Science supporting sustainability

Many developed countries have realised that Planet Earth is not a never-ending fountain providing resources to be exploited and consumed. As individuals, communities, companies, and countries, we need to bear in mind that all the decisions we make with regard to our planet are interconnected.

At NIWA, we take the implications of this interconnectedness very seriously. Each day in New Zealand, key decisions are made based on NIWA's science, from resource consent conditions to catch limits attached to fishing quota. We must provide the best evidence and analysis, develop solutions, communicate clearly, and operate sustainably ourselves.

CEO John Morgan.

Chair Sue Suckling.

Science provides solutions

Decision-makers at all levels are seeking pragmatic, evidence-based advice from environmental experts.

Across the breadth of NIWA's activities, our science provides both the high quality insights necessary to underpin important decisions, and innovative solutions. They range from assisting Māori business in commercial seafood and high value aquaculture development, to working with the dairy industry to devise, test, and communicate viable farm management practices which improve water quality. They include irrigation modernisation, producing biogas from farm effluent, and sophisticated computer modelling to predict the spread of aquatic pests. We are developing and refining tools for such important activities as hazard forecasting, fisheries stock assessment, and sustainable wastewater treatment.

Looking at one example in a little more detail: climate change and its impacts are now well-established as an important issue in boardrooms and policy forums around the world. People are looking to science for solutions.

As good international citizens, New Zealand should make a solid to climate change mitigation – even though our contribution will be relatively small in the global context. In the area of climate change adaptation, however, it's quite another story. As decision-makers in New Zealand, we can make a crucial difference to our economy and our society. We face choices with long-term ramifications: where to place bridges and highways and coastal subdivisions, what power stations to build, how to deal with new invasive pests, how to manage competing demands for water. Such decisions are worth many billions of dollars over the lifetime of the investment. In some cases, poor decisions could cost lives as well as money.

This year, the contribution of NIWA scientists and engineers to the Ministry for the Environment guidance manuals, helping local government adapt to climate change, is just one example of the real-world application of scientific discovery that NIWA, straddling both research and science based consultancy, is able to provide.

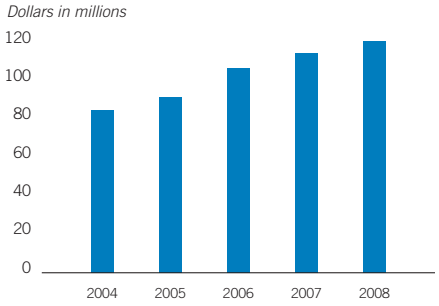
NIWA has both outstanding people and unique infrastructure. It is this combination of talent and hardware that enables us to be such a vital source of expertise for this country, our Pacific neighbours, and the wider world.

Our performance

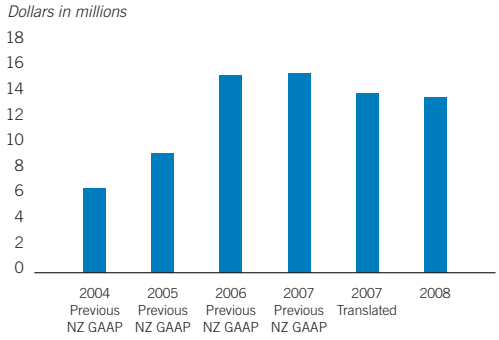
For the past five years, NIWA has maintained an excellent track record in financial and scientific outcomes. Our performance in the year to 30 June 2008 is, once again, a tribute to everyone at NIWA.

NIWA's revenue from its research, consulting, vessel operations, and other business activities (including interest income) grew strongly again in the 2007–08 financial year, reaching $120.7 million. The Group EBIT was $13.66 million and net profit after tax $10.121 million, and average shareholders' funds for the year were $79.306 million. Capital expenditure for the year ended 30 June 2008 was $13.985 million – up more than 50% ($4.878 million) from the previous year.

Total revenue (includes interest income)



Operating profit (EBIT)



NIWA's after-tax return on average shareholders' equity was 12.8% for the year to 30 June 2008. Comparisons with previous years are complicated by our move to the International Financial Reporting Standards, and a revaluation of our land and most of our buildings, however a 'translation' of last year's figures for comparison purposes is shown in the table below.

As a research and science services company, NIWA's performance is second to none. We continue to meet all shareholder targets for financial performance, and scientifically, 2007–08 has been one of our most productive years.

Some highlights include:

- New Zealand's International Polar Year voyage of discovery on RV *Tangaroa* – expanding fundamental knowledge to secure a sustainable future for the planet
- Successfully breeding from first-generation captive kingfish that were themselves produced from eggs at our Bream Bay Aquaculture Park – paving the way for high value aquaculture
- Innovative research on orange roughy – providing a scientific basis for sustainable fisheries management

	2008 $'000	2007 Translated $'000	2007 Previous NZ GAAP $'000	2006 Previous NZ GAAP $'000	2005 Previous NZ GAAP $'000	2004 Previous NZ GAAP $'000
Total Revenue (Includes interest income)	120,671	113,911	113,911	106,414	91,137	84,631
– Public Good Science	55,536	53,418	53,418	50,374	43,729	39,591
– Ministry of Fisheries	15,127	17,183	17,183	16,060	16,626	14,602
– Commercial and Other	50,008	43,310	43,310	39,980	30,782	30,438
Net profit before tax	14,335	14,279	15,843	15,706	9,654	7,036
Net profit after tax	10,121	9,813	10,461	10,342	6,434	5,276
Capital expenditure	13,985	9,107	9,107	8,480	7,348	8,389
Return on average equity (%)	12.8	14.1	22.6	24.4	13.5	10.7

The Group changed its accounting policies on 1 July 2006 to comply with New Zealand International Financial Reporting Standards. The transition required the Statement of Financial Performance to be translated for the year ended 30 June 2007 as shown above.

- The establishment of new operational flood forecasting trials – applying advances in science to reduce property damage and save lives
- Development of specialist tools to assist regional councils with freshwater management – practical tools to address an enormous environmental challenge
- New climate change projections for New Zealand, and associated guidance for local government – pragmatic planning advice based on authoritative, peer-reviewed science
- The completion of over 1200 science publications
- The delivery of over 1000 science presentations
- Responding to more than 350 000 database requests from our nationally significant databases.

Global collaborations

Many of NIWA's outcomes are made possible by working with other experts around the world. During 2007–08, we were involved in over 970 collaborations, some of which are outlined below. We have close relationships with the other Crown Research Institutes and all the New Zealand universities, which are rightly regarded as leaders in their fields.

NIWA hosts the secretariat of the New Zealand Climate Change Centre, made up of all nine CRIs and two universities (Victoria University of Wellington and the University of Canterbury).

The EnergyScape project, a collaboration involving NIWA, CRL Energy, GNS Science, Industrial Research Ltd, and Scion, has transformed the disparate information on New Zealand's energy system into a usable planning tool, and has only been possible through the Energy Research Alliance, comprising these organisations.

NIWA has close working relationships with many iwi, hapū, and other Māori entities. Through Te Kūwaha o Taihoro Nukurangi (our Māori environmental research group), NIWA currently has over 85 working relationships with Māori entities.

In 2007–08, NIWA had formal collaborative links with some 150 overseas institutions. New Zealand's International Polar Year voyage on RV *Tangaroa* was a good example of global scientific cooperation. Our 'polar partners' were the Ministry of Fisheries, Land Information New Zealand, the Ministry of Foreign Affairs & Trade, Antarctica New Zealand, Te Papa Tongarewa (National Museum of New Zealand), Victoria University of Wellington, University of Waikato, University of Auckland, Università di Genova (Italy), the National Oceanic and Atmospheric Administration (USA), Science Learning Hub, Cousteau Society, and Census of Antarctic Marine Life.

To all our collaborators, at home and abroad – thank you.

Peter Marriott, IPY-CAML

Steve Le Gal, NIWA

Strategic direction

NIWA must continue to make a difference for our clients and stakeholders, delivering expertise crucial for the sustainability of New Zealand and the planet. To do this, NIWA's strategy in 2007–08 and for the future revolves around three key themes:

- Attracting and retaining good staff
- Strengthening infrastructure and building new capability
- Continuing to improve the sustainability of our operations.

Investing in our people

Whether in the lab or at the Board table, at the vessel helm or the reception desk, on North Cape sand dunes or under the polar ice, NIWA's success relies on the talent and dedication of all our people.

NIWA is a truly cosmopolitan workplace. We recruit many staff from overseas, and our Kiwis have often undertaken PhD or post-doctorate research elsewhere. This brings a richness of thinking which we value enormously. We want our scientists to regard their New Zealand experience at NIWA as a career highlight.

To this end, we have an active programme to create the best possible working environment at NIWA, ranging from improving our leadership skills at all levels to improving the physical work spaces for staff. As an example, our Auckland staff will shortly move to new premises and the design of the fitout was chosen for its innovative approach to a science workplace.

While few of our staff are motivated solely by money, we are committed to offering remuneration packages that are at least competitive in the general market. During the past year, we took the unprecedented step of awarding all NIWA staff two across-the-board pay rises; one in July 2007 and one in December 2007. This, coupled with expanding staff numbers, resulted in our salary costs rising by close to $6 million; however we see this as an investment in attracting and retaining the best possible people in a world fighting for talent.

Again this year, our staff have garnered numerous national and international awards, including Dr Wendy Nelson (Member of the New Zealand Order of Merit) and the dozen NIWA staff who contributed to the Intergovernmental Panel on Climate Change (Nobel Peace Prize). Previous award recipients include Dr Clive Howard-Williams (New Zealand Antarctic Medal), and Dr Janet Grieve (Officer of the New Zealand Order of Merit).

Whilst on the subject of our people, we would like to acknowledge all Board members for their continuing commitment to good governance of NIWA. Our thanks go to departing Board members John Hercus, John Spencer, and Troy Newton for their contribution. During the year, Craig Ellison (now Deputy Chair) joined us and has brought new perspectives and skills to the Board.

Investing in our infrastructure

In 2007–08, we started a three-year $58 million capital investment programme, which will continue in 2008–09 and 2009–10. We are confident that this new infrastructure and capability will improve science outcomes for New Zealand, and generate additional revenue.

We are directing much of this investment towards three areas of unique infrastructure:

- Environmental monitoring networks
- Research vessels
- Information technology & supercomputing capability.

Our **environmental monitoring networks** provide a rich source of data for good quality decisions. To study changing atmospheric composition, for instance, we aim laser beams at the stratosphere, release mini-laboratories of instruments tied to special high altitude balloons, collect air samples from ships and hilltops, and download a vast stream of data from satellites revolving the Earth. NIWA's Marine Benthic Biology Collection, National Climate Database, Water Resources Archive Database, and New Zealand Freshwater Fish Database are all officially defined as "heritage assets" – taonga of unique scientific importance.

This year, we opened up web-based access to our archived data free of charge. The response was excellent with the number of registered users of the National Climate Database rising from 130 to over 4000.

We invested about $2.4 million of capital expenditure in extending the robustness and reach of our environmental monitoring networks. This included upgrading some hardware, devising better software support systems, and developing better measurement and telemetry systems.

NIWA's Instrument Systems group and our Perth-based subsidiary Unidata, successfully brought new Neon technology to market. The Neon system is one of the most advanced telemetry systems in the world. Data is logged in the field and transmitted to a central Neon server via cellular network or satellite. Users can view their data in 'near real time' via the internet, email, SMS (text message), or a range of other data transfer mechanisms.

Our **research vessels** provide a unique platform for science in this part of the world – from simple kayaks for paddling through mangrove forests to RV *Tangaroa* cracking a path through metre-thick ice in the Ross Sea. Planned investment of $10 million on a new dynamic positioning system for *Tangaroa* in 2008–09 and a new purpose-built 14 m coastal vessel will bring New Zealand's scientific research vessel capability up to the best in the world.

In 2007–08 we continued to invest significantly in our **information systems and technology** and plan to continue this throughout 2008 and 2009.

In addition, our scientific demands are fast heading towards saturating the capacity of our current Cray T3E supercomputer. We are now working through a process to invest in a new state-of-the-art supercomputer, initially with the power of about 11 000 average desktop PCs. That incredible number does not really convey the 'super' aspect of a supercomputer, of course, because plugging that number of PCs together won't give you the computational power of a supercomputer. The keys are high bandwidth and low latency – exceptional ability to process large volumes of data very quickly.

Tim Hay, NIWA/University of Canterbury

John Mitchell, IPY-CAML

Investing in sustainability

Like all companies which aim to be successful long-term, NIWA is focused on operating sustainably and on reducing our carbon footprint. But we regard ourselves as having a greater imperative than most to show leadership in this area.

We have already made the big gains, and we are applying more dedication and creative thinking to seek further leaps in efficiency. NIWA's biggest source of greenhouse gas emissions, for example, is diesel used by our research vessels. In 2007–08, we reduced cruising speeds by 1.5 knots resulting in a 25% reduction in diesel consumption and reducing emissions by 1700 tonnes CO_2. Now, such moves have reached a threshold that, if extended, would negatively impact on business viability. While continuing to seek opportunities for improvement, we are also turning our attention to the sustainability of other aspects of our operations.

This year, despite a 4% increase in permanent full-time employees (FTEs), we reduced our solid waste generation by 2% per FTE, and increased our total recycling of solid waste by 18% per FTE.

NIWA's Annual Report this year sets a benchmark for our future quadruple bottom line reporting, using guidelines and indicators from the international standard in sustainability reporting, the Global Reporting Initiative (GRI G3), for performance against environmental, economic, labour, and social/cultural indicators.

Rising to the challenge

As New Zealand decision-makers consider the many challenges we face – in renewable energy, clean water supply, the changing climate, bio-invasions, falling fish stocks, and so on – NIWA and its research partners will be ready to respond with innovative research, scientific evidence, and sound advice.

We believe these very challenges could be the drivers that will continue to make New Zealand the 'lucky country' – provided we make the right decisions about our natural resources, infrastructure, and communities. NIWA is well positioned to play its part, and will continue to invest in the skills and resources to do so. In this report we have presented some examples where NIWA is providing leading science to ensure the sustainable use of natural resources for New Zealand and the planet.

Sue Suckling
Chair

John Morgan
Chief Executive