



water for life

The Regional Council's Water Group is helping to support an economically vibrant region with a healthy population, by providing enough high quality drinking water for the region's cities every day at a reasonable cost. At the same time, we're working to ensure that supplying water doesn't place an unacceptable burden on the environment.

Juggling the linked but often competing requirements of sustainability – improving the quality of life for people in our region today without compromising future quality of life – is no simple task, but we think we're striking a fair balance.

This report, covering the year to 30 June 2002, is presented in a triple bottom line format to reflect the Council's ongoing relationship through water supply with the economic, social and environmental welfare of the region and its people.



OUR PURPOSE We aim to provide a quality, cost-effective water supply service for the benefit of the people of Greater Wellington. **WHAT WE DO** Collection, treatment and supply of high quality potable water to our region's four city councils – Hutt, Porirua, Upper Hutt and Wellington – for supply to consumers. This involves • Operating four water treatment plants, 15 pumping stations and 183 km of pipeline • Supplying on average 150 million litres of water daily, 1,730 litres every second, to meet the needs of 350,000 people • Actively targeting an 'A' grade standard for treated water • Forecasting future water needs and planning to ensure they can be met • Commitment to environmentally responsible use of resources • Managing assets valued at \$250 million. Every week we supply enough water to completely fill Wellington's WestpacTrust Stadium.

FINANCIAL PERFORMANCE

Operationally and financially 2001/02 was a successful year, although one that featured consolidation of past gains rather than dramatic change.

The water supply infrastructure is relatively modern and in good shape. We are in a phase of low or zero growth in demand for water, hence we have entered a maintenance phase, with lower levels of capital expenditure anticipated.

Direct operating costs are lower than the previous year for a fifth straight year. This trend, however, is unlikely to continue, due to the impact of \$1M in increased utility rates, insurance premiums that have increased 80% following the September 11 terror attack on the United States, and new electricity prices gener-

ating a \$0.3M increase in costs.

Despite this, the bulk water levy for 2002/03 has been held at the same level (\$25.6M) as last year. The levy has been cut or held in each of the last six years, and it is now at the lowest level in a decade.

Debt is now \$20.3M less than in 1997 and this reduction has been achieved while funding a \$20.9M capital expenditure programme over the same period.

Capital expenditure for 2001/02 was \$3.5M, 10% below budget.

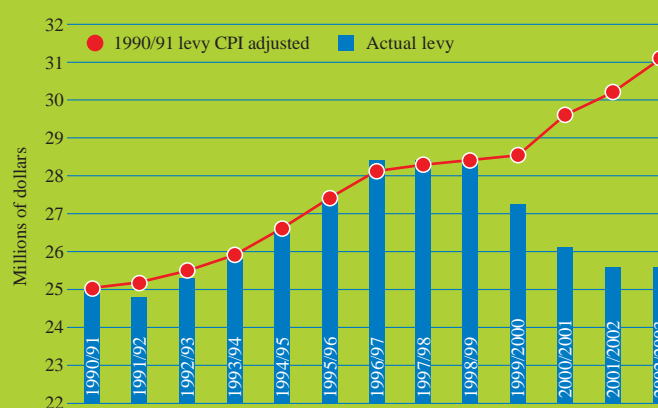
A review of the Water Group's Laboratory operation concluded that we should retain this capability for the medium term. The laboratory delivered a profit in a very competitive market, and provides a fundamental service.

A new base in Lower Hutt was purchased to house

Laboratory, Distribution and some Production personnel. Centralising these functions

is expected to contribute to reducing accommodation costs in coming years.

Water levy versus inflation 1990-2003



The Regional Council's water levy for the year to 30 June 2003 is just \$0.6 million more than the levy for 1990/91, a percentage increase of only 2.4%, compared with cumulative inflation (CPI) of 24.5%. (CPI figures are 12 months to 31 December – year to December 2002 estimated. Source Bancorp.)

Financial Summary

	Actual June 1997 \$'000	Actual June 1998 \$'000	Actual June 1999 \$'000	Actual June 2000 \$'000	Actual June 2001 \$'000	Actual June 2002 \$'000
Operating revenue	28,640	27,535	27,403	26,206	25,252	24,437
Depreciation	4,028	4,193	4,335	5,009	5,117	5,320
Financial costs	8,243	6,909	6,166	5,399	4,943	4,497
All other operating expenditure	14,340	12,695	11,862	12,264	12,251	11,481
Surplus before abnormal items	2,029	3,738	5,040	3,534	2,941	3,139
ABNORMAL ITEMS						
Karori land asset write down	-	-	(1,590)	-	-	-
Distribution stock write up	-	-	1,111	-	132	-
Interest – buy back of debt	-	-	(455)	-	-	-
Petone de-fluoridation	-	-	-	-	205	-
Wainui pipeline easement revenue	-	-	-	-	-	500
Infrastructure asset w/o – 1999/2002	-	-	-	-	-	(307)
Operating surplus	2,029	3,738	4,106	3,534	3,278	3,332

ENVIRONMENTAL PERFORMANCE

The Water Group is committed to sustainable environmental management, consistent with the Resource Management Act 1991 (RMA) and provision of high quality water at a reasonable price. The main impacts of our supply operation on natural and physical resources relate to water-take, energy and chemical use, discharges, and disposal of waste.

Under most operating conditions, we have some flexibility to vary the mix of production between aquifer and river sources. Treating aquifer water requires relatively little chemical adjustment and results in no sludge waste, but uses more power for distribution.

Information about the environmental impacts of producing chemicals is not available to us, so we are unable to determine which source of production results in the least environmental harm. Until we have better information, we will continue to produce water at minimum marginal cost, subject to meeting our obligations under the RMA, and taking a conservative view regarding supply security.

Water-take and Supply

- Security of supply standard achieved: all customer demand for water was met.
- Full compliance achieved against all 10 resource consents held for water-take.

New water-take consents for the Hutt, Wainuiomata and

The use of 1080 to control possum numbers in our water catchments is an important part of water quality management.



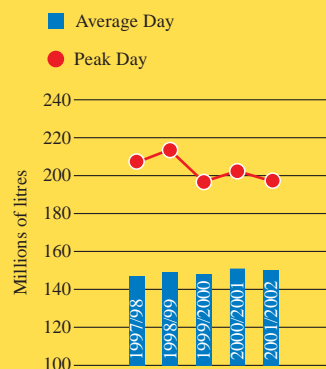
Orongorongo rivers, effective from July 2001, require that an increased minimum flow be left in the rivers. Minimum downstream flows will now be reached earlier into a drought. This would require greater reliance on the Hutt aquifer and storage lakes at Te Marua to meet demand. We have reviewed our management of these sources as a consequence and are confident that the new consent conditions do not significantly alter our ability to meet regional demand. The new limits were not reached during 2001/02.

Source of production shifted by 5% to our river-source treatment plants, due to increased water availability from Wainuiomata/Orongorongo catchment during summer and autumn, and the decision to minimise power use rather than marginal cost in response to central government's call for energy savings during late winter 2001.

- Water-take, at 58.8 million cubic metres (Mm³), was 1.1 Mm³ (1.9%) more than 2000/01. Storage in the Stuart Macaskill Lakes was increased by 0.8 Mm³ net during the year and overflow from the lakes back to the Hutt River (to control algae growth in the lakes, which can cause quality problems) accounted for up to 0.5 Mm³.
- Water treated 54.9 Mm³.
- Water supplied to customers 54.8 Mm³, 2.1% less than 2000/01. 9.2% less water was used by consumers during summer (December-February year on year), reflecting much higher than normal summer rainfall. Annual rainfall was also above average.
- Unaccounted for water was 0.2% of water treated – less than the margin of error for our meters (+/-1%).
 - Average supply was 150 million litres (ML) per day. The maximum day

was 199ML, well within the maximum day supply for the last 10 years – 216ML.

Supply: Average vs Peak Day



Energy Use

Energy use for treating and supplying water to Wellington's four cities is equivalent to that used by 2,500 average households and represents about 7% of total operating costs.

Energy use was 7% lower than last year for production and distribution (kilowatt-hours per million litres treated), due to more efficient energy use, and increased production from plants that use gravity to assist distribution. During the power shortage of winter 2001, system optimisation software was set to minimise energy use rather than marginal cost. This move contributed to energy use per litre of water treated being 11% less during August and September than for the same period in 2000.

Our optimiser software uses past water use to predict demand for the coming 24 hours at 8.00 am each day, then selects the most effective balance of pumping and treatment to minimise energy costs. Every half-hour the demand prediction for the rest of the day automatically updates in response to actual water use. The software has recently earned the Water Group a gold award for innovation excellence from the Association of Consulting Engineers of NZ, and was highly commended in the 2002

Energy-Wise Awards, run by the Energy Efficiency and Conservation Authority (EECA).

The National Energy Efficiency and Conservation Strategy (September 2001) has a saving target of 20% by 2012. Over recent years, we have investigated a range of energy efficiency options. Those that were financially viable, such as the optimiser software, have been adopted. Universal metering now appears the only means for us to meet the government target, however the cost far outweighs the forecast dollar savings in power use. There remains some flexibility to reduce our power use for water supply, but only at the expense of increased chemical use and total supply cost. Given our approach to minimise marginal cost, the national savings target is beyond our reach.



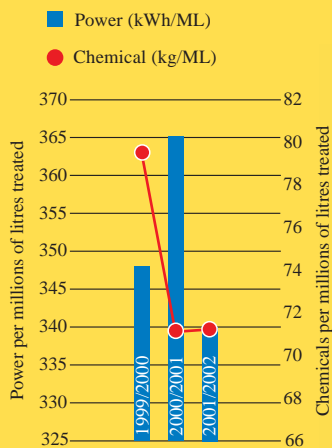
Energy cost optimisation software used to control Waterloo and Wainuiomata treatment plants was recognised for innovation excellence in the 2002 Energy Wise Awards.

Chemical Use

Chemical use per litre treated was unchanged from 2000/01, a notable achievement given the increased share of production from river-water plants. This resulted from several minor process changes, particularly from introducing powdered polymer at Wainuiomata.

Process trials in 1999 realised significant chemical efficiency gains, but we do not now believe there is scope for further dramatic

Power and Chemical Use



improvement. Chemical use and sludge per litre of production will vary from year to year depending on the source and quality of water for treatment. Our catchments are actively managed for good quality source water, and small increases in chemical or sludge volumes are likely to result from higher rainfall, when more debris is washed into rivers; this is largely beyond our control.

Emissions and Waste

- Full compliance achieved against all but one discharge consent.
 - 1670 tonnes of de-watered sludge were sent to resource consent-holding landfills, a 1.8% increase by volume of river water treated over 2000/01.
- The Water Group holds 20 resource consents for discharge and three trade-waste permits. Supernatant (treatment process by-product) discharge from Wainuiomata treatment plant to the Wainuiomata River did not comply with consented conditions as discharge pumps were, mistakenly, thought to be incapable of a flow rate that would breach the consent. Corrective measures have been implemented. A ‘whole effluent’ toxicity test of supernatant from the plant, conducted by the National Institute of Water and Atmospheric Research, found minimal impact on fauna, indicating that no significant harm resulted from non-compliant discharge.

Demand Management

We aim to manage demand for water (for the current population level) within the limits of the supply system, so that shortages

are rare (no more than one in 50 years on average) and resources are used effectively. Our main water conservation activity targets garden watering during summer, when peak daily water supply volumes coincide with low rainfall. Greater adoption of conservation methods by the public would help to reduce the

environmental impact of supplying water. A campaign over recent years, promoted jointly with our customers, has raised awareness of water conservation methods, however, there appears limited recognition of the benefits to the community of adopting them. The campaign will be reviewed in the coming year.

Land Use/Biodiversity

The Regional Council manages 16,500 hectares of water catchment land in the Tararua and Rimutaka ranges to ensure that conditions conducive to high quality water supply are maintained, while enhancing biodiversity within the water catchments.

The recent national debate around 1080 use raises a serious concern for water suppliers regarding pest control and quality. Catchment management is an important first barrier against microbiological contamination of drinking water. Possums are a main cause of potentially harmful pathogens in source water and they also degrade native forest, which is an effective natural filter. 1080 is the only poison suitable for aerial sowing – a vital consideration given that much catchment land is hard to reach any other way. Carefully managed use of 1080 in past years has been integral to controlling possum numbers and maintaining a high standard of source water for treatment; it remains the most effective possum control measure available, and this point will be

made to the upcoming review of 1080 use by the Environmental Risk Management Authority.

We recognise that supplying water may impact on fish and their habitat. Last year we began to investigate the extent of that impact on

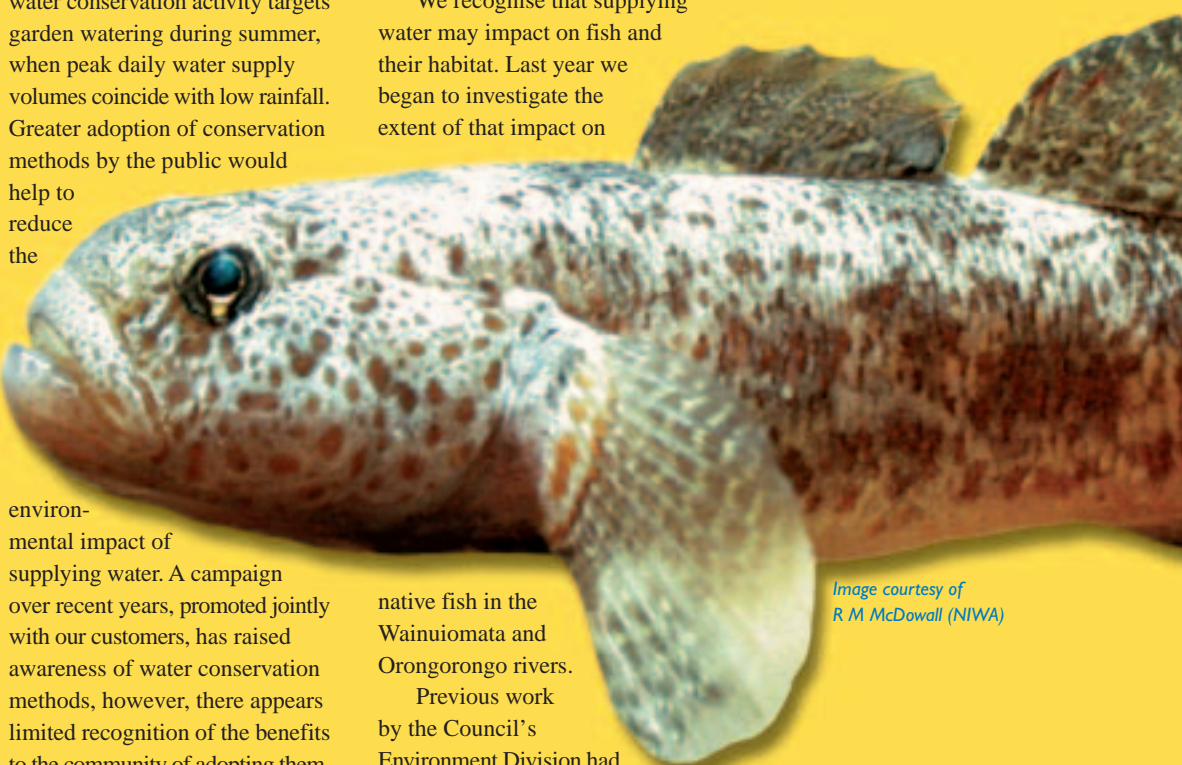


Image courtesy of R M McDowall (NIWA)

native fish in the Wainuiomata and Orongorongo rivers.

Previous work by the Council’s Environment Division had identified excellent conditions for native fish above the Orongorongo intake weir, but relatively modest fish numbers. Massey University’s Institute of Natural Resources (INR) was contracted to investigate ways to enhance the native fish population upstream of the intake, and this investigation is ongoing.

INR has also conducted a study of whether supernatant discharge to the Wainuiomata River is having any effect on native fish.

Findings indicate that diversity and density of fish downstream of the Wainuiomata treatment plant’s discharge point are lower than in the ‘pristine’ site above it. While supernatant appears to reduce densities of non-migratory fish and those that can circumvent dams, the physical barrier imposed by two dams is also thought to limit access to the upper river for some migratory species. It is unclear whether these results were influenced by our supernatant discharge consent being exceeded.

The researchers recommended repeat sampling and a study of supernatant effects on species found in relatively low numbers below the treatment plant. A repeat fish survey will be carried out during 2002/03 before further work is considered.

Understanding the effects of taking and treating water on native fish in the Wainuiomata and Orongorongo river catchments was the aim of two studies initiated during the year. Pictured below (top to bottom) are native species the Blue Gilled Bully, Koaro, Red Finned Bully and (above) the Upland Bully.

Images below courtesy of the Taranaki Regional Council.



SOCIAL PERFORMANCE

Commitment to sustainable development means recognising our role in the wider community. It also relies on building strong relationships with stakeholders.

Water Quality

- Chemical compliance achieved – all chemical content in treated water was within acceptable limits defined by the Drinking Water Standards for New Zealand (DWSNZ): 2000.
- Full microbiological compliance was confirmed for three of our four treatment plants following the latest annual assessment (2001) by Regional Public Health against the DWSNZ 2000 (detail below).
- Laboratory accreditation to the quality management standard ISO 9002: Guide 25 was maintained.

The Regional Council's 'Take Action for Water' environmental education programme aims to help children understand the importance of water and how to take care of it, through practical 'hands-on' learning.

During 2001/02, Ministry of Health grades for our main treatment plants were:

- Te Marua – A
- Waterloo – B
- Wainuiomata – C.

Achieving compliance with the 'A' grade standard for Wainuiomata has been complicated by changes to the DWSNZ, introduced at short notice in January 2001.

Microbiological compliance (*E.coli*) must now be demonstrated by continuous monitoring (sampling at least every minute) of turbidity, pH and chlorine, rather than single tests daily. In addition, turbidity (the indicator of possible protozoan contamination) must be reported separately for each filter, rather than the combined flow from all filters. Combined flow reporting resulted in turbidity spikes on a single filter being diluted by the

flow from the other filters before the sampling point, but this is no longer the case. Meeting the new compliance criteria in full is proving challenging, but we are now close to the required standard.

For the 2002 compliance year to date (January – June), Wainuiomata treatment plant achieved the turbidity 'rate of change' rule for filters 99.96% of the time: 100% compliance is required for an 'A' grading. The pH-chlorine rule was achieved 98.22% of the time; again, 100% compliance is our target.

The treatment plant's automatic shutdown function has been reprogrammed to reflect the new and more demanding aspects of the 2000 Standards, and changes to the filter media are also being investigated. While water supplied from the plant is safe, achieving full compliance to the DWSNZ and an 'A' grading remain high priorities.

Waterloo treatment plant cannot receive higher than a 'B' grade, as Hutt City Council prefers to receive unchlorinated water and manage the associated slightly



increased health risk. Hutt City has been asked to confirm that it wants to retain an unchlorinated supply, following recent overseas incidents of contaminated potable water causing health problems.

Tritium dating conducted for us by the Institute of Geological & Nuclear Sciences Limited has shown that water from the Hutt aquifer meets Ministry of Health standards for secure groundwater and remains safe to drink without chemical treatment.

A \$1M upgrade was started on the main Waterloo to Petone pipeline between Randwick and the Hutt Road. Inserting a plastic lining into the existing pipe will enhance water quality for Petone and Korokoro, and increase the





Tritium dating confirmed that water pumped from the Hutt aquifer at Waterloo (Lower Hutt) continues to meet the Ministry of Health definition of secure groundwater; free from potentially harmful microscopic organisms such as Giardia (above).

Image courtesy of Massey University/NZ Ministry of Health Protozoa Research Unit.

pipe's resistance to earthquake damage.

Our Laboratory gained accreditation in a new field defined by the Ministry of Health specifically for drinking water testing. The Laboratory is working towards compliance by November 2002 to the new ISO/IEC 17025 dedicated laboratory quality standard.

System and Risk Planning

Work between the region's Lifelines organisations, including the Regional Council, has identified that restoration of normal water supply to consumers after a severe earthquake would probably take more than four weeks; households typically store enough water for only a few days. Water supply and civil defence managers from the four cities and the Regional Council have been working to develop a joint approach to providing water in an emergency. A draft emergency supply strategy is expected in November 2002.

A feasibility study for Kapiti Coast being connected to the Council's potable water system was prepared for Kapiti Coast District Council. Kapiti is expected to consider this alongside other options for a long-term solution to the area's water supply shortfall.

The Water Group developed a new hydraulic model of the distribution system and extensively updated its Sustainable Yield Model (SYM) for regional water supply strategic planning.

The SYM, developed in 1997, was updated in light of new data, structural changes to the supply network and revised environmental consent conditions. Projections show that current water supply infrastructure is sufficient to meet a 1-in-50 year drought event until at least 2020, at current growth rates.

A new component of the SYM was developed to enable storage predictions for the next 365 days. The model projects the range of storage levels – known as 'spaghetti curves' – based on 40,000 days (1890-2001) of modelled records. It provides a systematic approach to predicting water supply deficits in the short term, allowing more timely planning with our customers for managing demand.

Education

Raising public awareness about the region's water supply is essential to reducing waste and promoting sustainability. Progress was made on several fronts during the year.

The Water Group contributes to the Council's *Take Action for Water* environmental education programme, designed to help 8-12 year olds understand and care for water. *Take Action*, comprising a study guide for teachers and support from the Council's environmental education staff, was officially launched in March 2002. The resource facilitates action by children to conserve water within their community. Twenty schools have taken part in the programme to date, with feedback from teachers universally positive.

- 1,100 visitors took guided tours of our water treatment plants
- A new water supply brochure – *FRESH* – was published, giving an overview of Greater Wellington's supply system.

The Water Group continued to support the Council's Landcare Division in facilitating increased access to the Wainuiomata/Orongorongo water catchment – an area described as the best example of lowland podocarp forest in the lower North Island.

Landcare rangers guided over 500 people from 22 groups in the Wainuiomata catchment, a doubling of visitor numbers over 2000/01.

Managed access to the Orongorongo Valley will be introduced in the coming year.

The annual ballot to hunt in the Wainuiomata/Orongorongo catchment area during autumn again proved popular, with 175 applications for the 40 available permits. The ballot hunt is primarily offered to accommodate recreational hunters, but also contributes to pest control.

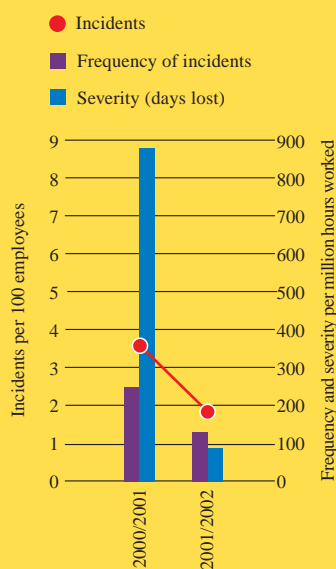
Workplace

Staff numbers were reduced from 86 to 56 during the year, due largely to a decision not to seek to renew a contract to manage Wellington's water reticulation network. The City Council had imposed new conditions that would have made the contract unprofitable.

The Regional Council operates a health and safety management system – *Keeping Employees Safe at Work*. The Water Group also undertakes to comply with all relevant codes of practice and legislation, and to continually improve procedures and provide training to promote safe working.

Accident and injury rates provide a measure of effectiveness of safety management.

Accident and Injury Rates



Accident and injury data has been gathered in this format for two years only. While results for 2001/02 were influenced by a reduction in Operations staff as a percentage of all employees, the downward trend is pleasing.

Governance and Organisation Structure

The Regional Council's water supply role is defined by the Wellington Regional Water Board Act (1972). Publicly elected councillors are responsible for setting water supply policy, which is carried out by the Water Group.

The Water Group is organised into five functional areas:

- Operations (responsible for water treatment and distribution);
- Laboratory; Engineering Consultancy (project design and management);
- Strategy & Asset (system planning, reporting and communications);
- and Support (financial and secretarial services).

Business Drivers

The Water Group has five key business drivers: water quality, security of supply, environmental management, customer service and cost efficiency. Detailed performance indicators are published in the Council's 10-year plan, which is updated annually. Our operating standards also outline commitments to health and safety and ownership/governance. The current annual plan and operating standards are available on the Internet (see below) or by contacting the Council.

Management Systems

The Water Group operates quality and environmental management systems, certified to international standards ISO 9002 and ISO 14001 respectively. Our laboratory holds IANZ accreditation to the NZ Code of Laboratory Management Practice (including ISO 9002 and ISO Guide 25). Management systems are independently audited annually.

Wellington Regional Council Water Group

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caring about you & your environment