating alpha and beta diversity into marine spatial planning are developed to

inform priorities for marine biodiversity protection at national scales, particularly in locations with minimal data.

7. Long-term trends in phytoplankton biomass and sea-surface temperature around New Zealand have been mapped and used to better understand broad-scale (climate) and local (direct human) drivers of ocean productivity changes.
8. Event-driven biophysical impacts in coastal waters in regions of freshwater influence (near river mouths) are quantified.
9. Distributions, movement, foraging behaviour, and food web interactions of targeted marine megafauna are documented and provided to central government agencies, iwi and industry.
10. New Zealand marine biodiversity data is curated and accessible, with 5000–7000 new registrations per year (ongoing).
11. A prototype web-based system has been developed to deliver satellite observations of water quality (e.g., chlorophyll-a, turbidity, colour, temperature) in New Zealand's coastal zone to end users.
12. Methods for measuring marine denitrification have been improved, major environmental factors driving changes in denitrification rates in nearshore areas are understood and denitrification rates can be predicted.
13. A new risk assessment approach for informing research prioritisation and management of fisheries bycatch has been developed.
14. NIWA's contribution to Pacific fisheries management has expanded, with at least two projects completed in the Asia/Pacific region.
15. Assessment of the status of selected fish stocks and projections of the impact of future yields have been completed to inform Ministry for Primary Industries management of fisheries.
16. Assessment of the environmental impacts of selected fisheries on bycatch species and habitats has been completed to inform Ministry for Primary Industries management of fisheries.
17. Agreement has been reached with partners for the farming of kingfish.
18. F1 hāpuku broodstock have been ongrown to maximise future fecundity and obtain performance metrics for a linked production-financial model.
19. Performance and health metrics of kingfish reared within an experimental recirculating aquaculture system have been refined.
20. A coupled biophysical model (incorporating the biogeochemical influences of aquaculture) for the Firth of Thames/Hauraki Gulf region has been calibrated and implemented.

2.3. Freshwater & estuaries

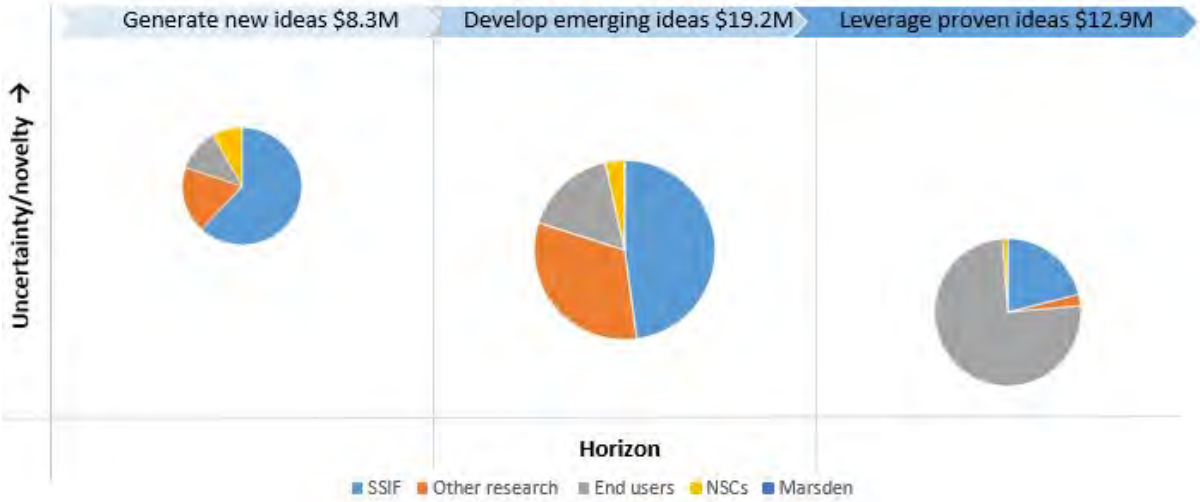
Expected outcomes

NIWA's freshwater science will contribute to the following outcomes:

- New Zealand's freshwaters and estuaries meet expectations for water quality and ecosystem health, while providing for the social, cultural and economic needs of their communities.
- Freshwater stakeholders in New Zealand are using 'best-in-class' technical tools for decision making, policy development, taking management actions, and preparing for future environmental change.

Dimensions

NIWA has 240 staff who contribute to the c. $40M of science conducted annually in this platform. These experts and their collaborators utilise data from NIWA's long-term water monitoring network, as well as from additional data collection campaigns using specialist sampling and analytical equipment.



Horizon profile and revenue sources for NIWA's freshwater and estuaries science.

Relevance

Engagement with key government agencies, Māori and relevant sectors has yielded a set of key challenges and opportunities which collectively determine the external drivers for the freshwater and estuaries platform strategy:

- Halting the decline in water quality, reversing past damage, and allocating water efficiently and fairly are among the government's highest priorities. These priorities are set out in the government's current agenda for freshwater reform, 'Essential Freshwater'.
- The 2018 'Three Waters Review' recommended improvements in New Zealand's drinking water, wastewater, and stormwater systems and their regulation.
- Māori rights and interests in freshwater, including co-governance and co-management, the restoration of degraded rivers and lakes, the protection of tāonga species, customary harvest rights, the recognition of mātauranga wai in decision-making processes, and the allocation of water are consistent with Te Mana o te Wai.
- Environmental limits on water takes and contaminant loading are driving interest in economic instruments for allocating available water resources in an efficient way. These instruments include taxes, dynamic water allocation systems, water trading schemes, and consideration of non-market values such as ecosystem services and sociocultural values.
- Research to support freshwater managers requires a collaborative approach across biophysical science, mātauranga Māori, economics, farm systems and social analysis if it is to have impact.

Strategic priorities

The strategic priorities for this platform over the next five years are to:

- Develop forecasting systems and models to predict the effects of perturbations on freshwater and estuarine ecosystems and their socioeconomic and cultural values.
- Expand research that is co-developed with Māori and includes the perspectives and approaches of mātauranga Māori.
- Implement a communications strategy to improve responsiveness to stakeholders, increase science uptake, and better inform the New Zealand public about freshwater. This strategy includes support for raising the profiles of New Zealand's next generation of freshwater science leaders.
- Work with others to develop cost-effective mitigation strategies and innovative technologies to reduce inputs of land-derived contaminants to receiving waters.
- Develop tools for rehabilitation of degraded freshwater and estuarine ecosystems, including the minimisation of biosecurity risks, the restoration of biodiversity, and the conservation of rare species.
- Develop tools to evaluate the hydrological, ecological, cultural and economic effects of allocation.
- Continue to support the Our Land & Water National Science Challenge by providing science capability, capital investment, international collaborations, stakeholder networks, data, models and tools.
- Continue to strengthen our Joint Institute for Freshwater Management with the University of Waikato to grow New Zealand's capacity to address freshwater issues with bold and innovative approaches.

Impacts

Over the period of this SCI the science NIWA undertakes in the freshwater and estuaries platform, along with the actions of our partnering agencies, is expected to have a number of beneficial impacts, including:

- Implementation of mitigation, rehabilitation and water treatment technologies have led to measurable improvements in the ecosystem health of freshwaters and estuaries, reduced human health risks, and increased social, economic and cultural values.
- Environmental flow setting has been informed by models that are reliable, fit-for-purpose, and which make trade-offs between supply reliability and protection of in-stream values transparent and predictable.
- Stakeholders have used ecological and hydrological models and forecasts to account for the impacts of future changes in climate and land use (including urbanisation and sustainable land management practices) in policy making, planning, water resources decision making, limit setting and mitigation and rehabilitation strategies.
- Hapū/iwi have advanced their aims for management, co-management and co-governance of freshwater and estuarine systems and water resources through the use of information and tools that are co-developed.
- Māori-led assessments of the state of freshwater and estuarine ecosystems have been widely used and are based on a fusion of mātauranga Māori and biophysical science.
- Limit-setting procedures and management actions have been selected using decision-support tools that reduce the risk of unintended outcomes.

2019/20 KPIs

NIWA's strategic priorities and contribution towards achieving impacts are delivered through meeting the following annual KPIs:

1. Technical advice has been provided on the revision of the NPS-Freshwater Management and its implementation.
2. New methods for increasing contaminant removal from surface and groundwater have been developed with end users and their effectiveness quantified.
3. A mitigation toolbox and guidelines have been published and disseminated.
4. Effects of urban wastewater treatment systems upgrades on estuarine ecosystems have been documented.
5. A national fish passage assessment protocol and app has been launched, with new and historical data uploaded to the app.
6. Design and performance guidance for constructed wetlands and riparian buffers to facilitate their future accreditation within regional limit setting processes has been developed.
7. Hydraulic geometry models to predict width, depth and velocity across New Zealand's rivers have been developed and tested, and outputs provided to stakeholders for environmental flow setting.
8. An adaptive management flow regime has been formally adopted by a dam operator as a result of modelling and monitoring of flushing flow effectiveness.
9. A simulation model of estuary evolution has been developed to predict effects of sea-level rise, land-use legacies, and current and future management actions (e.g., mangrove management, erosion control) on sedimentation, sediment accretion and mangrove expansion.
10. Evidence of the effects of land-use change and sustainable land management practices on water quality has been produced through data analyses from long-term research catchments.
11. A method for incorporating Māori values into decision making about river flows has been co-developed with whānau in Canterbury and is transferable to other rohe and takiwā for use by local whānau.
12. An urban water-quality screening tool has been developed for identifying management options (e.g., stormwater treatment) that will meet contaminant load and concentration limits.
13. A model for forecasting how alterations to riverine flow regimes affect the distribution of migratory and non-migratory fishes throughout New Zealand has been developed and made available to stakeholders.

2.4. Climate, atmosphere & weather (and related hazards)

Expected outcomes
NIWA's climate, atmosphere and weather science will contribute to the following outcomes:

- New Zealand communities will be more resilient to weather-related hazards in a future environment that is further modified by changes in climate extremes and their frequency.
- New Zealand reduces emissions of greenhouse gases and meets its international climate change obligations through transition to a zero carbon economy.

Dimensions
NIWA has 230 staff who contribute to the c. $45M of science conducted annually in this platform. These experts and their collaborators utilise NIWA's High Performance Computing Facility, atmospheric composition sampling and analysis equipment, and NIWA's 200 weather measurement sites across the country.

Horizon profile and revenue sources for NIWA's climate science.

Relevance
Engagement with key government agencies, Māori and relevant sectors has yielded a set of key challenges and opportunities which collectively determine the external drivers for the climate platform strategy:

- The government is seeking to transition New Zealand to a zero carbon economy by 2050 and to support local communities in adapting to the impacts of climate change.
- Climate change will have a significant impact on Māori business, and especially on farming, forestry and seafood interests. As holders of significant land-based assets and areas over which they have kaitiaki responsibilities, Māori are particularly interested in weather- and climate-related hazards.
- Industries are increasingly using weather-impact forecasting to improve response to impending risks and opportunities.
- Climate change is a geopolitical issue and science needs to contribute to New Zealand's obligations, positioning and global connectedness.

Strategic priorities
The strategic priorities for this platform over the next five years are to:

- Expand research that is co-developed with Māori, includes the perspectives and approaches of mātauranga Māori, and addresses Māori priorities.
- Develop environmental forecasting models and delivery systems for decision-support and real-time response to weather-related hazards, especially flooding.
- Develop national/regional risk assessments to inform priorities and policy development for both hazards and climate change adaptation.
- Developing systems for accountability and verification of greenhouse gas emissions in support of New Zealand's climate change mitigation strategies and transition to a zero carbon economy.

- Develop a world-class Earth System Model for long-term climate projections to assist in nationwide planning for climate change and its extremes.
- Implement novel community-based air-quality monitoring systems and new approaches for assessing urban air-quality hot spots.
- Continue to support the Deep South and Resilience to Nature's Challenges National Science Challenges by providing science capability, capital investment, international collaborations, stakeholder networks, data, models and tools.

Impacts

Over the period of this SCI the science NIWA undertakes in the climate platform, along with the actions of our partnering agencies, is expected to have a number of beneficial impacts, including:

- New Zealand has begun its transition to a low carbon economy.
- New Zealand communities and businesses integrate climate change mitigation and adaptation considerations into their everyday decision making.
- Atmospheric composition measurements from the New Zealand region, climate data and analyses, and direct scientist input have been used in international programmes that inform global science and policy on emissions and climate change.
- Sources and sinks of greenhouse gases in New Zealand have been quantified and are being used by government agencies and local councils to validate mitigation strategies.
- Planners and emergency agencies have access to accurate tools for evaluating the risk, impacts and potential losses due to weather-related hazards.
- National Environmental Standards for air quality have been refined, regional councils are able to assess their air quality and meet standards, and exposure projections are used in urban planning, leading to improved health outcomes for communities.
- New Zealand's proportion of renewable electricity generation has increased through the successful integration of new energy resources and more efficient operation of existing resources.
- Organisations, sectors and councils manage vulnerabilities and maximise opportunities related to climate extremes and change.

2019/20 KPIs

NIWA's strategic priorities and contribution towards achieving impacts are delivered through meeting the following annual KPIs:

1. Synthesise updated coastal and river flood-plain risk exposure into a national statement of hazard risk from climate change for the Ministry for the Environment's National Risk Assessment.
2. Contribute drafts to both working group I and II of the Intergovernmental Panel on Climate Change 6th Assessment.
3. Quality controlled atmospheric measurements have been archived regularly in major international databases for greenhouse gases and atmospheric composition and provided to government agencies for use in New Zealand international reporting obligations.
4. National greenhouse gas measurements and modelling are used in the Integrated Global Greenhouse Gas Information System to support New Zealand inventory development, mitigation and verification activities required for transitioning to a low carbon economy.
5. Quality controlled measurements of ocean carbon dioxide and pH are provided to national stakeholders, government agencies and international databases.
6. The regional variation of warming has been established in the New Zealand EEZ and used to inform mitigation and adaptation options.
7. New climate and hydrology projections and forecasts (covering seasonal to multidecadal timescales) are produced and made available to interested stakeholders.
8. The Our Future Climate New Zealand web-based visualisation tool has at least three new climate variables added to the suite of products.
9. Annual snowline survey results and digital historical New Zealand glacier photographs have been published, including quantitative ice volume changes for key index glaciers between 2017 and 2018 using 3D photogrammetry.
10. A specialised decision support (forecast delivery and alerting) tool has been developed and released for use by electricity distribution and network companies.
11. Benchmarking for a new approach to modelling tsunami and flood inundation has been completed.

12. High resolution weather re-analysis data for all New Zealand for a period within the current climate (1980–2010) are available for application across both productive and hazard sectors.
13. Hazard (and quiet time) forecasts have been developed based on a combination of very high resolution models and high resolution model ensembles that provide uncertainty estimates.
14. Novel community-based air quality monitoring systems and new approaches for assessing urban air quality hot spots have been implemented.
15. Human exposure to atmospheric pollutants, including heavy transport in urban areas, has been estimated, the main causes identified, and relevant results provided to collaborating health researchers and key agencies.

3. Enabling services

3.1. Science delivery

Our customers expect NIWA to understand and be responsive to their needs, to be socially, environmentally and commercially responsible, and to effectively communicate the science that we do for them. Delivering our science to meet these expectations requires us to:

- Collaborate well – co-innovate, co-develop and co-deliver.
- Listen – understand the customers' needs.
- Think innovatively – best teams and technologies brought together to meet customer needs.
- Be agile – respond rapidly when things change.
- Execute well – deliver projects in full, on time, and to customer expectations.
- Communicate clearly – make complex science understandable to the target audience.

NIWA will continue to build our capabilities in delivering excellent, relevant and timely science by:

- Training our people in customer engagement and responsiveness.
- Refining our contracting systems to reduce barriers to rapid and positive engagement.
- Investing in new technologies to provide new products and services.
- Adopting a wider range of mechanisms for delivery of services and its communication.
- Enhancing our project management and monitoring systems.
- Ensuring our systems continue to enable a virtual workplace – 'from-anywhere-anytime'.

2019/20 KPIs

1. Achieve organisational performance targets for collaboration, knowledge transfer, operational efficiency and on-time delivery (as described in Section 4).
2. Continue to survey key stakeholders on the quality of our engagement and delivery performance (N.B. NIWA's next formal commissioned survey of stakeholders is due to be undertaken in the 2020/21 year).
3. Implement key recommendations for minimising business interruption risks and strengthening business continuity.

3.2. Science communication

Skilful communication of sometimes complex science is crucial to evidence-based decision making and policy development. While key audiences still seek information from an authority they trust, like NIWA, it is important that our messages are accessible across many platforms, are highly visual, and are easy to understand. Social networks – NIWA's, our scientists, our customers and our collaborators – allow direct and immediate communication to the desired audience and are now often the tool of choice and most influence.

NIWA's key communication objectives are to:

- Ensure that our communication leads to public engagement and understanding of the critical issues in our areas of science, reinforcing the relationship between science and society.
- Enhance knowledge transfer and stakeholder engagement through continual development and use of highly visual imagery and innovative technologies, tailored stakeholder communications, and dynamic multimedia presentations as a key part of science delivery.
- Maintain proactive and responsive media engagement across mainstream traditional and digital media and selected social media platforms – by providing tailored, informative and appealing packages that reinforce our position of authority and innovation.
- Ensure that our website and social media channels continue to attract and reward visitors with continually improving, dynamic and highly visual content that is aligned with our stakeholder, customer and collaborator engagement and marketing strategies, is a foundation for our science communication, and complements other outreach activities.

- Engage with young New Zealanders to raise awareness of the opportunities that a science career brings.

2019/20 KPIs

1. Reinforce the relationship between science and society through investment in science fairs, Blake and other outreach activities to grow the constituency of science.
2. Develop and implement multimedia communication strategies for our three science platforms that target key issues of public and stakeholder interest.
3. Lead public engagement and understanding of the science in our domain, maintaining high media profile and engagement through a mainstream audience of 70+ million and a social media audience of 1+ million.

3.3. People & capability

NIWA's ongoing success depends on recruiting and retaining a high calibre workforce in a competitive international market. Our strategy is to provide a competitive package of remuneration and benefits, and a positive, motivating and safe workplace where people of all backgrounds can achieve their full potential. We have a highly educated and internationally diverse workforce, with three-quarters of our staff tertiary qualified and more than 30 nationalities represented. About 5% of NIWA's staff identify as Māori, having doubled in the last 3 years. Our overall gender mix is 64% male and 36% female, with new recruits in recent years showing an even gender split. We expect these trends to continue.

We are committed to being an employer of choice by:

- Providing flexibility in work arrangements to support those managing life's competing priorities.
- Having a high trust and high accountability approach that allows considerable autonomy and self-management.
- Engaging positively with staff and their union representatives.
- Valuing diversity in our workforce and the differing perspectives it brings.
- Striving for an inclusive culture where every person who works at NIWA feels welcome, is respected for their individual qualities and contribution, and has an equal opportunity to achieve to their full potential.
- Providing the best possible workplaces, scientific equipment, training and career development opportunities.
- Ensuring we remain focused on employee safety, health and wellbeing.

2019/20 KPIs

1. Actively support, and where relevant lead, collaborative initiatives arising from the recent CRI Workforce Report, including addressing science workforce capability issues with the tertiary education sector.
2. NIWA's Joint Management Team to complete a bicultural awareness and skills training programme.
3. Develop and implement a second stage of training for managers and staff on unconscious bias in the workplace.
4. Complete actions to achieve Rainbow Tick accreditation to provide assurance we have a welcoming and supportive environment for members of the Rainbow community.
5. Achieve DVFree Tick accreditation to provide assurance that we recognise the impact of domestic violence and that we have systems in place to support those affected by it.
6. Develop a performance dashboard of lead health and safety measures that are consistently and accurately reported.
7. Lift the health and safety awareness and leadership capability of line managers through quarterly health and safety awareness sessions and the provision of training and support resources on topical issues.

3.4. Finance, procurement and legal services

NIWA's finance, procurement and legal function supports and enhances the organisational health of the company by delivering the following four outcomes:

- Effective processes which 'just happen'.
- Insight to guide decision making.
- A source of trusted professional advice.
- Properties fit for world-class science.

The finance, procurement and legal function has the following key objectives:

- Financial accounting and external reporting will be delivered on time, free from material error and as efficiently as possible.
- Financial and administrative operations will be effective, efficient and well controlled, while allowing seamless interaction with our customers, suppliers and staff.
- Management reporting and financial analysis will be insightful, intuitive and well positioned to support agile decision making at all levels of the organisation.
- Risk management activities will help all areas of the business prosper by ensuring that risks are managed to an acceptable level while facilitating an agile and responsive operating environment.
- Property upgrades will be consistent with an overarching property strategy that ensures that all NIWA's properties are of a contemporary standard and closely align with its future needs.
- Internal audit activities will identify opportunities to improve systems and processes while providing assurance to the Executive and Board that risks are being appropriately managed.

2019/20 KPIs

Key performance indicators for completion in the 2019/20 year are:

1. Complete a business case for the redevelopment of NIWA's major sites at Wellington, Hamilton and Christchurch.
2. Undertake a review of NIWA's core financial systems in order to determine whether alternative offerings may better serve the company's need for accurate and timely business reporting.
3. Undertake a review of NIWA's core financial processes with a particular focus on identifying opportunities to improve efficiency.

4. Performance targets 2019/20

NIWA will measure its performance against the outcomes and operating principles in its Statement of Core Purpose using the following set of indicators.

Financial indicators

Measure	Calculation	Reporting frequency	Forecast 2018/19	Target 2019/20
Operating margin	Earnings Before Interest, Tax, Depreciation, Amortisation and Fair-value (EBITDAF)/Revenue	Annual	16.9%	18.0%
Profit per FTE	EBITDAF/FTEs	Annual	$40,000	$43,000
Quick ratio	Current assets less inventory less prepayments/Current liabilities less revenue received in advance	Quarterly	2.09	1.92
Interest coverage	EBITDAF/Interest paid	Quarterly	Not Applicable	Not Applicable
Profit volatility	Standard deviation of EBITDAF for past five years/Average EBITDAF for the past five years	Annual	6.4%	15.3%
Forecasting risk	Five-year average of return on equity less forecast return on equity	Annual	1.2%	1.2%
Adjusted return on equity	NPAT excluding fair value movements (net of tax)/Average of share capital plus retained earnings	Quarterly	7.1%	4.8%
Revenue growth	% change in revenue	Annual	7.2%	1.8%
Capital renewal	Capital expenditure/Depreciation expense plus amortisation expense	Quarterly	128.9%	129.3%

Organisational performance indicators – 2019/20 at a glance

Measure	Calculation	Reporting frequency	Forecast 2018/19	Target 2019/20
End-user collaboration*	Revenue per FTE from commercial sources	Quarterly	$93,000	$96,000
Research collaboration*	Publications with collaborators	Quarterly	93%	85%
Technology & knowledge uptake*	Commercial reports per scientist FTE	Quarterly	1.3	1.0
Science quality*	Impact of scientific publications	Annually	2.5	2.5
Operational efficiency*	Revenue per FTE	Quarterly	$237,000	$236,000
Operational delivery	% projects delivered on time	Annually	>90%	>90%
Strategic progress – operations	% Enabling Plan KPIs achieved	Annually	>90%	>90%
Strategic progress – science	% Science KPIs achieved	Annually	>90%	>90%

*Ministry of Business, Innovation & Employment generic indicators

5. Financials

NIWA has seen recent growth in the funding available to it for conducting scientific research, and this has enabled the company to continue the following actions which have been underway during the past two years:

- Building its capability in areas of science that are critical to national needs.
- Undertaking the early stages of the design process required to deliver the upgrades to its ageing facilities that have been signaled in previous SCIs.

The financial assumptions reflected within this SCI provide for the capital investment programmes required to deliver the facility upgrades noted above, together with continuing investment in the scientific and other equipment and infrastructure required to ensure NIWA retains its place at the forefront of environmental science. The amounts included in respect of the facility upgrades continue to reflect preliminary and indicative estimates, the accuracy of which will be improved as planning for these programmes continues over the coming year. NIWA currently anticipates submitting a business case to shareholding Ministers in respect of these proposed investments during the first half of the 2019/20 financial year.

Over the past year NIWA has continued to build its core capability across a range of freshwater, ocean and climate disciplines. During 2019/20, NIWA intends to continue to work to ensure that the range of skills represented by its staff matches closely the current and future demands of its customers.

Other than as discussed above, we have assumed only marginal changes to NIWA's current operating environment in developing our financial projections. In particular, we have taken a prudent approach to assumptions around increases in government research funding as well as around commercial charter voyages for the RV *Tangaroa*.

The five-year financial plan also reflects prudent revenue growth assumptions in the range of 1% to 3% each year, together with continued tight control on operating costs. The budgeted Group revenue for 2019/20 is $165.3M, with total costs of $157.4M, creating an operating surplus before tax (EBIT) of $7.9M and an adjusted return on equity of 4.8%. NIWA expects to continue to deliver strong operating cash flows, with a budgeted EBITDAF of $29.8M in 2019/20.

Revenue

In 2019/20 NIWA Group revenue is budgeted at $165.3M, up by $3.0M compared with the forecast for the 2018/19 year and by $5.4M compared with the level contemplated by last year's SCI. The increase on the previous year's forecast is driven by anticipated growth in applied science revenue, leveraging the growth in research funding which NIWA has won in recent years. This is partly offset by a cautious approach to forecasting revenue related to NIWA's fleet of research vessels. Research funding is forecast to be broadly unchanged compared with the prior year, with increases in revenue from sources of contestable funding largely offset by reductions in revenue related to the National Science Challenges (an effect of high levels of revenue in 2018/19 as the first five-year funding tranche came to an end).

Beyond 2019/20 we have taken a prudent approach to growth in research funding, with increases assumed not to keep pace with anticipated inflation. On the other hand, we are projecting increases in applied science revenue throughout the period as we continue to leverage the capacity increases that have been enabled by recent growth in research work.

Operating expenditure

In 2019/20, operating expenses are budgeted at $157.4M, up from $153.2M in 2018/19. This increase is accounted for by an increase of $4.2M in personnel costs. This is due both to our continuing to build capacity to deliver research in areas critical to meeting our Statement of Core Purpose obligations, and to anticipated continued increases in staff salary costs.

Beyond 2019/20 we expect personnel costs to increase by between 2% and 3% during each year of the SCI period, largely due to salary costs increasing with inflation. Operating cost efficiency gains of recent years are expected to be maintained, and we have assumed that inflation will continue at a low level. In the final year of

the SCI period we have provided for a material increase in depreciation expense, consistent with current indicative planning assumptions for the completion of NIWA's property upgrades.

Balance sheet management
NIWA's science is capital intensive and requires an on-going investment in scientific equipment if we are to deliver excellent science, secure revenue and be financially sustainable. Beyond this underlying capital spending requirement, and as signaled in previous years' SCIs, NIWA expects to make significant strategic investments in renewing many of its properties and facilities. The forecast set out in this SCI contemplates a requirement to spend in the region of $170M on renovating or replacing the physical infrastructure and buildings at most of NIWA's sites, including its regional centres. (These investments will be subject to Board, and where appropriate, Shareholder approval in due course.)

NIWA expects to fund this investment requirement from a combination of its existing resources, operating cash flows, and debt facilities.

During the 2019/20 year, we intend to progress the replacement of the administration building at NIWA's Northland Marine Research Centre as well as progressing the replacement of our field office in the Mackenzie District with a facility more suited to our growing requirements in that area. We also intend to submit a business case to shareholding Ministers in respect of the redevelopment of our major facilities in Wellington, Hamilton and Christchurch, and to progress those projects to at least the developed design stage.

As signaled in last year's SCI and in section 2.2, over the period of this SCI NIWA expects to complete a review of the future demand for a medium-sized vessel to replace the ageing RV *Kaharoa* and then decide on an appropriate course of action from the review's conclusions (which may include options of non-replacement, chartering, leasing, or purchasing a replacement). While this work remains at an early stage, if the possible option to purchase is favoured, then an investment in the range of $15–20M would be required in the latter half of the SCI period and would need to be included in our financial outlook in a future SCI. NIWA is comfortable that an investment need of the magnitude signaled here could be funded from its own resources, with the phasing of the planned programme of property renovations able to be adjusted to respond to any balance sheet pressure if needed.

Cash flow
NIWA expects its operating cash flow to remain steady, with EBITDAF of $29.8M in 2019/20 rising to $36.8M in 2023/24. NIWA expects to require debt financing of about $97M to support its strategic capital investment needs during the second half of the business plan period, such financing being repaid over the following six years. This financing requirement represents a preliminary estimate only at this point. It is expected to evolve as the certainty of estimates both of the costs of NIWA's strategic capital spending needs and of the company's profitability in the SCI out-years increases over time.

Dividend
Based on the strategic capital investment needs identified above, no dividends are planned during the period of this SCI; however, the NIWA Board will continue to review this on an annual basis.

Return on equity
NIWA's budgeted adjusted return on equity in 2019/20 is 4.8%. This metric is expected to remain broadly flat through the SCI period.

Risks
There is some forecasting uncertainty associated with NIWA's revenue expectations. The revenue assumptions built into the SCI forecast reflect an expectation that applied science revenue will grow to fill excess capacity currently being put in place as NIWA grows its staffing levels to address increasing demands for science research. The assumptions also reflect an expectation that NIWA will continue to be successful in growing its share of contestable revenue contracts. If these expectations are not realised to the extent forecast, then profitability will be adversely impacted in the short term, while in the longer term NIWA would need to adjust its cost structure to restore its financial sustainability.

Uncertainty also exists around revenues from commercial charters of NIWA's vessel RV *Tangaroa*. While the SCI reflects a realistic assessment of available commercial charter days, the maintenance and operation of this important science capability for the nation does remain reliant on NIWA winning such commercial contracts. If the market for this charter work significantly deteriorates, then NIWA's profitability will be adversely impacted.

NIWA's budgeting has been realistic, and we are of the view that there is equal downside risk and upside opportunity. NIWA is confident that its plans remain robust in the near-term to potential negative volatility, and we will actively monitor and respond to any emerging risks.

NIWA Group
Ratios and statistics

Statement of Corporate Intent ($M)	Forecast 18/19	SCI 19/20	SCI 20/21	SCI 21/22	SCI 22/23	SCI 23/24
Revenue	162.29	165.33	167.43	172.31	176.94	182.33
Revenue growth	7.2%	1.8%	1.3%	2.8%	2.6%	3.0%
Operating results						
Operating expenses & depreciation	153.16	157.41	158.80	157.63	164.30	167.70
EBITDAF	27.35	29.81	31.80	33.49	34.86	36.80
EBIT & dividend received	9.13	7.92	8.64	14.68	12.64	14.64
Profit before income tax	9.94	8.00	7.76	11.69	7.80	9.33
Profit after tax	7.16	5.07	4.73	8.42	5.62	6.73
EBITDAF per FTE	0.040	0.043	0.046	0.049	0.051	0.054
Average total assets	168.29	178.91	197.29	244.44	289.88	306.26
Average equity (Shareholders' funds)	123.66	129.20	133.87	140.70	147.55	153.56
Adjusted average total assets*	141.06	151.68	170.05	217.21	262.64	279.02
Adjusted average equity*	100.80	106.33	111.00	117.84	124.69	130.69
Capital expenditure (incl. Capital committed)	23.47	27.04	63.20	87.30	39.90	32.30
Capital expenditure % to revenue	14.5%	16.4%	37.7%	50.7%	22.6%	17.7%
Liquidity						
Current ratio	136.5%	130.0%	80.9%	80.3%	81.1%	81.0%
Quick ratio (aka Acid test)	2.09	1.92	1.09	1.09	1.10	1.11
Profitability						
Adjusted return on equity*	7.1%	4.8%	4.3%	7.1%	4.5%	5.1%
Return on equity	5.8%	3.9%	3.5%	6.0%	3.8%	4.4%
Return on assets	5.4%	4.4%	4.4%	6.0%	4.4%	4.8%
EBITDAF margin (aka Operating profit margin)	16.9%	18.0%	19.0%	19.4%	19.7%	20.2%
Operational risk						
Profit volatility	6.4%	15.3%	14.8%	11.7%	8.5%	7.2%
Forecasting risk (non-adjusted ROE)	1.2%	1.2%				
Coverage						
Interest cover	N/A	N/A	18.30	6.10	2.97	3.08
Growth/Investment						
Capital renewal	128.9%	129.3%	285.0%	490.4%	188.3%	153.0%
Funds available for distribution	0.0	0.0	0.0	0.0	0.0	0.0
Financial strength						
Gearing		0.0%	12.2%	34.8%	38.2%	38.2%
Equity ratio (aka Proprietorship)	73.5%	72.2%	67.9%	57.6%	50.9%	50.1%
Cash and short-term deposits	22.32	19.94	0.50	0.50	0.50	0.50
Financial debt	0.00	0.00	18.91	77.37	92.98	96.87

* Agreed with Officials after adjustment in 2006/07 for restatement of certain land and buildings cost figures.

Key: Statement of Corporate Intent indicators.

Appendices:

Appendix 1: NIWA's Statement of Core Purpose

Purpose
NIWA's purpose is to enhance the economic value and sustainable management of New Zealand's aquatic resources and environments, to provide understanding of climate and the atmosphere and increase resilience to weather and climate hazards to improve safety and wellbeing of New Zealanders.

Outcomes
NIWA will fulfil its purpose through the provision of research and transfer of technology and knowledge in partnership with key stakeholders including industry, government and Māori to:

- Increase economic growth through the sustainable management and use of aquatic resources.
- Grow renewable energy production through developing a greater understanding of renewable aquatic and atmospheric energy resources.
- Increase the resilience of New Zealand and South-West Pacific islands to tsunami and weather and climate hazards, including drought, floods and sea-level change.
- Enable New Zealand to adapt to the impacts and exploit the opportunities of climate variability and change and mitigate changes in atmospheric composition from greenhouse gases and air pollutants.
- Enhance the stewardship of New Zealand's freshwater and marine ecosystems and biodiversity.
- Increase understanding of the Antarctic and Southern Ocean climate, cryosphere, oceans and ecosystems and their longer-term impact on New Zealand.

Scope of operation
To achieve these outcomes, NIWA is the lead CRI in the following areas:

- Aquatic resources and environments (with a focus on surface freshwaters and coastal environments).
- Oceans.
- Freshwater and marine fisheries.
- Aquaculture.
- Climate and atmosphere.
- Climate and weather hazards.
- Aquatic and atmospheric-based energy resources.
- Aquatic biodiversity (including biosystematics) and biosecurity.

NIWA will work with other research providers and end users to contribute to the development of the following areas:

- Biosecurity, freshwater and hazards management.
- Climate change adaptation and mitigation.
- Ocean floor exploration.
- Seafood sector.
- Urban environments.
- Antarctica.

Operating principles

NIWA will:

- Operate in accordance with a Statement of Corporate Intent and business plan that describes how NIWA will deliver against this Statement of Core Purpose and describes what the shareholders will receive for their investment.
- Meet its obligations as a Crown Company and remain financially viable, delivering an appropriate rate of return on equity.
- Develop strong, long-term partnerships with key stakeholders, including industry, government and Māori and work with them to set research priorities that are well linked to the needs and potential of its end users.
- Maintain a balance of research that provides for both the near-term requirements of its sectors and demonstrates vision for their longer-term benefit.
- Transfer technology and knowledge from domestic and international sources to key New Zealand stakeholders, including industry, government and Māori.
- Develop collaborative relationships with other CRIs, universities and other research institutions (within New Zealand and internationally) to form the best teams to deliver its core purpose.
- Provide advice on matters of its expertise to the Crown.
- Represent New Zealand's interests on behalf of the Crown through contribution to science diplomacy and international scientific issues and/or bodies as required.
- Seek advice from scientific and user advisory panels to help ensure the quality and relevance of its research.
- Establish policies, practices and culture that optimise talent recruitment and retention.
- Enable the innovation potential of Māori knowledge, resources and people.
- Maintain its databases, collections and infrastructure and manage the scientific and research data it generates in a sustainable manner, providing appropriate access and maximising the reusability of data sets.
- Seek shareholder consent for significant activity beyond its scope of operation.

Appendix 2: NIWA's Organisational Responsibility Charter

NIWA is committed to contributing positively to the social, economic and environmental wellbeing of New Zealand:

Economic

NIWA is committed to operating with fiscal discipline to ensure that we retain our long-term viability and meet our core purpose science responsibilities to generate sustainable benefit to New Zealand.

We are committed to:

- Fair trading and observing high standards of behaviour, integrity and ethics.
- Maintaining positive relationships with our customers, partners and collaborators.
- Taking a broad approach to decision making and business development with the aim of benefitting all of New Zealand.

Social

NIWA is committed to work practices, operations and science outcomes that support our staff and the wider community.

We are committed to:

- Ensuring that people are safe in our workplaces.
- Engaging positively with the communities in which we operate and live.
- Respecting cultural values and diversity in New Zealand and in the countries where we work.
- Fostering positive interactions with, and outcomes for, Māori.

Environmental

NIWA is committed to operating in an environmentally responsible way when carrying out our activities and ensuring that we meet our core purpose science responsibilities to contribute to better environmental outcomes for New Zealand.

We are committed to:

- Minimising the environmental effects of performing our business.
- Integrating environmental perspectives into our wider business planning.
- Complying with all regulatory requirements, standards and best practice guidelines.

Operating to our charter principles

We must ensure that the commitments we give are owned by all our people and demonstrated by their actions.

Economic

We will support the Organisational Responsibility Charter by:

- Being fair and honest in all our business dealings.
- Maintaining objectivity in our service provision and avoiding actions that could damage NIWA's reputation for impartiality.
- Taking a 'NZ Inc' approach to business decisions and using any market advantage responsibly.
- Delivering on our project commitments – on time, to budget and with the expected quality.
- Employing our assets responsibly to deliver NIWA's goals and to benefit the wider community.
- Abiding by the laws of the lands in which we operate.
- Resolving differences without the need for litigation.

Social

We will support the Organisational Responsibility Charter by:

- Being a good employer, particularly in relation to;
    - providing equitable access to employment opportunities
    - leadership, accountability and culture
    - recruitment, selection and induction
    - employee development, promotion and exit
    - flexibility and work design
    - remuneration, recognition and conditions
    - harassment and bullying prevention.
- Treating our employees and all others with whom we interact with dignity and respect, including fostering long-term relationships built on trust and mutual benefits.
- Ensuring staff have opportunities to participate in work-place improvement programmes.
- Making available best practice systems and training to achieve a fit and healthy workforce.
- Empowering our employees to identify and resolve safety concerns so that potential hazards are eliminated, and safe processes and work methods are under continual improvement.
- Maintaining open communication with local communities and ensuring our activities and staff respect their traditions and cultures.
- Supporting our employees to participate in voluntary activities that benefit the wider community.
- Working closely with individual employees to help them reach their goals and provide NIWA with talent for the future.
- Striving for 'no surprises' in our internal and external relationships.

Environmental

We will support the Organisational Responsibility Charter by:

- Ensuring that all our activities and assets comply with resource consents, relevant environmental standards, biosecurity and biodiversity regulations, and permitting requirements.
- Maintaining full compliance with animal ethics procedures and ensuring that all sampling and work with live animals complies with the Animal Welfare Act 1999.
- Minimising material waste and resource use and making maximum practical use of recycling and electronic media.
- Minimising energy consumption and greenhouse gas emissions, within the constraints of business sustainability.
- Supporting our employees to take positive actions to reduce the effects of their activities on the environment at work and beyond.

Appendix 3: Other matters required by the CRI Act 1992

Information to be reported to shareholders
NIWA will provide information that meets the requirements of the:

- Crown Research Institutes Act 1992 (the Act);
- Companies Act 1993;
- Financial Reporting Act 1993;
- Crown Entities Act 2004; and
- New Zealand Institute of Chartered Accountants (NZICA) with regards to Generally Accepted Accounting Practice (GAAP).

The following information is made available to enable our shareholders to make an informed assessment of NIWA's performance:

- A Statement of Corporate Intent (SCI) which sets out NIWA's strategy for delivering against its core purpose and the company's financial and non-financial performance targets. The draft SCI is due not later than 1 month before the start of the financial year (31 May).
- An Annual Report containing sufficient information to allow an informed assessment to be made against the performance targets in the SCI. This report includes comments on our core business and how we communicate our science, financial statements (including audit report), and a report from the Directors to the shareholders. The Annual Report is to be provided within three months of the financial year ended 30 June. A public Annual General Meeting is to be held no later than six months after balance date and not later than 15 months after the previous AGM.
- A Half-Yearly Report containing unaudited financial statements (including comparatives of the same period in the previous year) and major highlights during the period. The Half-Yearly Report is due within two months of the first half of each financial year ended 31 December.
- A Quarterly Report containing information such as unaudited financial statements (including current quarter and year-to-date budgets and a forecast for the financial year ended 30 June). The Quarterly Report also includes financial performance measures and progress towards meeting non-financial performance targets. The Quarterly Report is currently requested within one month of each financial quarter ended 30 September, 31 December, 31 March, and 30 June.
- Any other information relating to the affairs of the company, as reasonably required by shareholders, under section 20 of the Act and section 45B of the Public Finance Act 1989.

Policy and procedure statements
NIWA Group consists of:

- National Institute of Water and Atmospheric Research Ltd
- NIWA Vessel Management Ltd
- NIWA Environmental Research Institute
- NIWA Natural Solutions Ltd
- NIWA Australia Pty Ltd
- EcoConnect Ltd
- Unidata Pty Ltd

All companies have 100% ownership and voting interests, except Unidata Pty Ltd which has 80% ownership and voting interest. NIWA Group will adhere to the following procedures, as required to be discussed under section 16 of the Crown Research Institutes Act.

Accounting policies
NIWA adopts generally accepted accounting practice in New Zealand as prescribed by the External Reporting Board. The accounting policies for the measurement and reporting of financial performance, movements in equity, financial position, and cash flows are detailed in NIWA's Annual Reports available at www.niwa.co.nz.

Dividend policy
Profit retention and dividend distribution will be determined from year to year by the Board. The policy's objective is to ensure that an appropriate level of funds is maintained in the company to sustain financial viability, whilst providing an adequate return to the shareholders.

In considering this objective, the Board each year determines the level of surplus funds by reference to NIWA's:

- medium- and long-term capital investment requirements (including equity investments);
- ability to maintain and expand operational capability;
- ability to repay debt (if any);
- funding requirements for subsidiaries;
- capacity to fund RV *Tangaroa*;
- working capital requirements;
- legislative requirements, e.g., ensuring section 4 of the Companies Act 1993 (Solvency test) has been satisfied.

Any dividend would be paid within two months of the financial year-end.

Shareholder consent for significant transactions
The Board will obtain prior written consent for any transaction or series of transactions involving full or partial acquisition, disposal, or modification of property (buildings, land, and capital equipment) and other assets with a value equivalent to or greater than $10 million or 20% of the company's total assets (prior to the transaction), whichever is the lesser.

The Board will obtain the prior written consent of Shareholding Ministers for any transaction or series of transactions with a value equivalent to or greater than $5.0 million or 30.0% of the company's total assets (prior to the transaction):

- the acquisition, disposal, or modification in a joint venture, partnership, or other similar association;
- the acquisition or disposal in full or in part of shares or interests in external companies, subsidiaries, and business units;
- transactions that affect the company's ownership of a subsidiary or a subsidiary's ownership of another equity;
- other transactions that fall outside the scope of the definition of the company's core business or may have a material effect on the company's science capabilities.

The Board will advise the Shareholding Ministers in writing (in the Quarterly Report) before entering into any transaction below this threshold related to property or to a specific commercialisation venture which involves change in intellectual property ownership or control.

Ratio of shareholders' funds to total assets
The target ratio of 'shareholders' funds to total assets' is as follows:

	As at 30 June 2019 Forecast	2020 Plan	2021 Plan	2022 Plan	2023 plan	2024 plan
%	73.5	72.2	67.9	57.6	50.9	50.1

Shareholders' funds are defined as the sum of the 'share capital' and 'equity reserves' (otherwise called 'total equity').

Total assets are defined as the sum of the net book value of 'current' and 'non-current assets'. This is 'as disclosed' in the company's balance sheet as per the Annual Report, prepared in accordance with the accounting policies adopted by the Board.

Shareholders' funds and total assets are averaged over two years.

Commercial value of the shareholders' investment
Section 16(3) of the Act requires the NIWA Group to furnish an estimate of the current commercial value of the Crown's investment.

The NIWA Board is satisfied that the net asset position (or shareholders' funds) as at 30 June 2018 is a fair and reasonable indication of the commercial value of the Group. The net asset position as shown in accordance with the company's accounting policies for 30 June 2018 was $120.081 million.

Activities where shareholder compensation would be required
The Board would look to seek compensation from the shareholders in the following circumstances:

- Where the shareholders instruct NIWA to undertake activities or assume obligations that would result in a reduction of the company's profit or net realisable value.
- Where the Board may consider undertaking strategic investments for the wider benefit of the New Zealand public, involving financial outlays beyond those incorporated within the company's Statement of Corporate Intent or financing capabilities.

No request for compensation is currently being sought from the shareholders. At this time no such investment has been identified, nor have any financial projections for such investment been included in NIWA's 2018/19 Statement of Corporate Intent. In the longer-term, NIWA will be reviewing deepsea marine capability and future high-performance computing capability (beyond its recent purchase plans in 2017/18) and how investment in these national science infrastructure assets may be supported.

Other matters specifically requested by the shareholder
There are no other matters that have been specifically requested by the shareholders.

The following information can be found on NIWA's website:

- Personnel policy that complies with the principles of a good employer
- Equal Employment Opportunities programme
- Corporate Social Responsibility policy

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Barry Harris, Chairman

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Nick Main, Director

Directory

Board of Directors
Barry Harris (Chairman)
Nick Main (Deputy Chairman)
Dr Helen Anderson
Dr Tracey Batten
Prof. Gillian Lewis
Mary-Anne Macleod
Michael Pohio

Executive Team
John Morgan (Chief Executive Officer)
Geoff Baird (General Manager Communications & Marketing)
Patrick Baker (Chief Financial Officer)
Dr Barry Biggs (General Manager Technology & Innovation)
Dr Bryce Cooper (General Manager Strategy)
Dr Mary-Anne Dehar (General Manager People & Capability)
Dr Rob Murdoch (General Manager Research)
Dr Helen Neil (General Manager Operations)
Marino Tahi (General Manager Māori Strategy and Partnerships)

Solicitors
Bell Gully
Atkins Holm Majurey Ltd

Auditors
Price Waterhouse Coopers on behalf of the Auditor-General

Bankers
ANZ National Bank of NZ Ltd

Insurance Broker
Marsh Ltd

Registered Office
41 Market Place
Auckland Central 1010
New Zealand

Private Bag 99 940
Newmarket
Auckland 1149
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Website
http://www.niwa.co.nz
https://www.facebook.com/nzniwa
https://twitter.com/niwa_nz

NIWA
Taihoro Nukurangi

Climate, Freshwater & Ocean Science