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NIWA
Taihoro Nukurangi

The Climate Update

April extremely dry in the west

Rainfall was very low in western areas. Southeasterlies brought lower temperatures than normal along the east coast ... *page 2*

Outlook: warmer than normal

The next three months may be warmer than normal, and there's still a risk of lower than normal rainfall in the east ... *page 3*

Drought lingers in some areas ... *page 4*

New Zealand climate in April 2003

Very dry in western regions

Most of the South Island west coast and some alpine areas recorded just a third of normal rainfall in April. Only half normal rain fell in most other western regions from Waikato to Fiordland, as well as in central Wairarapa, Wellington, central Marlborough, Otago, and Southland. It was drier than normal also in south Auckland, Taranaki, and King Country. Reefton recorded its lowest April rainfall total since records began in 1961.

A few areas of the country were wetter than average, particularly the Bay of Islands, parts of Auckland, Coromandel, areas of Bay of Plenty, southern Marlborough, Banks Peninsula, and coastal Canterbury.

Cool in the south east

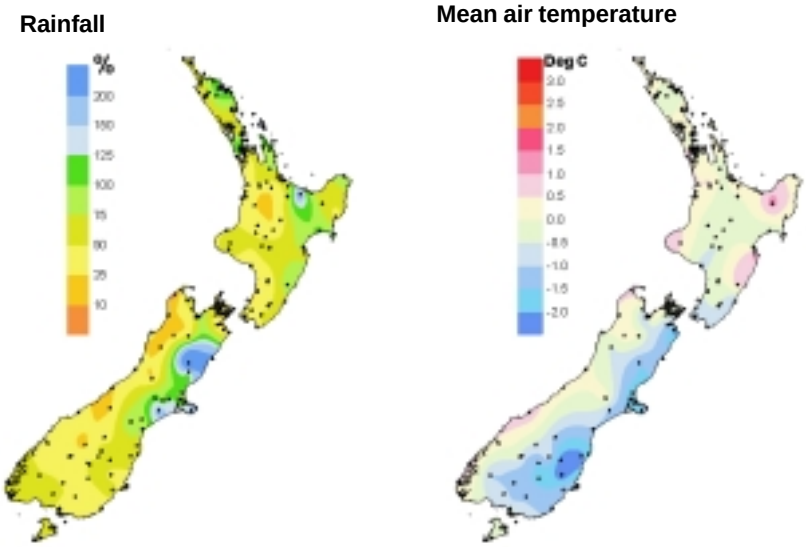
Parts of the country from southern Wairarapa down the east coast of the South Island to Southland recorded mean temperatures for the month of more than 1.5 °C below normal. Elsewhere in New Zealand temperatures were near average or above. The national average temperature of 12.9 °C was 0.4 °C below normal.

Easterlies

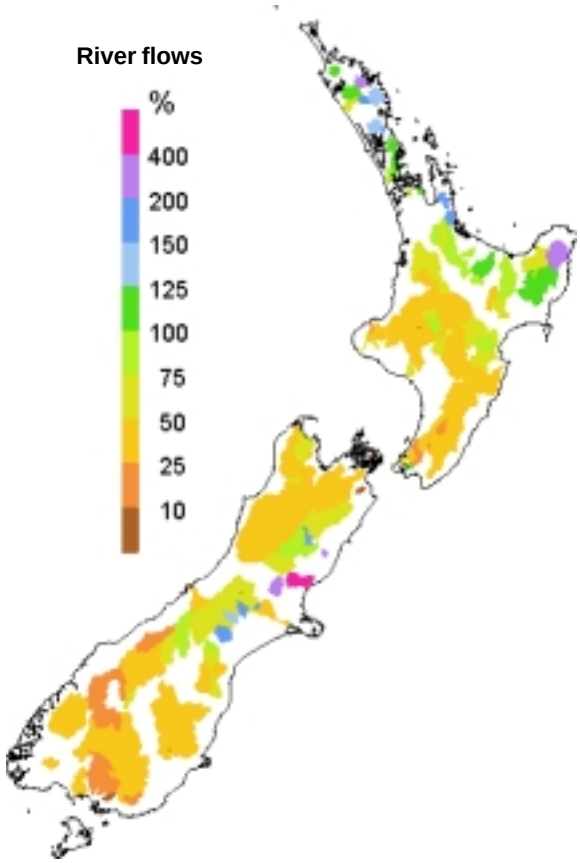
April's climate pattern was dominated by more frequent anticyclones than usual to the south and southwest of New Zealand, with more frequent centres of low pressure to the north of the North Island. These systems produced more 'dry' easterly and southeasterly winds than usual over New Zealand.

Extremely low April flows in the central North Island and Southern Alps

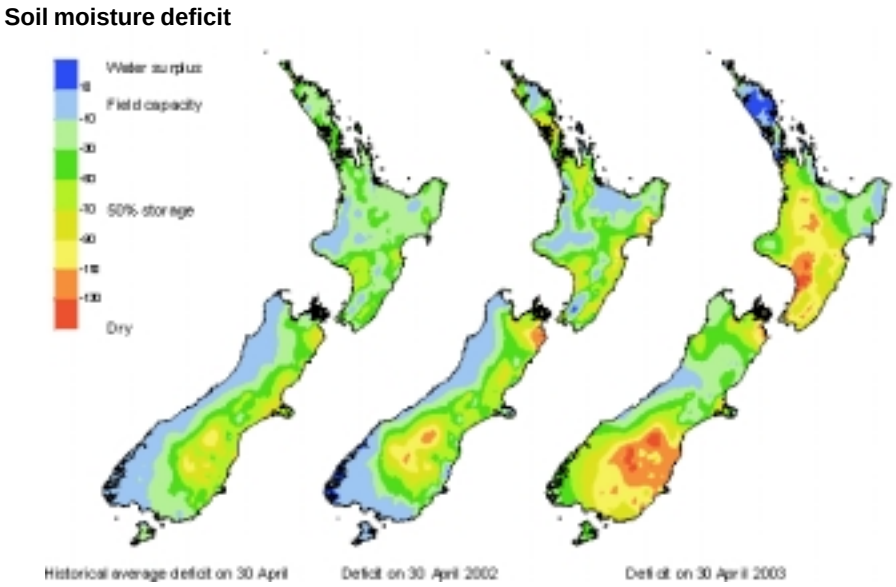
April streamflows were high in parts of Northland, Coromandel, East Cape, and north and mid Canterbury, but below normal elsewhere. Extremely low or record low flows occurred in the catchments in the central North Island, Southern Alps, and Southland.



ABOVE: Percentage of average rainfall (left) and difference from the average air temperature in degrees Celsius (right). Dots indicate recording sites.



ABOVE: Percentage of average April streamflows for rivers monitored in national and regional networks. The contributing catchment area above each monitoring location is shaded. NIWA field teams, regional and district councils, and hydro-power companies are thanked for providing this information.



Very dry soils

There were still significant soil moisture deficits at the end of April in the southwest of the North Island, and in Marlborough, south Canterbury, and much of east and Central Otago.

Some areas that were particularly dry at the end of March, including eastern areas of the North Island and the South Island east coast from Kaikoura to north Canterbury, recorded improved moisture levels during the month after near or above average rainfall.

LEFT: Soil moisture deficit in the pasture root zone at the end of April (right) compared with the deficit at the same time last year (centre) and the long-term end of April average (left). The water balance is for an average soil type where the available water capacity is taken to be 150 mm.

Checkpoint

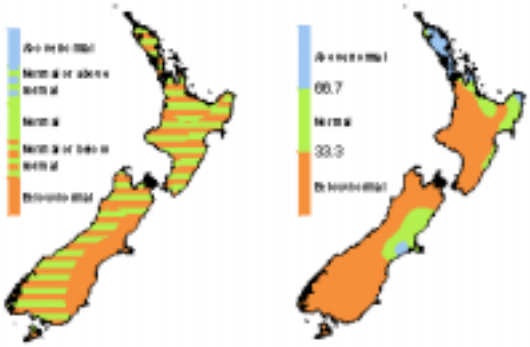
February to April 2003

Rainfall was near or below normal as predicted in most regions, but above normal in a few areas of the northern North Island. It was drier than expected in the southwest North Island.

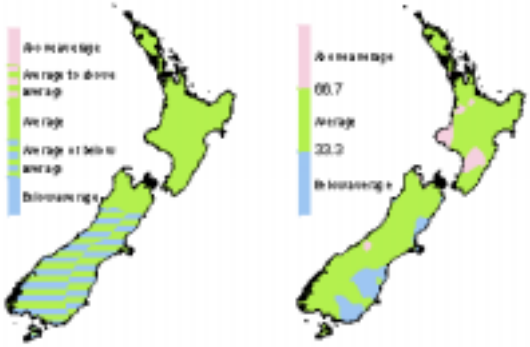
Temperatures were near or below average in most regions as expected.

Higher than expected **river flows** occurred in Northland, Coromandel, East Cape, Hawkes Bay, and north and mid Canterbury. In most other areas, below normal or normal flows occurred as expected.

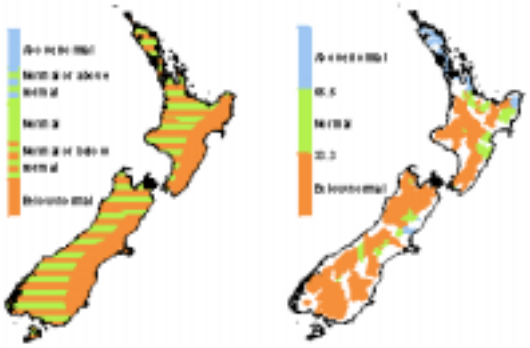
Rainfall — **Outlook** What we said | **Outcome** What actually happened



Mean air temperature



River flows



The three outcome maps (right col) give the tercile rankings of the rainfall totals, mean temperatures, and river flows that eventuated for February to April 2003. Terciles were obtained by dividing ranked February to April data from the past 30 years into three groups of equal frequency (lower, middle, and upper one-third values) and assigning the data for the present year to the appropriate group. As an approximate guide, middle tercile rainfalls (33.3 to 66.7%) often range from 80 to 115% of the historical average. Middle tercile air temperatures typically occur in the range of the average plus or minus 0.5 °C. The upper, middle, and lower tercile ranges are indicated in the maps by the terms *Above normal*, *Normal*, and *Below normal,* respectively.

Outlook

May to July 2003

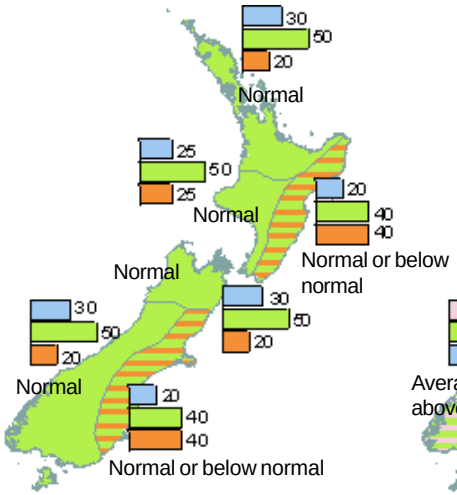
A relatively mild early winter is expected, with above average local sea surface temperatures. For May–July, temperatures are expected to be above average over the North Island and north of the South Island, and average or above average over the rest of the South Island.

Normal or below normal rainfall is expected in the east of both Islands, with near normal rainfall likely elsewhere.

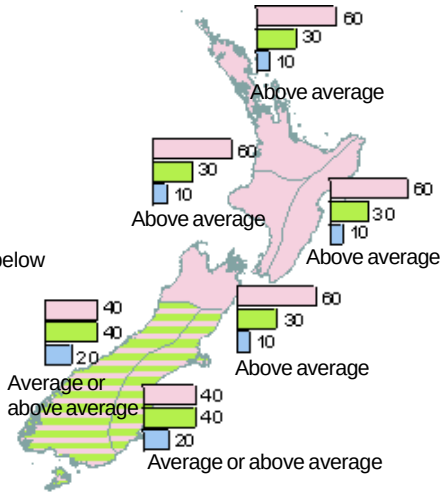
Soil moisture levels are predicted to be normal in most regions, but normal or below normal in the western North Island and northern South Island. River flows are expected to be normal in the northern North Island and western South Island, normal or below normal in the western North Island and northern South Island, and below normal in the east of both islands.

The El Niño event in the tropical Pacific has died out, and no El Niño influence is expected over the next three months.

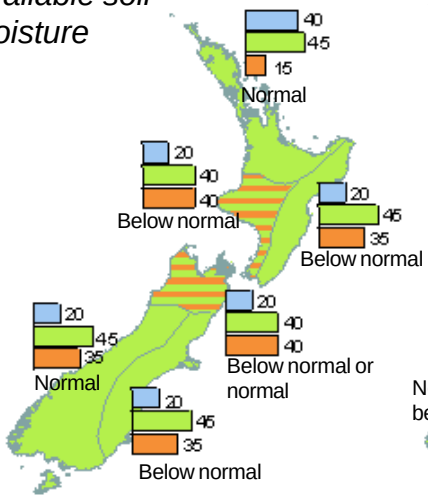
Rainfall



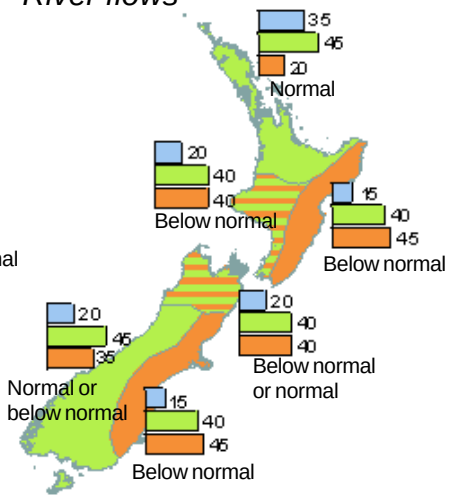
Mean air temperature



Available soil moisture



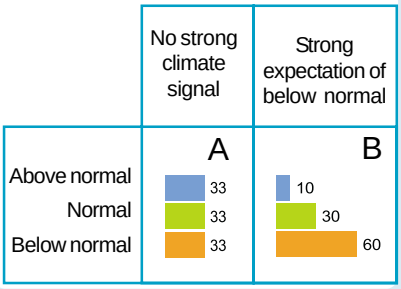
River flows



KEY to maps (Example interpretation)

In example A, climate models give no strong signals about how the climate will evolve, so we assume that there is an equal chance (33%) of the climate occurring in the range of the upper, middle, or lower third (tercile) of all previously observed conditions.

In example B there is a relatively strong indication by the models (60% chance of occurrence) that conditions will be below normal, but, given the variable nature of climate, the chance of normal or above-normal conditions is also shown (30% and 10% respectively).



Feature

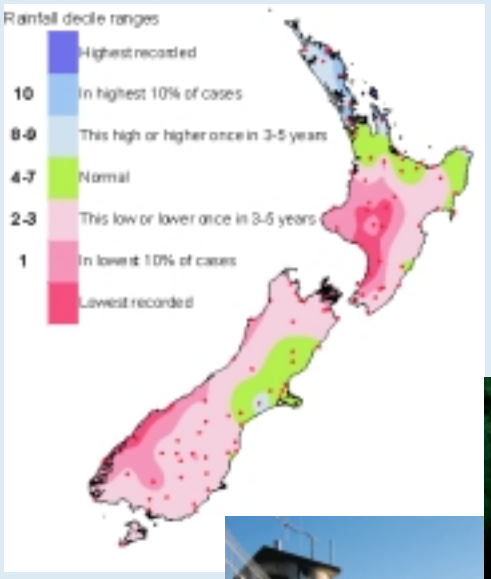
Images of the drought

Relatively, and in several cases extremely, dry conditions have persisted in some regions of New Zealand for much of this year. Parts of the southwest of the North Island and of the west coast of the South Island have recorded rainfalls for this year so far that are the lowest for at least 30 years (see map below).

Total rainfall for the past three months (February–April) at Milford Sound was the lowest since at least 1930, when rainfall recording began.

The drought affected areas include the main hydroelectric catchments – Lake Taupo in the North Island, and the Waitaki, Clutha, and Waiau catchments in the South Island.

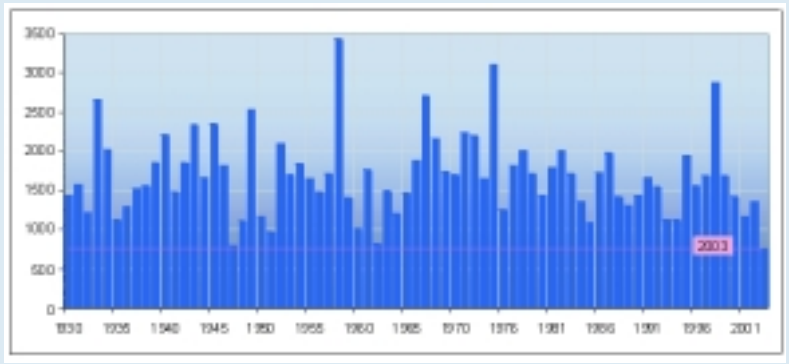
Lake Tekapo (below left), the Otaki River (below), and the Waikanae River on the Kapiti Coast (shown on the cover), were still at unusually low levels in early May.



ABOVE: Anomaly pattern for total rainfall from 1 January to 5 May, 2003, calculated from records dating from 1972. Areas with 30 year low rainfalls are indicated by the darkest pink shading.

ABOVE: Water level indicator and exposed bed of the Otaki River, early May 2003. *Photograph: Alan Blacklock*

LEFT: Lake Tekapo from the lake level gauging station on 2 May 2003. *Photograph: Ian Halstead*



LEFT: Milford Sound February to April rainfall for 1930 to 2003. The horizontal line hightlights the total for this year, 764 mm, which is the lowest total in the record.

The Climate Update is a monthly newsletter from NIWA's National Climate Centre for Monitoring and Prediction, and is published by NIWA, Private Bag 14901, Wellington. It is also available via the web. Comments and ideas are welcome. Please contact Alan Porteous, Editor.
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Visit our website: www.niwa.co.nz/ncc

Cover picture:
View upstream of the Waikanae River from the water level gauging station. The river is the main supply source for the Kapiti Coast, where water supplies were still very low in early May.
Photograph: Cathy Blacklock

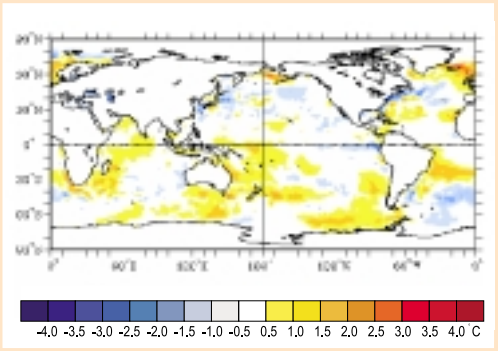
Global setting

ENSO signal approaching neutral

The current warm phase of the El Niño-Southern Oscillation has ended and is not expected to influence New Zealand's climate over the next few months.

Most forecast models of the development of the El Niño-Southern Oscillation are predicting neutral conditions through late autumn and winter.

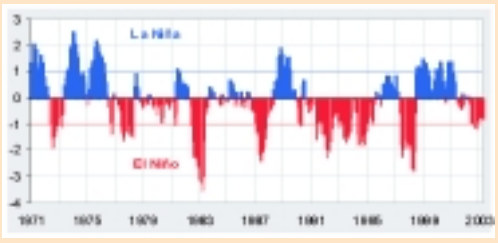
Sea surface temperatures around New Zealand were above average at the end of the month.



ABOVE: Mean sea surface temperature departures from normal from 30 March to 26 April 2003.

Update on the SOI

The mean Southern Oscillation Index (SOI) for April was -0.6, with the three month average now at -0.8. Further general information on El Niño is available on the World Meteorological Organization web site, www.wmo.ch



ABOVE: The Southern Oscillation Index (SOI), a measure of changes in the atmospheric pressures across the Pacific, smoothed over three months. La Niña or El Niño typically have an observable effect on the New Zealand climate when there is a large departure of the SOI from zero.

Online climate graphics

Climate maps and line plots of climate site observations are updated each week on the `Climate Now` website at:
www.niwa.co.nz/ncc/climatenow