

Capability Funding

Capability funding is provided to Crown Research Institutes (CRIs) through the Ministry of Research, Science & Technology to support and enhance long-term research capability. Capability funding is based on each CRI's proportion of the total government research investment. In 2007–08, NIWA received \$10.08 million (excluding GST) in capability funding.

	\$'000 (excl GST)	Percentage
Support core skill bases that are at or below critical mass	532	5
Advance new areas of science and innovation	4,053	40
Increase the transfer of science to end-users	1,527	15
Build future research capacity in areas of high national need	2,720	27
Bridge the gap between research and commercialisation of new products	1,250	13

Impact of fishing on albatross colonies monitored

Capability funding is assisting NIWA with a post-doctoral study into the effects of fishing activity on New Zealand's white-capped albatross.

Although the white-capped albatross is the most common albatross found in New Zealand, these seabirds are prone to bycatch in commercial fishing operations when foraging for food.

Dr Leigh Torres, a NIWA post-doctoral fellow, analysed high resolution data of the seabird distributions at sea from GPS tags attached to 19 white-capped albatross.

This information was matched with commercial fishing data, provided by the Ministry of Fisheries, to assess changes in habitat use and behaviour patterns of the albatross when they were near fishing activity.

Results show that 75% of the foraging trips by the albatross overlapped with fishing vessels at some point, but six birds did not go near the fishing vessels at all.

While this indicates commercial fishing activity could be influencing the ecology and biology of the albatross population, a wider study is needed to determine whether commercial fishing is actually detrimental or an advantage to the seabirds.

More albatross will be tagged, and their movements monitored against fishing activity, in the coming months.

How does commercial fishing affect white-capped albatross? The Capability Fund is supporting a NIWA post-doctoral fellow to investigate.



David Thompson, NIWA



Geoff Reard, NIWA

Invasive species like this Mediterranean fanworm, Sabella spallanzanii, can wreck havoc. The Capability Fund is helping NIWA scientists develop new and reliable ways to model and predict aquatic species distributions – both native and introduced.

Modelling aquatic species distributions for better biosecurity & biodiversity management

Understanding more about aquatic biodiversity and possible threats from non-indigenous species is essential for New Zealand's biosecurity management.

Capability funding has assisted NIWA to strengthen its research in this area; in particular, with the development of new and reliable ways to model and predict aquatic species distributions – both native and introduced species.

Our models can predict the distributions of species based on what's known about their current distribution, habitat requirements, and some environmental variables. We can predict where a species is likely to occur for the whole country or EEZ, even for locations where we don't have any presence/absence information. Using these techniques, we have also assessed the likely spread of invasive species, such as didymo.

NIWA's analyses can help government departments, including the Department of Conservation, and MAF, to develop biosecurity policies and operational management decisions for responding to pest species incursions and spread, and conserving or restoring critical habitats.

This research also includes design and evaluation of large-scale marine protected areas in offshore waters, predicting the distributions of coastal reef fishes and the 30 commonest freshwater fish species. The freshwater fish distributions are being used to assess the conservation values of New Zealand rivers and streams.

Capabilities to be maintained, enhanced, or developed with Capability Fund

Areas of nationally recognised expertise	2007–08 Forecast	2007–08 Achievements
<i>Freshwater</i>	<ul style="list-style-type: none"> ■ maintain national capabilities in lake and wastewater sciences ■ continue support for seven post-doctoral fellows in key areas of increasing stakeholder need (e.g., water allocation, catchment water quality modelling, water-borne pathogens) ■ enhance national capability in freshwater science through support of two sabbaticals and technical training 	<ul style="list-style-type: none"> ■ research on lake restoration processes and novel wastewater treatment ponds ■ post-doctoral fellows supported to study modelling riparian processes, stream geomorphology, water resources planning, stream habitats, health risk assessment modelling, and snow resources ■ staff sabbaticals supported to study fish migrations and water resource assessments, and training in environmental contaminants
<i>Coasts</i>	<ul style="list-style-type: none"> ■ enhance core skills in key areas of coastal hydrodynamics, near-shore ecology, and effects of marine farming through support of five post-doctoral fellows ■ strengthen understanding of interactions between coastal aquaculture and land-derived contamination ■ assist iwi in implementing techniques for managing coastal ecosystems, especially shellfish and pelagic fish 	<ul style="list-style-type: none"> ■ post-doctoral fellows supported to study fish farm impacts, beach erosion modelling, coastal fisheries, inundation modelling, and coastal currents ■ research on the effect of dairy farming on coastal embayment contamination ■ framework developed with iwi on management of the Kaipara Harbour marine resources
<i>Oceans</i>	<ul style="list-style-type: none"> ■ continue support for cross-agency initiative for Ocean Survey 20/20 to proceed and inform ocean policy ■ maintain critical mass in core skill areas of ocean sciences through support of three post-doctoral fellows 	<ul style="list-style-type: none"> ■ 60-day census of Antarctic marine life voyage completed ■ three post-doctoral fellows supported to study submarine hazards, ocean hydrodynamics, and seabird ecology
<i>Fisheries</i>	<ul style="list-style-type: none"> ■ develop tools and services to mitigate fisheries bycatch and damage to sensitive environments ■ improve our core fisheries survey and analytical software tools ■ re-develop our software systems for gathering, storing, and interrogating our fisheries data ■ develop training courses to enable stakeholders to better participate in the fishery management and research planning process 	<ul style="list-style-type: none"> ■ researched net selectivity and bycatch mitigation in the hoki fishery ■ developed and upgraded stock assessment models ■ initiated software development for new fish data gathering instrumentation ■ organised four stakeholder workshops on fisheries management
<i>Māori Development</i>	<ul style="list-style-type: none"> ■ provide guidance to iwi on the potential economic opportunities from renewable energy ■ support a post-doctorate fellow to study the effects of climate change on the Māori economy ■ support staff collaborations and technology transfer initiatives with iwi on lake restoration, fisheries, aquaculture, energy and water supply, and wastewater treatment ■ continue to strengthen the capability of staff to interact effectively with Māori through the provision of support tools, guidelines and protocols, and training courses 	<ul style="list-style-type: none"> ■ established advisory group and guided iwi on resource use ■ post-doctoral fellow researching the impacts of emissions trading on Māori businesses ■ completed national aquaculture roadshows with iwi, and transfer of environmental science through hui, reports, and collaborative research ■ staff participated in four noho marae and attended te reo and tikanga training courses
<i>Atmospheric Trace Gases</i>	<ul style="list-style-type: none"> ■ maintain critical mass in atmospheric chemistry and modelling through supporting a post-doctoral fellow ■ develop models that quantify health risks associated with emissions/air quality ■ establish capability for assessment of indoor air quality 	<ul style="list-style-type: none"> ■ post-doctoral fellow supported to study ozone chemistry and climate interactions ■ research on human exposure to air pollution ■ instrumentation developed for measuring indoor pollutants
<i>Energy</i>	<ul style="list-style-type: none"> ■ develop techniques for assessing environmental impacts of marine energy installations ■ recruit skills in distributed and combined source energy technologies 	<ul style="list-style-type: none"> ■ guidelines for environmental consents developed ■ new staff employed to study small scale energy installations
<i>Climate & Hazards</i>	<ul style="list-style-type: none"> ■ develop near real-time hazard forecasting products ■ improve integration of our chained models (e.g., rainfall, river flow, inundation) ■ enhance ability to advise local authorities on the effects of climate change on urban infrastructure ■ support the activities of the national centres for climate and hazards in providing advice to policymakers and the public 	<ul style="list-style-type: none"> ■ riverflow, wave, and sea-level forecasting models implemented ■ hydrological models implemented for all New Zealand catchments ■ produced second edition of climate change guidance manual for local government ■ seasonal updates and outlook publications produced monthly and over 100 presentations to stakeholders
<i>Environmental Information</i>	<ul style="list-style-type: none"> ■ develop new tools for real-time data capture, transfer, and display ■ expand coverage of our environmental monitoring networks to enable better decision-making ■ improve web access to NIWA's environmental data 	<ul style="list-style-type: none"> ■ system developed for large scale irrigation water management ■ new monitoring stations for snow and ice established in mountain areas ■ new web tool developed to access water resources information
<i>Aquaculture & Biotechnology</i>	<ul style="list-style-type: none"> ■ develop commercial scale trials on a new species with sector partners ■ complete technical feasibility studies on added-value products ■ develop a broodstock programme to support industry ■ engage with industry in developing an R&D programme to support the sector's future vision 	<ul style="list-style-type: none"> ■ sea cage rearing trials of kingfish established at Mahanga Bay ■ initiated research on drug encapsulation for finfish health care ■ breeding families established for kingfish, hapuku, and paua ■ new research programme established with industry to advance commercial culture of high value species
<i>Aquatic Biodiversity & Biosecurity</i>	<ul style="list-style-type: none"> ■ enhance core skills in marine and freshwater taxonomy and freshwater biosecurity through support of visiting scientists and post-doctorates ■ increase staff skills in taxonomy through sponsoring training courses ■ improve utility of biosecurity data through developing better analysis and mapping tools ■ develop predictive models and tools for biodiversity management and bio-invasion spread and effects 	<ul style="list-style-type: none"> ■ post-doctoral fellows and visiting scientists supported to study aquatic algae and freshwater fish biosystematics and identification of invasive species ■ seven taxonomic training courses held ■ biosecurity data used to develop spatial models of introduced freshwater species ■ statistical techniques developed to predict spread of introduced aquatic species