

# Sustainable Development Report

*[This full version of the SDR has been verified by URS. An edited, illustrated version appears as part of both the electronic [[www.niwa.co.nz/ar/2006](http://www.niwa.co.nz/ar/2006)] and printed versions of the 2006 annual report, with the URS assurance statement. Any enquiries about this SDR can be directed to: Communications Manager, Geoff Baird, [g.baird@niwa.co.nz](mailto:g.baird@niwa.co.nz)]*

## **SUSTAINABLE DEVELOPMENT REPORT AND WHAT WE DO AS A COMPANY**

In accordance with our mission statement NIWA is committed to operating in a sustainable manner and working with others to achieve both NIWA and the Government's economic, environmental, and social goals. Many of our core business activities contribute directly to the sustainable development of New Zealand's natural and human resources through the provision of scientific advice, products, and services.

We recognise the importance of improving the sustainability of our internal operations, and take particular care to minimise the impact of our activities on the environment and to ensure that individuals and communities potentially affected by our actions are well informed and consulted about how we plan to proceed. A growing component of our work is directed at creating new business and job opportunities, both in the main city centres and rural areas of New Zealand. We support, and are actively involved in, extensive interactions with non-government organisations and New Zealand community groups, and contribute significantly to the education of primary, secondary, and tertiary students; local and central New Zealand government agencies; and the wider public. Involvement with universities and international networks is essential in developing human capital for New Zealand's wider long-term interests in our key science sectors. Internationally, we are actively involved and represent New Zealand at a vast array of scientific meetings and inter-government forums.

In support of our mission and vision, our values include:

- contributing to environmental sustainability through developing and maintaining core capabilities to deliver leading edge science and innovative services focused on the natural environment;
- taking social responsibility;
- ensuring that our staff are treated fairly and equitably;

- providing staff with a safe and healthy work environment.

### **Sustainable Development Reporting**

Along with an evolving business which is putting more emphasis on products and services, the area of Sustainable Development Reporting is also changing, and there is an increasing requirement for a wider set of performance criteria linking environmental and core business initiatives to economic and social performance. It is important that performance measures are updated to reflect our changing business environment and/or growth in key sectors. In 2006–07 these will need to be more closely linked to stakeholder requirements and with governance and risk management practices. One of NIWA’s major internal challenges is to provide for economic growth through alignment with industry while continuing to play our part in sustainable use of resources, operating in a responsible manner, and remaining socially responsible.

The Crown Research Institutes Act 1992 sets out the principles under which CRIs operate. NIWA is committed to these principles, which include:

- undertaking research for the benefit of New Zealand;
- pursuing excellence in all its activities;
- complying with all ethical standards while carrying out its activities;
- promoting and facilitating the application of the results of research and technological developments;
- being a good employer;
- maintaining financial viability.

These principles form the basis of NIWA’s non-financial performance measures, which are agreed each year with the shareholding Ministers as part of our Statement of Corporate Intent. These measures, performance against targets, and the new initiatives for 2005–06 are reported in this section.

From 2006–07, we will report on new performance indicators developed by the Crown Company Monitoring & Advisory Unit to monitor our performance. They will be used to demonstrate the role and effectiveness of NIWA in its target sectors and the impact on New Zealand’s society, environment, and economy, and be reported on in the September quarterly report to the shareholding Ministers and summarised in our 2007 annual report.

## **OUR SCIENCE HELPS TO ENSURE THE SUSTAINABLE DEVELOPMENT OF NEW ZEALAND’S NATURAL RESOURCES**

NIWA’s core business is providing scientific advice, products, and services, that underpin the sustainable development of New Zealand’s natural marine, freshwater, and

atmospheric resources. Sectors that we contribute significantly to include agriculture, aquaculture, energy, fisheries, and marine and freshwater resources. Because we operate across New Zealand and a wide range of sectors, direct involvement with stakeholders is imperative. These stakeholders include the New Zealand public; national, regional, and local government; industry; and customers who purchase our products and services. Key issues facing these stakeholders and sectors include concerns about water quality and allocation, which is fast becoming one of the major global environmental and health issues, increased atmospheric and aquatic pollution, declining fish stocks, and increased pressure on freshwater and marine resources. Some examples of how we contributed to sustainability in these sectors are given below.

### **Sustainable management of marine resources**

- Understanding the factors that might drive inter-annual variation in the productivity of coastal waters is important for the management and commercial viability of offshore aquaculture and for long-term sustainability of the environment. Two large industry-collected datasets have been analysed to reveal that multi-year variations in nitrogen concentrations are driving variations in plankton production (mussel food) in the Marlborough Sounds via upwellings from Cook Strait and inflows from the Pelorus River. Correlations of nutrient concentrations with industry performance over the last 10 years show a change from low performance at inner-Sounds sites (river affected) to outer-Sounds sites, where nutrient dynamics are ocean-dominated. The results from this research are helping to provide more predictability and improved sustainable management of the industry on the basis of environmental variability (as has been the case for agriculture for many years).
- NIWA participated in a number of stock assessments and working parties for the Ministry of Fisheries. Species which were targeted because of current or potential sustainability issues included hoki, orange roughy, oreo, and paua. Previous assessments for a number of other species were reviewed.
- A model is now under development by NIWA to predict coastline changes over long time-scales. This work is relevant, for example, to the South Island east coast where the model will be used to simulate the effects of dams on rivers and the resulting reduction in sediment delivery to the coast and the coastline response. The model also aims to simulate the response of the coast to long-term sea-level changes and identify the important forcing functions for the development of river deltas. The model is now generating realistic delta shapes in response to sea-level rise and fall. When completed, the model will be of considerable benefit to regional councils for coastal and water resource planning.

### **Sustainable use of freshwater resources**

- Harvesting from rivers is one solution to restricted water availability for agricultural development in water-deficient areas. One of the environmental 'costs' of water harvesting is the subsequent development of woody vegetation in former stream channels, which affects channel shape, sediment transport, and

river ecology. NIWA researchers have developed a computer model that links channel vegetation with river conditions. The model will be one of the tools needed to run future development scenarios for sustainable water use in water-deficient regions.

- A web-based toolbox, 'Water Resources Explorer', has been developed by NIWA for modelling stream water resources information on a catchment basis. It now includes models to estimate mean annual suspended sediment yield, water runoff, and water quality. Users only have to zoom to and mouse-click on their stream segment of interest to launch the models. The toolbox will provide valuable information for resource managers and will go live in 2006.

### **Sustainable land use**

- A new NIWA-developed web-based computer model to predict nitrogen and phosphorus losses from single properties in the Rotorua Lakes area is now available. The model, NPLAS, will be used for land-use consenting under the Environment Bay of Plenty 'Land and Water Plan' to ensure the long-term sustainability of valuable land and freshwater resources in the region.
- During the year NIWA ran a number of workshops aimed at helping farmers make informed decisions, both in the paddocks and at the water's edge, when considering farm intensification and sustainable use of resources. The workshops provided farmers with knowledge about water and contaminant pathways and allowed them to ask questions and share their own experiences and knowledge to look for creative solutions for sustainable farm businesses and maintenance of water quality.

### **Sustainable management of biodiversity and biosecurity**

- The continued spread of the invasive river alga *Didymosphenia geminata* is causing great concern nationwide. A recent economic impact assessment (with NIWA involvement) identified that the cost of this incursion could amount to \$58–285 million in terms of lost production and decreased biodiversity values over the next six years. The first stage of NIWA's control trials has been completed and this research has identified four biocides which will be progressed to Stage 2 for full experimental analysis (including toxicity bioassays on insects and fish). If a toxic agent can be found, it is likely that its use will need to be incorporated into broad-based control strategies which take into account natural phenomena such as floods and seasonal growth cycles. Control of this species is likely to be critical to maintaining biodiversity in some South Island streams and river systems.
- An epidemiological model to simulate the transport of non-indigenous fouling species around New Zealand by yacht movements has been further developed by NIWA to assist researchers and managers in identifying the relative benefits of a range of biosecurity incursion response strategies. The model is based on standard Susceptible-Infected-Resistant (SIR) models used in medical science. During

development, the model successfully evaluated the impact of three different control options, and it will help to evaluate the most effective methods of preventing the spread of key invasive marine species.

### **Improving the quality of life in urban and rural areas**

- Kilometres of stream length are lost each year in the Auckland region through land development and roading, and to date there have been no clear guidelines for mitigation of this loss. NIWA researchers are part of a team of experts, with the Auckland Regional Council, Environment Waikato, Massey University, and Landcare Research that has made progress in developing a method to evaluate the worth of streams in the urban environment and to show how adequate replacement or restoration can be achieved with ‘no net loss’ of stream function. The next and final stage of this study will deal with placing the evaluation within a sound social context before guidelines are issued by regional councils next year.
- Traditional methods of evaluating the impacts of pollutants use measurements of toxicity that examine direct responses (death) of animals to pollutants. These measure a worst case effect rather than assessing slow cumulative changes. A new NIWA research programme ‘Estuarine Ecodiagnosics’ has been examining pollution impacts to look at the more subtle effects of pollution with longer term implications. Stress responses of organisms, combined with biochemical markers (e.g., stress proteins) and genetic assays, are being compared with evaluations of the structure of animal communities on the seabed. The research links closely with the Auckland Regional Council’s urban catchment protection initiatives by providing a multi-faceted and rapid assessment of estuarine condition to assess the effects on long-term sustainability.
- Emissions from over 73 000 vehicles were tested by a remote sensor device at 24 sites in the Auckland region. Valid emission records were obtained for about 49 000 vehicles, and emissions from about 4000 vehicles (8.5% or 1 in 12) were above an acceptable level. The owners of these vehicles were sent a letter by the ARC, as part of their Big Clean Up programme, encouraging them to tune their vehicle.

### **Renewable and alternative energy sources**

- Biogas production from anaerobic waste stabilisation ponds treating dairy, piggery, and domestic wastewater has been monitored to determine greenhouse gas emissions and the potential for economical energy capture. Conventional anaerobic ponds release considerable quantities of greenhouse gas, and NIWA research has shown that the methane content (typically 67%) represents excellent energy recovery potential that will reduce the running cost of small waste treatment plants.
- The feasibility of using algae from wastewater treatment ponds as a fuel source is being investigated, with interest from regional councils and power companies.

## **Working with Māori**

- In collaboration with Te Arawa Māori Trust Board, NIWA is assisting in the development of a sustainable management framework for customary fisheries of Te Arawa lakes. The programme aims at improving Māori capability to manage taonga species in the Rotorua lakes. Using both western science and traditional methods, researchers are monitoring stocks and developing models in an attempt to ensure sustainable fisheries.
- NIWA has been working with Taumutu Runanga to teach safe, efficient, and ethical usage of both backpack and bank-mounted electric fishing equipment. By upskilling Māori in various regions, it is anticipated that participants will help in NIWA projects with aspects of electric fishing.

## **WE OPERATE IN A SUSTAINABLE MANNER**

NIWA has continued its strong financial growth and been very successful in meeting its financial targets. From an environmental perspective, NIWA is dedicated to the provision of scientific advice, products, and services which will help ensure sustainable development and protection of natural resources; however, NIWA acknowledges that its operations can have an impact on the natural environment and is committed to operating in a sustainable manner. In terms of our environmental impact, this means that we minimise our consumption of natural resources and the impact of our activities, where practicable, to safeguard our environment for future generations. In addition to complying with all legislative requirements, we closely monitor our energy use and consumption of resources and take all practical steps to minimise them. Environmental performance measures have been developed over the last four years and targets have been set for key measures. Meeting these targets has required investment in infrastructure and equipment and the active encouragement of staff to reduce direct and indirect energy consumption and waste production. NIWA coordinates these activities through its own Sustainable Development Committee, which has representatives from all the major regions and the senior Executive, and provides reports on initiatives and achievements to the monthly Board meetings.

To demonstrate our commitment to social responsibility in 2005–06 we developed a new human resources framework, continued to be actively involved in community events and education, and developed new social performance measures for NIWA in areas such as staff training and development, financial and non-financial benefits for staff, and the creation of job opportunities in main city centres and rural areas.

## **Economically sustainable**

Economic sustainability addresses our effect on the economic circumstances of our stakeholders and their economic systems. As a Crown Research Institute, NIWA is required to be financially viable and undertake research for the benefit of New Zealand.

Economic sustainability is not just about attaining economic growth from year to year, it's also about providing benefits and improvements to our community, the environment, and the whole of New Zealand.

For NIWA Group to strive to meet its obligations of economic sustainability, NIWA needs to generate sufficient operating surpluses to enable it to continue to grow and invest in capital expenditure and areas that extend our current base beyond fee-for-service. Increased investment in this area was reflected this year with the acquisition of 50% of CRL Energy Ltd. Combined, NIWA and CRL Energy is the largest energy research provider in New Zealand. The investment is an obvious extension to our core business in sustainable energy solutions – one of the most critical issues challenging New Zealand's future development and economic growth.

#### **Economic highlights this year included:**

- NIWA Group exceeded its financial targets;
- record high revenue of \$106 million;
- net surplus, at \$10 million, producing a return on average equity of 24.4%;
- expanded the energy research capabilities of the Group by acquiring 50% of CRL Energy Ltd.

#### **Direct customers**

Our direct customers are those who fund our science and research. The Government is our largest customer, but we also conduct research for, and provide advice and information to, many others ranging from international conglomerates to local commercial fishers and schools. We consider the New Zealand public to be our most important customer.

#### **Total revenue**

NIWA Group for the year ended 30 June

2004 \$84,631,000

2005 \$91,137,000

2006 \$106,414,000

#### **Revenue**

*NIWA Group for the year ended 30 June 2006*

Public Good Science and Technology

Contract funding

\$42,895,000

Capability funding	\$ 7,479,000
Ministry of Fisheries	\$16,060,000
Other Crown Research Institutes	\$ 1,015,000
Central government and subsidiaries	\$11,069,000
Local government	\$ 5,665,000
Private sector	\$ 6,459,000
Other sales	\$15,772,000

**Contracts to supply information to New Zealand users**

*NIWA Group for the year ended 30 June 2006*

2006      \$35,196,000

**Contracts to supply information to international users**

*NIWA Group for the year ended 30 June 2006*

2006      \$4,444,000

To continue to provide the best science for all customers, we have to grow with the market. The continued increase in our revenue shows the ongoing growth in demand for the science, products, and services we provide and the ability to respond to new opportunities and issues facing New Zealand.

A client survey was conducted during 2005–06 to determine the quality and effectiveness of our consulting services. While issues around price are always a concern, the overall impression of respondents is that NIWA is a highly credible science-based organisation employing highly skilled and competent staff. The competency of our staff and quality of work appears to be the principal drawcard for our services. Monthly publications from our National Centres are widely read and have helped considerably in increasing knowledge of NIWA's research and consulting services.

**Suppliers**

We aim to be good customers ourselves by supporting our suppliers and subcontractors by paying them in a timely manner in accordance with agreed terms.

**Cost of all goods, materials, and services**

*NIWA Group for the year ended 30 June*

2004    \$36,153,000  
2005    \$38,071,000  
2006    \$42,824,000

**Employees**

**Total payroll and benefits**

*NIWA Group for the year ended 30 June*

2004    \$41,864,000  
2005    \$43,214,000

2006 \$47,188,000

### **Providers of capital**

NIWA had interest bearing debt at 30 June 2006 of \$600,000 (2005: \$1,700,000). Changes in economic value to our shareholders are:

### **Operating surplus before tax**

*NIWA Group for the year ended 30 June*

2004 \$ 7,036,000

2005 \$ 9,654,000

2006 \$15,706,000

### **Return on equity (%)**

*NIWA Group for the year ended 30 June (net surplus/average shareholders' funds)*

2004 10.7

2005 13.5

2006 24.4

### **Public sector**

Most of our research is aimed at addressing issues of relevance to the general public – the sustainability of our society and civilisation.

As a commercial entity, we also contribute by paying tax. Taxes paid in other countries were minimal.

### **Taxes paid**

*NIWA Group for the year ended 30 June*

2004 \$1,506,000

2005 \$3,000,000

2006 \$5,606,000

### **The future economic challenges include:**

- continuing to meet NIWA's economic targets in the face of increasing competition and increasing resource costs;
- continuing to find new investment and growth opportunities that add value to our organisation and extend beyond straight fee-for-service;
- maintaining our profitability and continuing to produce acceptable returns to our shareholders, balanced against the increasing costs to retain the best scientists in an increasingly tight labour market and increasing operating costs;
- increasing commercialisation and adding value that turns our research outcomes into new products, services, and industries for New Zealand;
- increasing the contribution of the products and commercialisation components of NIWA's activities revenue.

## **Environmentally sustainability**

Environmental sustainability identifies the need to meet NIWA's and its customers needs while maintaining the environment and associated resources to at least its present level of quality and availability, thereby ensuring that future generations receive the same benefits. We acknowledge this responsibility and act accordingly to minimise the impacts of our activities on the environment.

Our Environmental Policy recognises that we need to conduct all our activities to a high standard of environmental awareness by complying with relevant legislation, taking all practical steps to minimise any impact, having contingency plans in place for accidental spills, minimising the consumption of resources and waste production, and striving to improve our environmental performance.

### **Highlights for 2005-06 included:**

- video conferencing established at the four major sites and limited coverage at four smaller sites to reduce travel requirements;
- energy audits carried out at all major sites and aquaculture facilities to identify areas where energy consumption could be reduced;
- purchase of NIWA's first hybrid vehicle (located in Wellington);
- VDU display set up at our Auckland office to show real-time environmental data at the site;
- recycling facilities expanded, including facilities to process organic waste;
- waste audit carried out at the Hamilton office;
- increased rate of recycling and decrease in waste production;
- increasing staff awareness and involvement in minimising the impacts of NIWA's activities;
- no incidents of non-compliance with discharge regulations;
- reduction in carbon emission equivalents from operating our vessels.

### **Resource use**

During the year we carried out energy level one audits at all major sites. The scope of the level one audit was to report on the patterns of energy use and make specific recommendations on potential energy saving opportunities. The level two audits covered sites that had high consumptions of electricity and/or the last audit had not been carried out for a number of years. These sites were the aquaculture facilities at Bream Bay and Mahanga Bay and at our biggest regional office in Wellington. The scope of these audits was to report on the patterns of energy use; carry out instrumented site surveys and inspections of the buildings, equipment, and operating procedures; list potential energy cost saving measures; and give an estimate of costs required to achieve the savings. Where practical, recommendations from both audits will be followed up in 2006-07. These audits were partly subsidised by the Energy Efficiency & Conservation Authority (EECA). NIWA is also a foundation member of the Energy Wise Government Programme, which is administered by EECA.

## Energy Use (kWh) per fulltime staff equivalent

	Gas	Electricity
2001–02	1437	7446
2002–03	1387	7239
2003–04	1504	7292
2004–05	1570	7469
2005–06	1387	7659

Electricity use per fulltime staff equivalent increased this year compared with previous years and the baseline in 2001–02. However, without the efficiency efforts in place during the last few years the increase would have been considerably higher. Although some of this increase may be attributed to colder weather, we will investigate further initiatives to reduce it to at least 2003–04 levels in 2006–07. Another factor is increased productivity. Compared with 2001–02, electricity use has gone up by 2.8%, while staff productivity (measured as billable hours per FTE) has gone up by 23%. The electricity use for 2003–04, 2004–05, and 2005–06 excludes consumption associated with the new site at Bream Bay and the upgrade to the supercomputer in Wellington. The goal to reduce energy use and targets were set before these facilities were established and, although we are working on reducing the energy demand at these sites, it is not appropriate to include those sites in baseline comparisons. Bream Bay is NIWA’s newest facility, specialising in large-scale aquaculture production, and it accounted for 29% of the total electricity use at NIWA in 2005–06. One of the major water consumers at Bream Bay has designed a water and heat recirculation system for abalone production which uses considerably less water and heat than once-through systems. The supercomputer upgrade accounted for 11% of the total electricity use.

2005–06 target	2005–06 performance	2006–07 target
Reduce NIWA's use of electricity and gas by at least 5% by June 2006 (from the baseline in 2001–02).	Electricity and gas use increased by 1.8% compared with 2004–05.	Develop plans to reduce NIWA's use of electricity and gas by at least 5% by June 2007 (from the baseline in 2001–02).

In addition to auditing our use of electricity and gas, we gathered information on our use of motor vehicles, hire of taxis, and air travel to enable an assessment of the equivalent greenhouse gas emissions produced by our activities. We estimated that the consumption of fossil fuels to support our activities emitted 2983 t of carbon dioxide in the year ending 30 June 2002, 3030 t in 2003, 3373 t in 2004, 4039 t in 2005, and 4407 t in 2006 (using the protocol made available by the New Zealand Business Council for Sustainable Development). The increase in 2006 was expected and is due to the Bream Bay site fully utilising its facilities. The use of motor vehicles, hire of taxis, and air travel are essential to enable us to carry out our business.

Electricity is a significant resource used by NIWA. In 2005–06 it accounted for 77.1% of the total carbon dioxide emissions. Our major resource use was:

### Resource use (%)

Diesel	4.4
Petrol	7.5
Air travel	7.5
Gas	3.5
Electricity	77.1

Based on fulltime staff numbers (588), carbon dioxide emissions increased from 6.99 t in 2004–05 to 7.49 t in 2005–06. The main reason for this was the increase in electricity use in Wellington and Bream Bay and, to a lesser extent, in petrol and diesel. In 2006–07 we are considering:

- adopting recommendations outlined in the energy audits to conserve electricity through investment in energy efficient systems and building management systems;
- purchasing more hybrid vehicles in an effort to reduce the use of petrol and diesel by our vehicles;
- installing further video conferencing facilities at other NIWA sites in an effort to reduce air travel.

### CO2 gas emissions (t) per fulltime staff equivalent

2002	5.06
2003	4.94
2004	5.06
2005	6.99
2006	7.49

The Inventory of New Zealand's Greenhouse Gas Emissions (<http://niwa.co.nz/ncces/ghge>) and the Residential Carbon Dioxide Calculator (<http://www.niwa.co.nz/services/c02calc>) are both active on the NIWA website. The latter tool enables individuals to estimate their contribution to carbon dioxide emissions.

<b>2005–06 target</b> Based on fulltime staff numbers, NIWA's total annual contribution to greenhouse gas emissions did not increase above the baseline in 2001–02.	<b>2005–06 performance</b> Based on fulltime staff numbers, carbon dioxide emission for the year ended 30 June 2006 was 18% higher than in 2001–02 (excluding Bream Bay).	<b>2006–07 target</b> Based on fulltime staff numbers, NIWA's total annual contribution to greenhouse gas emissions does not increase above the baseline in 2001–02.
--	--	---

### NIWA Vessel Company Ltd

NIWA Vessels manages two research vessels – *Tangaroa* (deepwater) and *Kaharoa* (inshore and coastal). Both operate on diesel fuel, and the equivalent carbon dioxide emissions over the last five years were:

Year ending 30 June 2002	6682 t (12.7 t per sea-day)
Year ending 30 June 2003	6091 t (12.5 t per sea-day)
Year ending 30 June 2004	5522 t (11.7 t per sea-day)
Year ending 30 June 2005	6954 t (13.3 t per sea-day)
Year ending 30 June 2006	5173 t (9.83 per sea-day)

<b>2005–06 target</b> To reduce carbon dioxide emissions by <i>Tangaroa</i> and <i>Kaharoa</i> , based on tonnes of fuel per sea-day by reducing vessel speed when practical.	<b>2005–06 performance</b> Carbon dioxide emissions were reduced by 12.8% compared with 2004–05.	<b>2006–07 target</b> To reduce carbon dioxide emissions by <i>Tangaroa</i> and <i>Kaharoa</i> , based on tonnes of fuel per sea-day by reducing vessel speed when practical.
--	---	--

A policy was put in place during 2005–06 to reduce the maximum speed for *Tangaroa* and *Kaharoa* by 1.5 knots, and diesel use has been considerably reduced.

The level of emissions from diesel fuel is also minimised by continually reviewing work schedules and updating servicing and maintenance plans. Both vessels are classified with Det Norske Veritas (DnV), an internationally recognised classification society, and both are maintained in accordance with the society’s rules. These require the vessels to comply with stringent, planned maintenance routines and high levels of operational practice. NIWA Vessels carries out underwater hull scrubbing of *Tangaroa* and *Kaharoa* at about 9 monthly intervals to improve fuel consumption.

Every 6 months the vessels are inspected for introduced species, such as *Undaria*, and are cleaned. This is also done before they enter areas where *Undaria* and other noxious plants have not been recorded, such as Antarctica. A waste separation station has also been established on *Tangaroa* for recycling glass, paper, cardboard, cans, and plastics.

### **Waste management and recycling**

We are continually evolving our waste management and recycling strategies, including providing recycling facilities in all offices and at each site, and increasing awareness of the need to reduce waste and increase recycling.

In Christchurch an organic waste composting facility and vegetable patch were developed. In Hamilton we carried out a waste audit during which 101 kg was gathered in one week – 70% of the total weight or 60% by volume was recyclable (e.g., paper, cardboard, plastics). Hamilton also set up two compost bins, and there are plans to increase this to four during 2006–07.

Our four main sites (Auckland, Hamilton, Wellington, and Christchurch) accounted for recycled paper and solid waste as follows:

	<b>Recycled</b>	<b>Waste</b>
<b>2003–04</b>	<b>21 699 kg (45 kg per FTE)</b>	<b>72 708 kg (150 kg per FTE)</b>

<b>2004–05</b>	<b>26 544 kg (56 kg per FTE)</b>	<b>64 980 kg (136 kg per FTE)</b>
<b>2005–06</b>	<b>29 834 kg (51 kg per FTE)</b>	<b>61 280 kg (104 kg per FTE)</b>

<b>2005–06 target</b> Maintain and where possible increase the level of recycling of paper, glass, and plastic and the reduction in solid waste production.	<b>2005–06 p-Performance</b> An increase in recycling of paper by 12.4% and a reduction in solid waste of 5.7% compared with 2004–05.	<b>2006–07 target</b> Develop plans to maintain and where possible increase the level of recycling of paper, glass, and plastic and the reduction in solid waste production.
--	--	---

**Paper use**

Paper is the most significant area of waste for NIWA, and we have developed strategies to reduce its use. These include installing double-sided printers and the electronic distribution of faxes. Although paper use increased by 286 reams, or 715 kg, we recycled an additional 3290 kg.

<b>2005–06 target</b> Continue to reduce the use of paper and not exceed the 2004–05 use.	<b>2005–06 performance</b> There was a minor increase from 11.1 (FTEs: 578) to 11.4 (FTEs: 588) reams of paper per FTE, an increase of 2% compared with 2004–05.	<b>2006–07 target</b> Reduce the use of paper and not exceed the 2005–06 use.
--	---	--

There were no incidents of non-compliance with discharge regulations during 2005–06. The waste management plans and recycling facilities for NIWA’s vessels follow those of the International Ship Management Plan.

**Key environmental challenges and initiatives for 2006–07 include:**

- minimising waste production as the company grows and becomes more involved in product sales;
- maintaining and enhancing staff awareness of the need to conserve energy and develop alternatives;
- continuing the investment required in energy saving infrastructure and equipment (e.g., video conferencing and building maintenance systems) despite the heavy demand for other capital equipment requirements;
- adopting recommendations to reducing energy consumption as outlined in the energy audits so that NIWA meets its performance targets;
- developing a NIWA-wide operational sustainability plan.

## **NIWA STAFF AND OUR SOCIAL AND CULTURAL RESPONSIBILITIES**

NIWA's social responsibility starts with the well-being of its greatest asset – its staff. Without the commitment and expertise of a highly skilled and dedicated workforce, NIWA would not be able to meet its financial and scientific goals. NIWA is therefore committed to providing a safe and healthy working environment that enhances professional/career development, enhances capability in core areas, promotes a work/life balance, ensures staff are treated in a fair and equitable way, rewards staff within the financial constraints of the company, and promotes innovation and excellence in scientific research, services, and the commercialisation of intellectual property.

NIWA is equally committed to promoting social and cultural sustainable development and fulfilling its responsibilities to the wider public through its education initiatives at all levels, linking closely with local communities, and working with staff, iwi, hapū, and Māori organisations to promote partnerships in areas such as renewable energy systems.

### **Highlights for 2005/06 included:**

- implementing a recruitment strategy focused on proactively marketing NIWA Science to potential recruits and updating our succession plan for leaders in core research and support areas;
- introducing new key performance indicators for science and technical staff as part of their career development and to manage expectations better;
- providing a safe and healthy working environment, maintaining our high workplace safety record and premium discount in the ACC Partnership Programme;
- creating and appointing 34 new positions to grow capability in core areas of aquaculture production, bioactives, environmental data management and forecasting, taxonomy, hazards and sustainable energy.
- completing an internal audit of human resources policies against Equal Employment Opportunities Trust standards, policies and practices and updating these to ensure best practice;
- undertaking a wide range of training including leadership training and commercial skills training for key staff.

### **Rewarding staff**

A tight labour market, skills shortage, and talent war placed considerable pressure on our ability to maintain competitive levels of remuneration. On average, and based on the Hay Survey of Pure and Applied Research, we have remained ahead of the science market across most levels. However, on some levels the gap between our remuneration levels and the Hay Survey results is narrowing. To continue to recruit and retain high quality staff, and deliver excellent science and high quality products and services, we must aim to continue to keep remuneration levels above market median, within our financial constraints.

Our remuneration system provides for an annual review and aims to reward people by appropriately recognising contribution to the business and individual performance. We have an annual profit share scheme that allows all permanent staff to share equally in the success of the organisation. This year the profit share was the largest in NIWA's history, a reflection of the achievements, increased productivity, and dedication of our staff.

### **Benefits**

Our staff are entitled to a range of additional benefits on top of their competitive salaries. For permanent staff this includes:

- a subsidised superannuation scheme;
- an annual remuneration review;
- provision of life insurance;
- a profit share scheme;
- sick leave and bereavement leave as necessary;
- a personal training and development leave programme;
- ex gratia payments after returning from parental leave;
- support for sabbaticals, technical training awards;
- access to overseas travel grants;
- access to subsidised crèche facilities at our largest site.

### **Staff development**

Working with staff, we have developed and implemented new sets of key performance indicators that map career pathways at the individual level. Reflecting the diverse range of work undertaken within NIWA, while maintaining flexibility and meeting both individual and company needs, was a challenge, but staff now have a framework for career development.

Our staff management, communication, and commercial skills training programmes were rerun during the year for a greater range of staff, and a new leadership programme was developed and delivered. This programme was aligned to succession planning initiatives and aimed to ensure that NIWA has a pool of talented, experienced leaders available in the future.

New social performance measures were developed during 2004–05. Achievements against those measures were:

- 300 staff received internal and external training;
- 61% of staff have personal development plans;
- 88 (including replacements) permanent job opportunities were created  
72 in main city centres, 16 in rural areas);
- 33 different types of financial and non-financial benefits available to staff.

### **Employee well-being and work-life balance**

A staff survey showed the overall satisfaction in NIWA had dropped slightly to 48%, still within the margin of error of the science benchmark of 49%. The survey highlighted that

staff are proud to work for NIWA, that NIWA provides a supportive and friendly work environment, and that people tell their friends NIWA is a great place to work. Our managers are friendly and easy to approach, and receptive to ideas and suggestions. Areas of concern raised in the survey included pay and benefits, which were perceived as being below that of other organisations, treating staff fairly, high workload, and pressure on staff.

In supporting our staff it is important to assist in the maintenance of a healthy work and life balance. NIWA facilitates work-life balance by providing flexibility in work hours where possible, generous sick leave provisions (which include family), provisions for parental leave in addition to the standard government provisions, and a training and personal development programme with paid leave and some reimbursement of costs. This leave can be used to attend a range of options, such as yoga classes, photography seminars, golf lessons, and to attend community related events, such as coaching camps, graduations, and school trips. To support the community as a whole we also provide special paid leave for staff to take part in civil defence, search and rescue, volunteer fire fighting, and coastguard activities.

It is important that a working environment is supportive and a work-life balance maintained, and it must be safe. To revitalise and reinforce our safety culture this year we created an annual Health and Safety Champion Award to recognise a staff member whose enthusiasm, knowledge, and drive made a substantial contribution to workplace health and safety.

Reported workplace accidents rose slightly from 90 to 93, with lost-time accidents dropping from 6 to 5. Improvements in our management of rehabilitation and support for an early return to work saw the lost time drop from 157.6 FTE days to 73.9 FTE days, corresponding to 0.05% total work days per year for science staff.

50.7% of NIWA's employees belong to our major union the PSA. We facilitate partnership, openness, trust, and involvement with the PSA through quarterly meetings with delegates at our 'Partnership Forum'.

### **Staff composition**

Staffing levels increased over the year, reflecting a period of growth for the company. NIWA established 34 new science positions, spread through our main centres and also in more rural areas such as Bream Bay, Greymouth, and Turangi. Recruitment of skilled staff in the face of increased competition remained challenging, but a new recruitment strategy focused on leveraging off our existing scientific network, resulted in key appointments in aquaculture production, bioactive compounds, and operational forecasting. Turnover remained constant at 9.8% for the group and dropped for NIWA science from 9.6% to 9.0%.

### **NIWA age profile (%) by 10 year age groups**

Category (%)	>19	20–29	30–39	40–49	50+	Total (%)
Research teams	0.0%	9.3%	30.7%	30.9%	29.1%	73.0%
Research support	0.0%	4.3%	13.0%	32.6%	50.0%	7.0%
General support	1.9%	13.6%	28.2%	26.2%	30.1%	15.8%
Executive/Managers	0.0%	0.0%	11.5%	23.1%	65.4%	4.0%
Marketing and promotion	0.0%	0.0%	100.0%	0.0%	0.0%	0.2%
TOTAL (%)	0.3%	9.2%	28.4%	30.0%	32.1%	100.0%

## HOW WE HELP OTHERS

### Contributing to education, training, and communities

#### Education and training

NIWA is committed to education that advances science, particularly in our core areas of marine and freshwater resources and atmospheric and climate science. We do this through targeted sponsorship initiatives for schools, joint research and teaching ventures with universities, and training courses for the public. NIWA is the major sponsor of the regional school science and technology fairs in Auckland, Waikato, Bay of Plenty, Wellington, and Nelson. We assist with sponsorship of several other regional science fairs and the national ‘Realise the Dream’ fair. The ‘NIWA Interactive Room’ at Kelly Tarlton’s Underwater World is aimed at primary school pupils, attracting some 42 000 each year.

NIWA has strong links with New Zealand universities. Our postgraduate Centres of Excellence at Canterbury and Otago, together with the Institute of Aquatic and Atmospheric Sciences at Auckland, form the core of this collaboration, with NIWA staff supervising 58 postgraduates this year. In 2005–06 we offered 12 public training courses and 3 training workshops, ranging from environmental monitoring and aquaculture to biodiversity. We provided funding for eight postdoctoral fellowships in core areas for NIWA. (Additional details are provided in the “Education and Training” section on page 51).

#### Maintaining a high regard for animal welfare

NIWA undertakes environmental research and aquaculture for such purposes as understanding the ecological requirements of indigenous species, assessing the impacts of proposed developments on environmental health, and in the development of new aquaculture techniques. All our research with animals is conducted in accordance with the Animal Welfare Act (1999) which requires projects to be approved by our Animal Ethics Committee (AEC).

In compliance with the Act, our animal-based research is also conducted in accordance with NIWA's Code of Ethical Conduct for the Use of Live Animals in Research. Our code permits the use of animals only when the AEC considers that the benefits of the research outweigh the suffering imposed on the animals. Only the minimum number of animals needed to produce statistically sound results can be used. The total number of animals and the range of species used (mainly fish) depends entirely on the spectrum of funded projects. Consequently, use varies from year to year. In 2005–06, animal use fell significantly compared with previous years, following the changes in research priorities and funding.

### **Working with Māori**

NIWA supports the Vision Mātauranga policy framework designed to unlock the innovation potential of Māori knowledge, resources, and people. The Māori Development Portfolio encourages capacity building of Māori researchers and measurable research outcomes identified by Māori. Our Māori Research and Development Unit, Te Kūwaha, focuses on research that underpins Māori aspirations for business development and sustainable resource management. Collaboration has continued between Te Kūwaha scientists and iwi in the development of strategic research plans which assist in prioritising the research aspirations of iwi, hapū, and Māori organisations. Our Māori researchers and scientists specialise in the core areas of climate and energy, freshwater, marine, and aquaculture research.

A key aim for Te Kūwaha is to improve all staff interactions with iwi partners, based on 'tikanga tangata' and 'kawa atua', thus making NIWA an attractive place for Māori researchers to work. Te Kūwaha now comprises a General Manager and 15 key Māori scientists and technicians. We have daily interactions with iwi, and currently have 85 iwi relationships, 13 letters of understanding, 19 draft proposals, and 9 signed memorandums of understanding.

Te Kūwaha has engaged in several hui and wananga with their iwi research partners, users, and stakeholders. Particular highlights include the 2nd Māori Climate Forum at Hongoeka Marae in Plimmerton, Wellington, where Māori stakeholders, including many of our iwi partners, discussed regional issues and research priorities regarding climate change, and customary fisheries wananga reporting on the use of traditional methods as monitoring tools for taonga species in lakes, to ensure the sustainability of these important fisheries.

### **Key social challenges for 2006–07 include:**

- **continuing to reward all staff and retain key staff in a competitive workforce environment and with high inflation;**
- **improved workforce planning and recruitment to provide succession and meet resource needs;**
- **maintaining our high level of health and safety standards;**
- **renegotiation of our collective agreement with the PSA in a challenging employment relations environment;**

- **continuing to invest in education and Māori initiatives in the face of competition for staff time and resources;**
- **providing practical strategies and tools to promote work-life balance with a highly dedicated and passionate workforce while managing the business effectively.**

## Performance against Statement of Corporate Intent (for NIWA Group)

The following table summarises performance against measures in our SCI. Commentary on economic, environmental, and social performance is provided earlier in this report. Despite changes in science priorities and funding, staff have managed to maintain the level of publication over the last 5 years, but with a greater focus on international, externally refereed journals compared with local, internally-, or editor-refereed journal articles, which have been declining. The number of conference papers and presentations and media articles is significantly higher than in recent years. This is partly a reflection of better reporting, but also of the greater focus on promoting our activities. NIWA funded 200 presentations at international conferences.

A major effort has gone into improving access to our nationally significant databases. The Climate Database, for example, is now a web-based fully automated system, and this is reflected in a significant increase in the number of requests serviced. The numbers reported in the table below for climate data are for individual data requests by 122 external subscribers who regularly access the database and do not include data requests for internal NIWA users.

<i>Financial Performance Measures</i>	2005–06 Actual	2005–06 Target	2004–05 Actual
Revenue	\$106.4M	\$100.6M	\$91.1M
Current ratio	0.90	0.81	1.0
Quick ratio	1.20	0.87	1.3
Return on equity	24.4%	14.2%	13.5%
Return on assets	22.7%	12.8%	13.4%
EBIT margin	14.5%	8.8%	10.2%

### *Non-Financial Performance Measures*

#### **Staff composition** (incl. all Subsidiaries)

Number of staff in			
Research teams (incl. postdocs)	475	462	437
Research support	46	44	44
General support	104	103	106
Management	26	24	24
Staff turnover	9.8%	<8%	9.6%

#### **Good employer**

Lost time injuries (% of work days)	0.05	<0.05%	0.07%
Days lost to injury (NIWA Science)	73.9		157

#### **Research output\***

Papers in international, externally refereed journals	369	300	347
---	-----	-----	-----

Papers in local, internally-, or editor-refereed journals	102	180	127
Conference papers and other presentations	1020	800	781
Research monographs and books	83	70	88
Popular books	1	2	0
Client reports	609	510	606
<b>Application and promotion of science</b>			
Value of consultancies to NZ users	\$35M	\$28M	\$24M
Achievements of technology transfer objectives in FRST contracts	98%	95%	95%
Number of external training courses	15		13
Number of joint ventures with NZ users	2		2
Value of TBG and Technet contracts	\$649K	\$800K	\$758K
Requests serviced for information from NIWA's nationally significant public good databases			
• National Climate Database**	88 690	9000	8500
• Water Resources Archive	10 200	800	1120
• NZ Freshwater Fish Database	1309	1200	1452
Magazine and newspaper feature articles plus TV and radio interviews	231	250	194
Number of patents/licensed products owned **	11		6
Number of representatives on international committees	107		
International visits (incl. conferences)***	136		
Visiting scientists	18		

\* Measured for a calendar year.

\*\* These are individual data requests by 122 external subscribers who regularly access the database and do not include data requests for internal NIWA subscribers.

\*\*\* The number of patents includes patents granted (4) or at application stage. They cover three products, but exclude Unidata and other products which are licensed to distributors.

\*\*\*\* Visits and conferences funded by NIWA.