Number 106, 15 April 2008

NIWA
Taihoro Nukurangi

The Climate Update

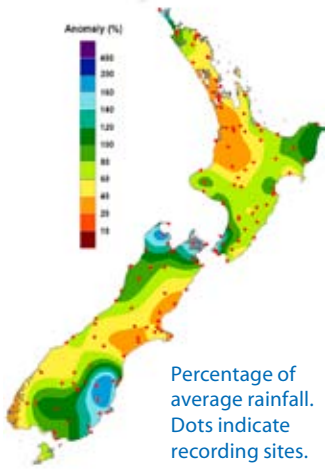
A monthly newsletter from the National Climate Centre

March climate – warm over much of the country and heatwave temperatures exceeding 30 °C in the south. Low rainfall over much of the North Island, and in Canterbury and Fiordland. Low river flows over most of the North Island.

Outlook for April to June – La Niña weakening. Warm conditions over most of the country. Rainfall is expected to be near normal in most places, but normal or below in the west of the North Island. Below normal soil moisture levels and stream flows are expected over most of the North Island and northern South Island. Normal soil moisture levels and stream flows are expected in the west, south, and east of the South Island.

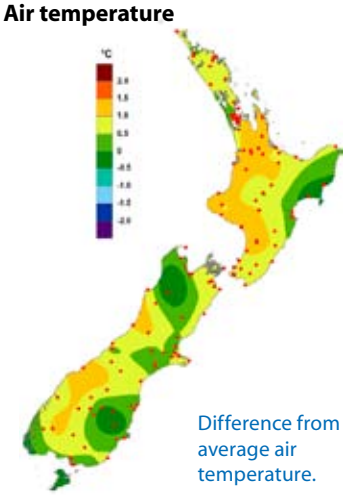
New Zealand climate in March

Rainfall



Percentage of average rainfall. Dots indicate recording sites.

Air temperature



Difference from average air temperature.

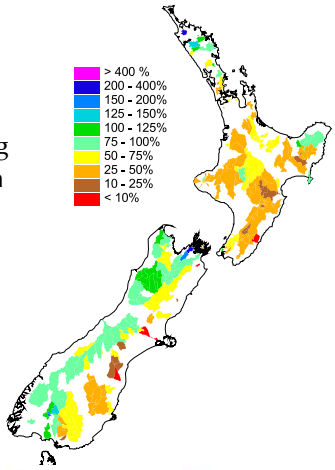
March temperatures were well above average in most places. The national average temperature of 16.5 °C was 0.8 °C above normal. Heatwave conditions occurred mid month across inland and eastern areas of the South Island, with temperatures of 30 °C or more.

Canterbury, Fiordland, Auckland, Waikato, the King Country, and parts of eastern Wairarapa recorded 30–50% of normal rainfall. Conditions were wetter in Wellington, the north of the South Island and eastern Otago.

For more information see www.niwascience.co.nz/ncc/cs/mclimsum_08_03

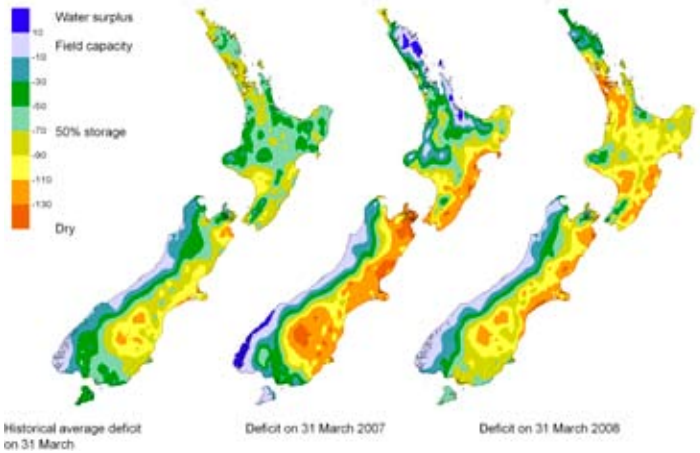
River flows

Stream flows were above normal in Northland, below normal in the rest of the North Island and the eastern South Island including Marlborough, and near normal in the west and south of the South Island.



Percentage of average March river and stream flows in monitored catchments. NIWA field teams, regional and district councils, and hydropower companies are thanked for providing data.

Soil moisture deficit



Water balance in the pasture root zone for an average soil type, where the available water capacity is taken to be 150 mm.

At the end of March soils were unusually dry in the Waikato and central North Island, South Taranaki to Manawatu, and much of the east coast of the country. Late rain improved moisture levels in Taranaki and Manawatu.

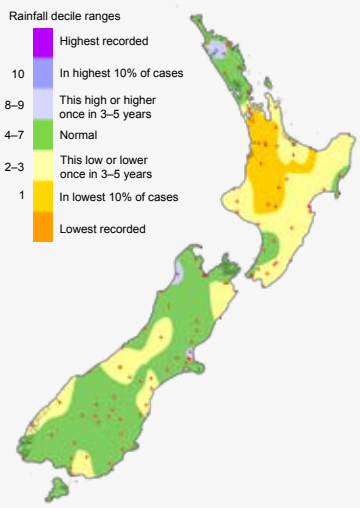
January to March — the climate we predicted and what actually happened

Rainfall

Predicted: Above normal in northern North Island, below normal in the west, south, and east of the South Island, and near normal elsewhere.

Outcome: Above normal in the far north, below normal over most of the rest of North Island and some South Island districts; near normal elsewhere.

January to March rainfall

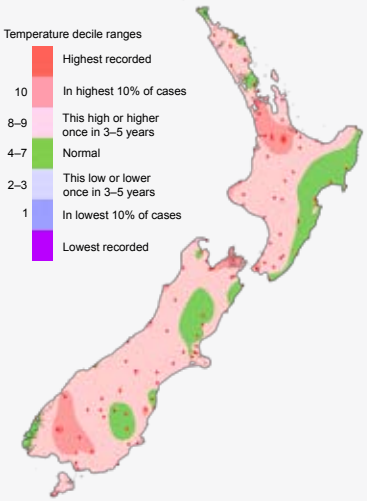


Air temperature

Predicted: Above average in all districts.

Outcome: Above average over most of New Zealand; near average in parts of the North Island east coast.

January to March temperature

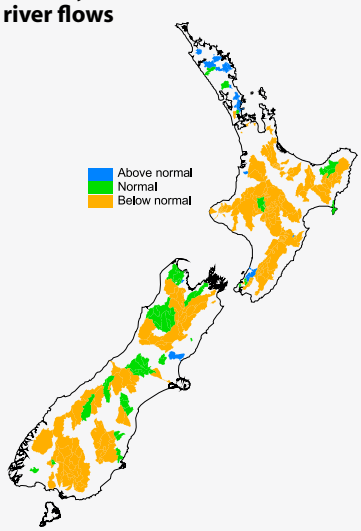


River flows

Predicted: Above normal in the north of the North Island, and below normal in the southwest of the North Island and the west, south, and east of the South Island.

Outcome: Above normal in Northland, and below normal elsewhere. Extremely low flows occurred in much of the North Island.

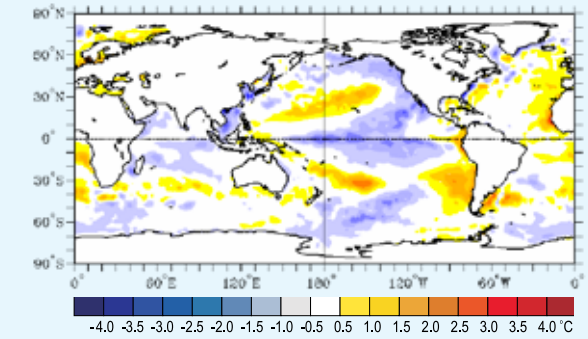
January to March river flows



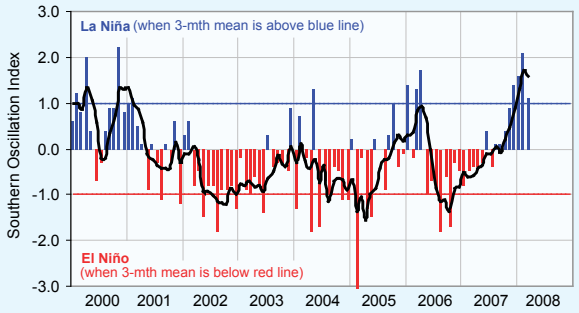
Global setting and climate outlook

La Niña weakening

La Niña conditions have reached maturity, and are now showing signs of weakening. Below normal sea surface temperatures (SSTs) extend across most of the equatorial Pacific, with anomalies of –1.0°C or lower over the central equatorial region. The oceanic component of La Niña has weakened over the last few weeks as indicated by the weakening of the cold SST anomalies and the strengthening of a significant warm anomaly along the South American coast. The SOI weakened a little during March and was near +1.5 (down from +2.1 in February).



Difference from average global sea surface temperatures for March 2008. Map courtesy of NOAA Climate Diagnostics Centre

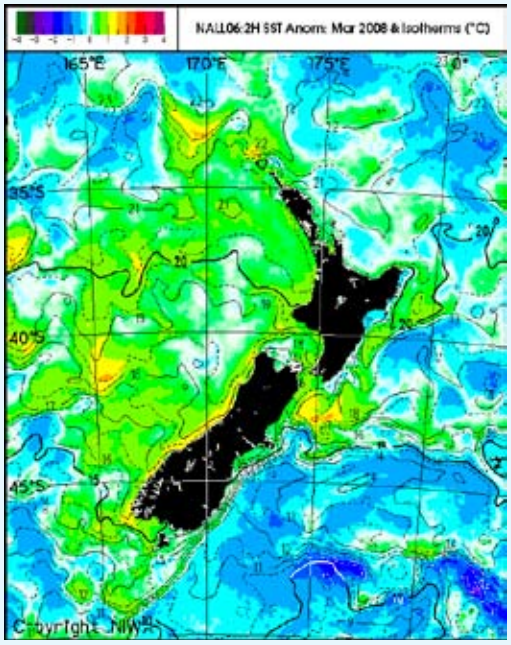


Monthly values of the Southern Oscillation Index (SOI), a measure of the changes in atmospheric pressures across the Pacific, and the three-month mean (black line).

SOI mean values:
March: +1.1
January to March: +1.6

Sea surface temperatures around New Zealand

Sea surface temperature (SST) anomalies are positive, but weaker than last month, with the largest anomalies remaining to the west of the country. The March SST anomaly in the New Zealand 'box' was about +0.1 °C (down from +0.4 °C in February). Although the heat content in the Tasman Sea/New Zealand region is about normal for the time of year, there is a warm pool in the ocean layer down to about 1000 m in the mid Tasman.



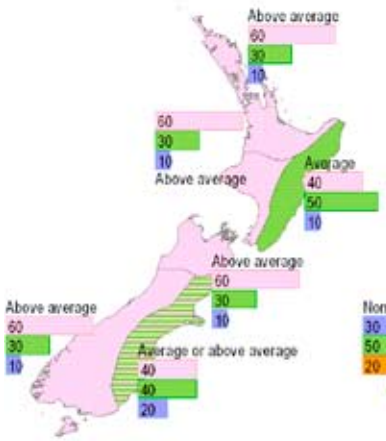
Differences from normal March surface temperatures in the seas around New Zealand.

Outlook for April to June 2008

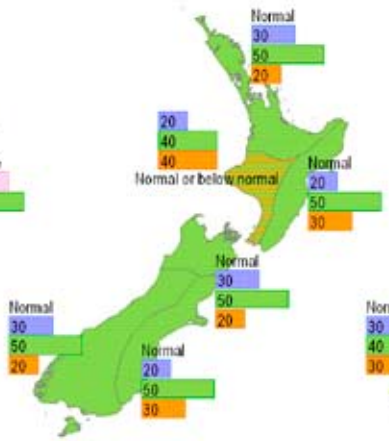
Average sea level pressures are expected to be higher than normal east of the South Island and lower than normal to the north of New Zealand, with weaker than normal westerlies over the country.

Air temperatures are very likely to be above average in many regions. Rainfall is expected to be near normal in most places, but normal or below in the west of the North Island. Below normal soil moisture levels and stream flows are expected to continue over most of the North Island and northern South Island. Normal soil moisture levels and stream flows are expected in the west, south, and east of the South Island. Two ex-tropical cyclones passed close to New Zealand during the current tropical cyclone season. For the remainder of the season (through to May 2008), there is still a small chance of one more ex-tropical cyclone passing close to the country.

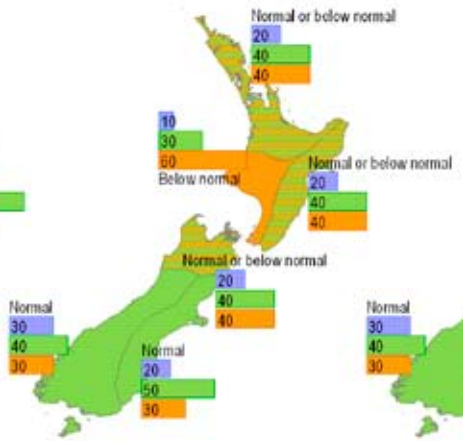
Mean air temperature



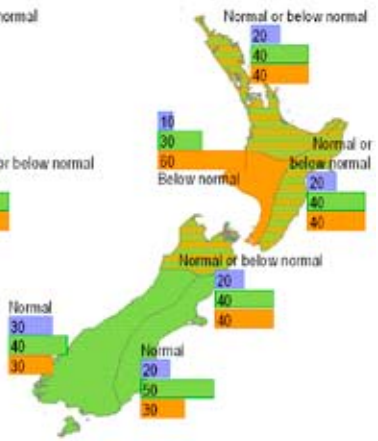
Rainfall



Available soil moisture



River flows



How to interpret these maps

In the example here the climate models suggest that below normal conditions are likely (50% chance), but, given the variable nature of the climate, the chance of normal or above normal conditions is also shown (30% and 20% respectively).

Below normal
20 — 20% chance of above normal
30 — 30% chance of normal
50 — 50% chance of below normal

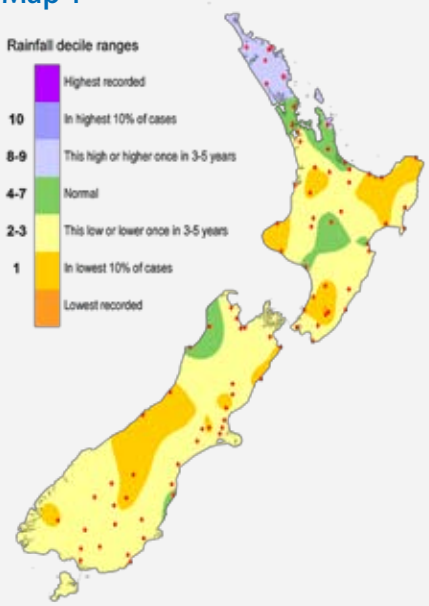
2007–08 summer follows a dry year

The year 2007 was very dry across much of New Zealand. Map 1 shows lowest decile (once in 10 year) rainfalls in 2007 for large areas of the country. The lowest rainfalls for the period 1972–2007 (36 years) were recorded at a number of locations including Masterton, East Taratahi, New Plymouth Airport, Stratford, Palmerston North Airport, Cape Campbell, Omarama, Hokitika, and Okarito.

Dry conditions have continued into the first three months of 2008, particularly in Waikato, while March was unusually dry in Canterbury (see the rainfall map on Page 2). Map 2, which ranks November 2007–February 2008 rainfalls against data since 1972, indicates that large parts of Waikato recorded the lowest rainfall in this 36 year period. Ruakura climate station has recorded below normal rainfall for each of the past seven months.

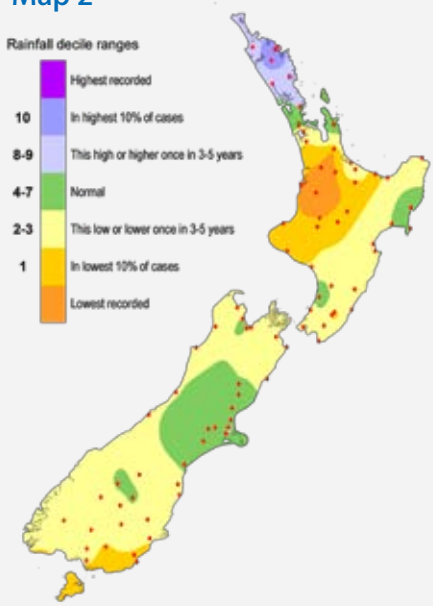
For more information on the climate of 2007, see http://www.niwascience.co.nz/ncc/cs/annual/aclimsum_07

Map 1



Patterns of total rainfall for the calendar year 2007 ranked against annual rainfalls for all years from 1972. Although not clearly shown on the map, 2007 was a record dry year for this period in a number of locations.

Map 2



Patterns of total rainfall for November 2007 to February 2008, ranked against data for this period for every year from 1972–73. The data are shown in decile ranges as described. Dry conditions for this period were most severe in the Waikato, with the lowest 4-month rainfall total recorded at a number of locations

Note: The data shown above contain estimates of missing values, and some districts are not represented well by the available data. The maps should be used as indicative only.

Damaged Wairarapa pastures. Successive droughts have taken their toll.
Cover photo: *Alan Blacklock*

The Climate Update is a monthly newsletter from NIWA's National Climate Centre, and is published by NIWA,
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It is also available on the web.
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