



<water

FRESH WATER IS PART OF OUR NATIONAL IDENTITY
– WE WON'T FORGIVE OURSELVES
IF WE DON'T LOOK AFTER
THIS PRECIOUS RESOURCE





Clean Water for All

Fresh water is part of our national identity. Clean fresh running water is something we feel connected to, something we expect will be there forever. Clean fresh running water supports life and our way of life. Our rivers, lakes, streams and wetlands are among our most valued natural assets.

Fresh water is important for our health. We drink from rivers and lakes, we swim in them, we fish from them and we eat food from them, we kayak on them and we just admire their beauty. We feel better because they are there. We also expect them to help generate our power and help us to grow our economy. We expect the cultural and spiritual significance of water to be respected. We expect our rivers and streams to provide a good home for plants and animals, and we expect some of them to remain untamed and untouched.

We have about 200,000 km of river network. The Waikato River at 425 km is the longest; however the prize for carrying the most water goes to the Clutha, from which the equivalent of a family-size pool of water is discharged into the sea every second. We also have some stunningly beautiful lakes, both built and natural.

We have lots of fresh water, but we are finally reaching the point many other countries reached a while ago – where we have to worry about how much water we have, how it is used, what is polluting it, and how we better protect our rivers, lakes and streams from what we do on the land. In some places we want water for so many conflicting reasons that we will need to make decisions we haven't faced before.

We want to be able to use some water and leave some water wild and free, but as we drain off more and more for our use, the pool of water left is shrinking.

Ways we manage water

Regional councils manage our fresh water. Under the Resource Management Act (RMA), councils have to decide how much water our rivers need to survive and for the living things in the rivers to thrive. That's the line in the sand against which any request to use water is measured.

The RMA allows councils to plan how they will manage fresh water. These plans can control how much fresh water can be taken for specific uses (such as irrigation), they guide whether anything can be put down pipes into rivers and lakes, and they say how some water will be protected for cultural and recreational reasons. While water plans are not compulsory, 15 out of New Zealand's 16 regions have them.

A DIVERSE NETWORK NEW ZEALAND HAS A DIVERSE NETWORK OF RIVERS.

Some, like the Rakaia, cascade down from the greywacke heights of the Southern Alps before hitting the plains and flowing to the sea as wide braided rivers. Others, like the Waikato, meander slowly through lowland farm area and towns.

Some follow rainfall patterns – flowing high in winter and low in summer. Others, fuelled by glaciers melting, have high flows in spring and summer and dwindle in winter.

Some rivers feed off lakes, their waters flowing evenly throughout the year.

Water conservation orders are a tool to protect outstanding rivers. Rivers can qualify for a number of reasons – because they are wild and scenic; they are valuable as a habitat or fishery; or they have recreational, historic, spiritual or cultural value. We currently have 13 rivers in New Zealand with this type of protection.

While allocating water wisely is difficult, controlling and protecting water quality is harder still. People expect our waters to be clean. Sometimes they aren't.

Rivers are affected by whatever we do on the land. When it rains, oil and rubbish on the roads is washed down storm water drains. Fertiliser and animal dung on farms is washed into streams. It all ends up in our rivers. As land is used for towns, farming, forestry and horticulture our rivers, lakes and streams have to cope with increasing levels of pollution, bacteria, silt, fertilisers and animal dung.

Pipes from factories and towns emptying into rivers used to be the biggest and most obvious reason for polluted water, but we don't have many of these anymore. To keep rivers clean, we need to manage land better and reduce what washes off land into our waterways.

And that runs us smack into another Kiwi value – we expect clean fresh water but we want to do what we want. We don't like being told what to do.

It's simply not possible to have unlimited freedom in how we use the land and still have the clean lakes and rivers we all want.

Often we can't see the damage we are doing straight away. It can take 20 years or more for the things we do now to show up as polluted rivers or lakes. That's because run-off from land sometimes works its way quietly through the soil into ground water and then gradually into our rivers. Our grandchildren may have to fix up some of the messes caused by what we do today. They won't thank us for it.



How much of New Zealand's fresh water do we use?

We know how much rain we get, how much of this dries up and therefore how much is potentially available. As a country we are not short of water – on average, less than three percent of New Zealand's available fresh water resource is used by farming, industry and towns. According to the Organisation for Economic Co-operation and Development (the OECD), that gives us the second lowest rate of fresh water use in the world. Of what we use, 15 percent goes into public water supplies and 7 percent is used by industry.

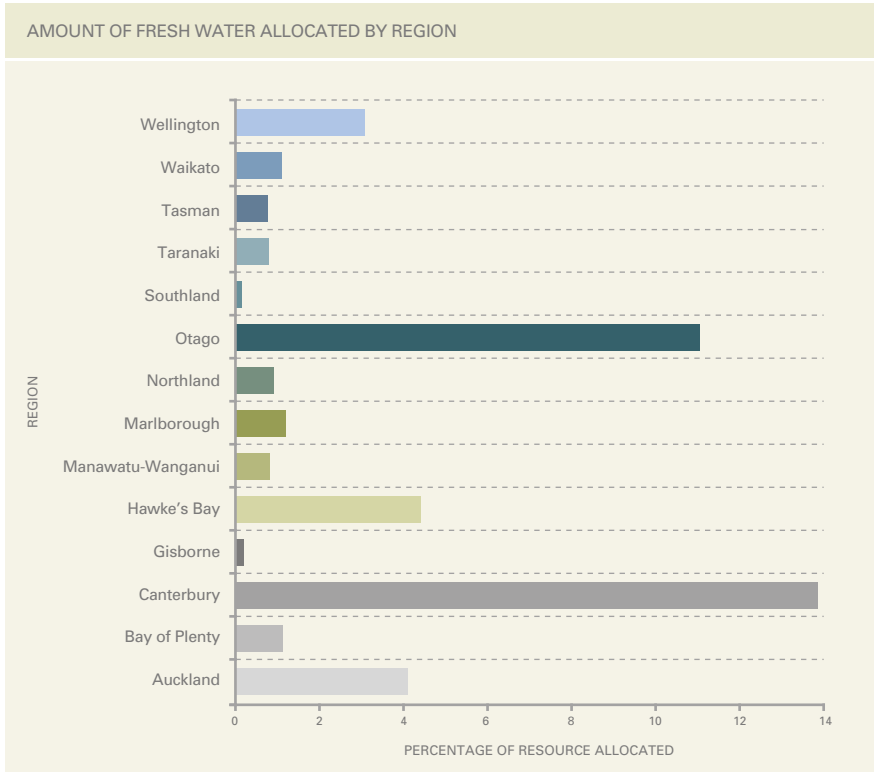
Most is used by agriculture and horticulture. Irrigation uses 70-80 percent of our water, excluding hydroelectricity.

Even though we have lots of water nationally, some regions still have shortages and droughts. Demands on fresh water in dry regions (especially for irrigation) are increasing. In many cases requests for water are greater than what is available or wise to use.



The eastern coast areas of New Zealand are getting drier, with less rainfall to fill rivers, lakes and ground water systems. In some of these areas, including Canterbury and the Hawke's Bay, there is high demand for water to support more farming, grape growing and orchards. The Ministry of Agriculture and Forestry estimates that the area of land irrigated in New Zealand could double within 20 years.

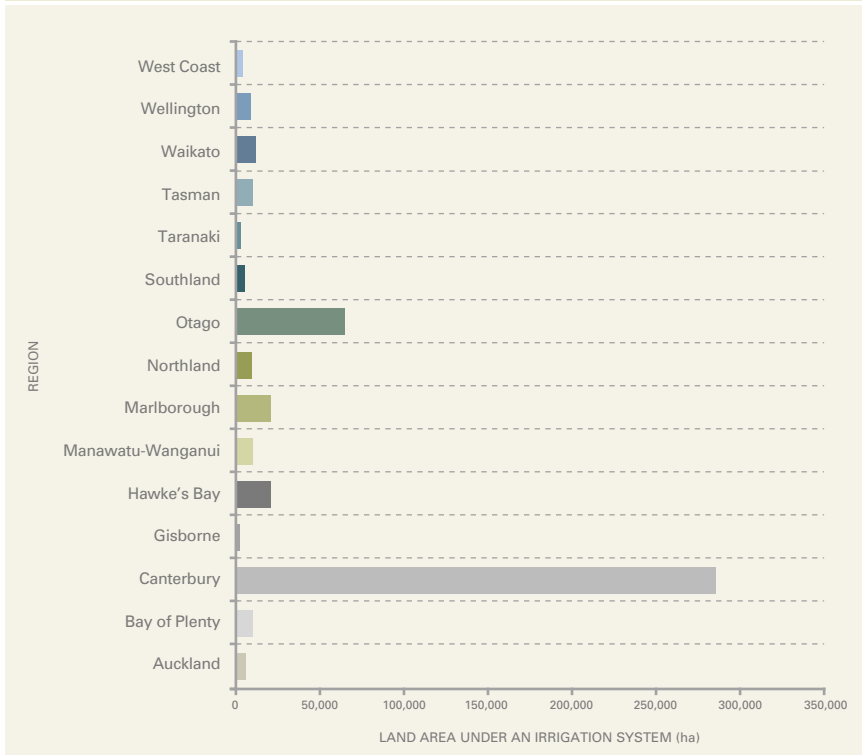
On average, each New Zealander uses about 160 litres of water per day. If we include the 'big' users (hydroelectricity, irrigation and industry), we use 82,000 litres of water per person per day (which is about 8,200 buckets each).



In Canterbury, nearly 14 percent of the available water is allocated, and in Otago it's just over 11 percent. Some of this water may not be being used as wisely as it could be. Sometimes there is little left to support the life in rivers and streams over dry summers, and wells in Canterbury, in particular, now need to be deeper to reach the water.



AMOUNT OF LAND AREA UNDER IRRIGATION SYSTEMS BY REGION



According to the 2002 agricultural census, we use river and ground water to irrigate about 500,000 hectares across the country. First place goes to Canterbury which has 61 percent of the irrigated land, followed by Otago (14.7 percent). Distant third and fourth go to Marlborough (4.3 percent) and Hawke's Bay (3.8 percent).

Some regions still suffer from shortages and droughts.

In January 2006, Environment Canterbury reported the lowest level of water ever recorded in aquifers deep beneath the plains between the Opihi and Waimakariri rivers. One of the wells tested has been monitored for 54 years.

MANAGING DEMANDS ON THE WAITAKI
THE WAITAKI RIVER, IN THE SOUTH ISLAND'S MACKENZIE BASIN, IS OF GREAT SIGNIFICANCE TO NGAI TAHU. IT IS ONE OF THEIR TAONGA OR TREASURES.

Lying mainly in the Canterbury region, the Waitaki catchment is important for generating hydroelectricity and irrigating pasture, for recreation, and as a trout and salmon fishery. It is also a great river.

The competing demands for the river's water came to a head around a proposal by Meridian Energy, a state-owned enterprise, to take about 75 percent of the river's flow to generate electricity and irrigate pasture.

To help resolve the debate, a special law set up the Waitaki Catchment Water Allocation Board in 2004. In September 2005, the Board approved a regional plan to control the allocation of Waitaki's waters. That plan was appealed to the High Court, and not resolved, at the time of going to press.



What do we know about the quality of New Zealand's water?

By world standards, the quality of our fresh water is very good – a United Nations report in 2002 rated New Zealand's fresh water quality third best out of 122 countries.

In the past, the main problem was pollution that came down pipes from towns and factories. Today, water management has improved and pipes and drains are less of an issue. However, the water quality of urban streams and lowland rivers is still not good enough.

Urban streams are polluted by run-off from roads and buildings and this also affects our estuaries and harbours.

Poor water quality is now largely caused by run-off from land – particularly from farm land. Fertilisers, animal dung and silt all play a part. These are known as diffuse sources of pollution. Data collected by the National Institute of Water and Atmospheric Research (NIWA) confirms this change. NIWA monitors 77 sites on 34 of our major rivers, and the trends it found between 1989 and 2003 are shown in the table below.

RECENT TRENDS IN RIVER WATER QUALITY		
WHAT WAS MEASURED BETWEEN 1989 AND 2003	TREND	WHAT THIS MEANS FOR WATER QUALITY
Water flow	No change	
Water temperature	No change	
pH – a measure of acidity or alkalinity	Decreased	Uncertain
Conductivity	Increased	Deterioration
Percentage of dissolved oxygen	No change	
Biological oxygen demand	Decreased	Improvement due to fewer pollutants from point sources
Water clarity	Increased	Improvement due to fewer pollutants from point sources and possibly improved sediment control
Ammoniacal nitrogen	Decreased	Improvement due to fewer pollutants from point sources
Nitrate		
Total nitrogen	Increased	Deterioration due to increased diffuse loss of nutrients from fertile land
Dissolved phosphate		
Total phosphorus		

Source: Dr Mike Scarsbrook (NIWA)

Fact

IN ORDER TO GROW IN LAKES AND RIVERS, PLANTS NEED ONLY NUTRIENTS (PLANT FOOD) AND LIGHT FOR PHOTOSYNTHESIS.

When there is too much, there can be virtual population explosions of algae. This can happen when nutrients from sewage, animal dung and fertiliser reach our waterways. Algae can smother out other forms of life.

WHAT'S BEING DONE TO IMPROVE OUR WATER QUALITY? THE DAIRYING AND CLEAN STREAMS ACCORD

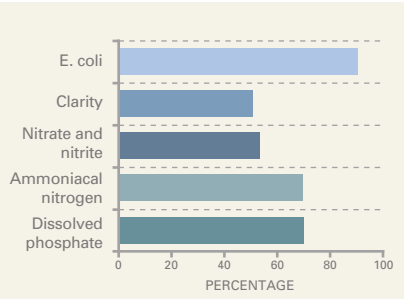
In 2003, a Dairying and Clean Streams Accord was agreed. Key players are the Fonterra Co-operative Group, councils and the Ministry for the Environment and the Ministry of Agriculture and Forestry. The voluntary partnership aims for healthy water in dairying areas.

Farmers' progress toward targets is measured each year and so far it has been good – with many targets having already been met.

The 2007 target to exclude dairy cows from more than 50 percent of waterways is in the bag. And the 2012 target for bridging 90 percent of streams has also been achieved.

One disappointment is that few dairy farmers have put in place systems to manage the amount of fertilisers they put on the land. Hawke's Bay is an exception, with over half of farmers now having nutrient budget systems.

% OF SITES EXCEEDING WATER QUALITY GUIDELINE VALUES FOR RIVERS SURROUNDED BY PASTURE



This increased trend in pollution from runoff is a particular concern for water quality in farming areas in New Zealand. A report published in 2005 gathered results from regional council and NIWA monitoring from 1996–2002 (996 sites). Rivers surrounded by pasture did not compare well with measures of water quality. Most monitoring sites in farming areas showed high levels of nutrients and signs of pollution from animal dung (as indicated by E.coli in the graph).

We know that poor water quality in farming areas is associated with some farming practices. Dairy farmers are changing what they do to avoid polluting water. For example, dairy ponds now generally don't drain directly into streams – a definite move in the right direction.

Underground water, fed by surface water moving down through the soil, is an important part of New Zealand's water resources. Ground water can differ greatly in age, type and location. Ground water that has a direct connection with the surface will quickly show things that have happened on the land, whereas damage done today may not show up for decades in water deeper underground.

While generally our ground water quality is good, there is concern about pollution in parts of the Waikato, Southland and Canterbury. In the Waikato, more than nine percent of 198 sites monitored for nitrates in 2004 failed the accepted standard for drinking water. These sites are mainly shallow aquifers located near market gardens and intensive farming.



Going swimmingly

Councils around the country monitor water at popular swimming places every summer for bugs that can cause illnesses, including stomach upsets.

During the summer of 2004/05, 271 sites on rivers and lakes throughout the country were monitored by councils. While almost half of the freshwater sites passed guidelines almost every time they were tested, 11 percent failed the guidelines frequently.

Seaside beaches were also monitored. In contrast to the freshwater sites, most coastal beaches (78 percent) met guidelines for safe swimming almost all of the time. Very few coastal beaches (one percent) failed frequently.



Fact

DOWNSTREAM CONSEQUENCES ENVIRONMENT WAIKATO MONITORS LAKE TAUPO.

Results show that the lake's open water is still of a high quality, is clear and is low in nutrients. However, a review of monitoring data from the past 30 years has shown that the amount of nitrogen in the lake's bottom waters has doubled and, in the 10 years up

to 2004, more phosphorus and nitrogen were recorded in its surface waters.

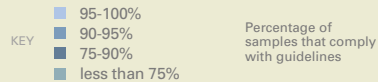
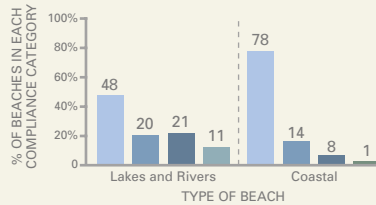
Environment Waikato expects that if the current levels of nutrients reaching the lake continue, Taupo's water will gradually become less and less clear.

LIFTING OUR GAME

COUNCILS IN AUCKLAND HAVE BEEN CLOSELY INVESTIGATING THE QUALITY OF WATER IN THEIR HARBOURS FOR MANY YEARS AND ARE TRYING TO REDUCE POLLUTION FROM STORM WATER.

For example, to improve the quality of its bathing beaches, North Shore City is spending \$210 million over 20 years to upgrade its storm water and wastewater systems.

BATHING BEACHES 2004/05
WATER QUALITY COMPLIANCE WITH GUIDELINES



Note: Only sites that were sampled more than 10 times over the bathing season are included in the dataset for this chart.



Photo courtesy of Greater Wellington

Coastal water quality

Whatever we do on the land washes into streams, rivers and storm water drains and eventually finds its way to the coast.

While most of our popular beaches still have water quality of a relatively high standard, there are areas where the effects of urban and other land-based activities show up. The main sources of metals in the Waitemata Harbour, for instance, are roads (especially from car tyres and brake linings) and the zinc coating from roofs.

