Number 96, 15 June 2007

NIWA
Taihoro Nukurangi

The Climate Update

A monthly newsletter from the National Climate Centre

May – unusually warm, with low rainfall in the north and east; flooding in Nelson and Taranaki. Low stream flows except in the north and west of the South Island.

Outlook for June to August – air temperatures average or above; mostly normal rainfall, although normal to above normal in the east and north of the North Island, and normal or below normal in the east of the South Island.

New Zealand climate in May

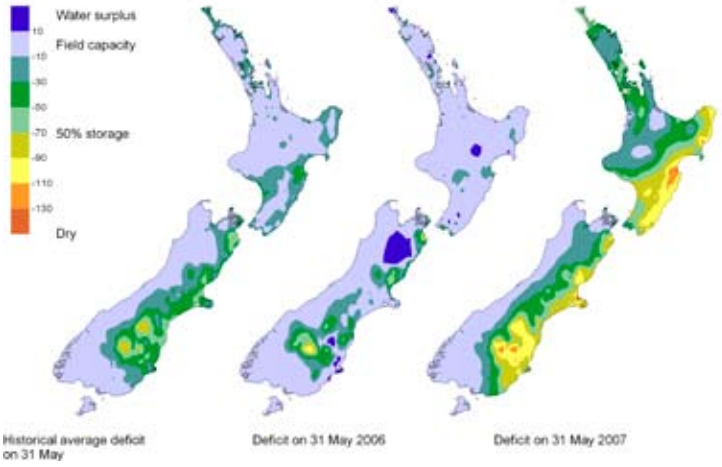
More frequent northwesterlies than usual were recorded over much of New Zealand in May. It was the warmest May in over 140 years of measurement, with a national average temperature of 1.7 °C above normal. Rainfall was well below normal in the north and east of the country, and above normal in Nelson and south Westland. The month was sunnier than usual in many North Island and eastern South Island locations.

For more information on the climate in May 2007, visit the climate summaries page at www.niwascience.co.nz/ncc/cs/mclimsum_07 05

Deficits remain

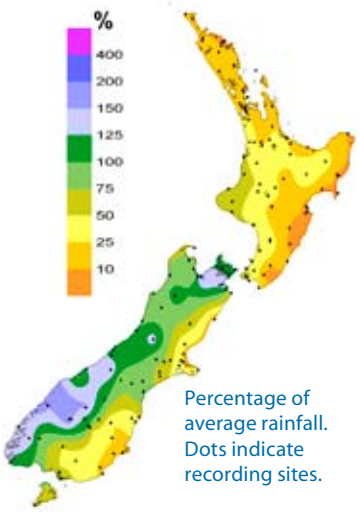
Soil moisture deficits of more than 70 mm remained along the east coast of the country at the end of May. Deficits of more than 110 mm remained in Hawke's Bay and inland Otago. This is in marked contrast to normal conditions at the end of autumn, and to the relatively wet conditions of a year ago.

Soil moisture deficit



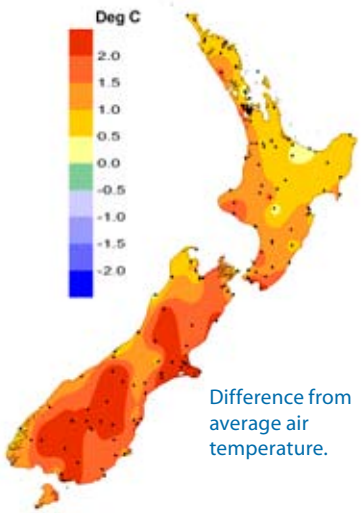
Water balance in the pasture root zone for an average soil type, where the available water capacity is taken to be 150 mm.

Rainfall



Percentage of average rainfall. Dots indicate recording sites.

Air temperature

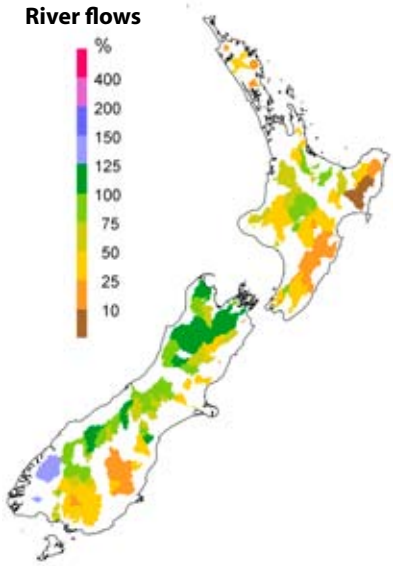


Difference from average air temperature.

Generally below normal stream flows

May stream flows were normal to above normal in Nelson, Marlborough, and the west of the South Island, and below normal elsewhere.

River flows



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

March to May – the climate we predicted and what happened

Rainfall

Rainfall was mostly lower than predicted, apart from areas of Northland, Waikato, and the north and southwest of the South Island, which recorded normal rainfall.

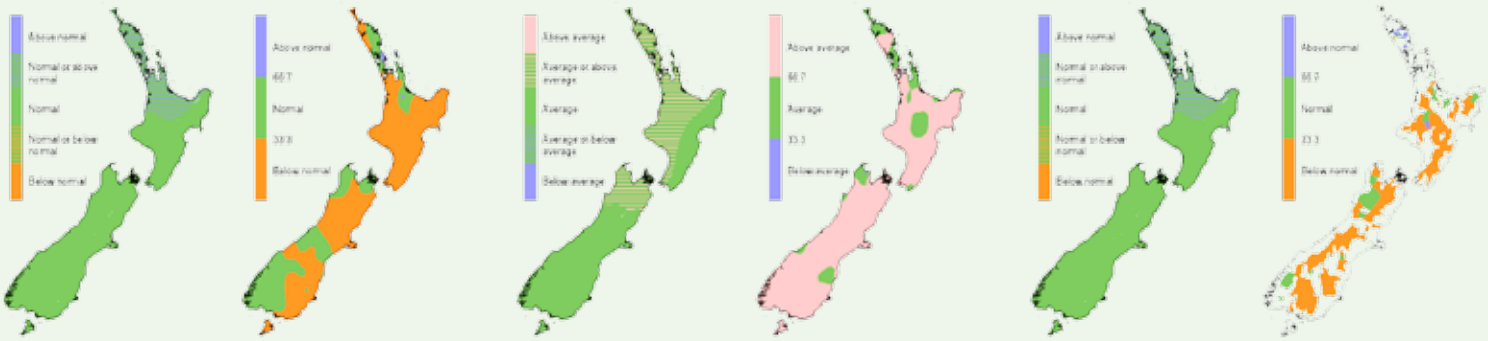
Air temperature

Air temperatures were correctly predicted in the north and west of the North Island, and the north of the South Island. In most other places, autumn was warmer than expected.

River flows

Stream flows were above normal in the far north, as was predicted, but mostly below normal elsewhere.

Outlook **Outcome** **Outlook** **Outcome** **Outlook** **Outcome**



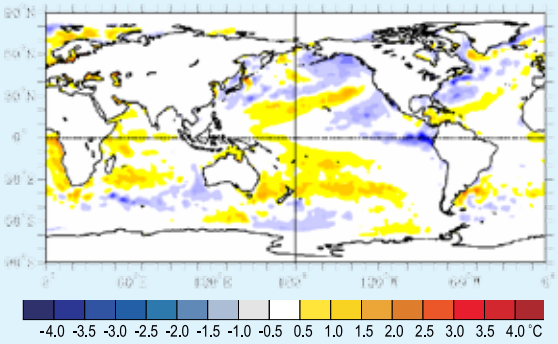
The three outcome maps give the tercile rankings of the rainfall totals, mean air temperatures, and mean river flows that eventuated from March to May, in comparison with the forecast conditions.

As an approximate guide, middle tercile rainfalls typically range from 80% to 115% of the historical normal, and middle tercile temperatures range about the average by plus or minus 0.5 °C.

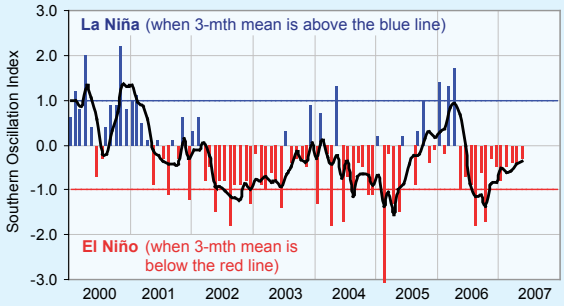
Global setting and climate outlook

La Niña likely to develop

Conditions are currently neutral in the tropical Pacific, but there is a relatively high (55%) probability of a transition to La Niña conditions over the winter period. The pattern of sea surface temperature anomalies, shown in the global map below, is beginning to resemble La Niña conditions, with colder than average waters in the far eastern Pacific off the north westcoast of South America, and slightly warmer than average waters in the western Pacific.



Difference from average global sea surface temperatures for May 2007. Map courtesy of NOAA Climate Diagnostics Centre.

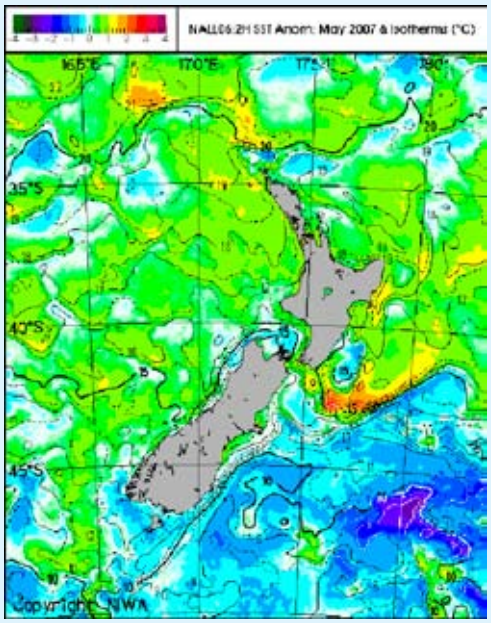


Monthly values of the Southern Oscillation Index (SOI), a measure of the changes in atmospheric pressures across the Pacific, and the three-month mean (black line).

SOI mean values:
May: -0.3
March to May: -0.4

Sea surface temperatures (SST) around New Zealand

SST anomalies in the New Zealand region continued to increase, rising in May to 0.7 °C above normal, up from 0.4 °C above normal in April. SST anomalies have increased since April throughout most of the Tasman, except for south of the Chatham Rise to the east of the South Island, which remains cooler than normal. SST in the New Zealand region are expected to remain above normal over winter.



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

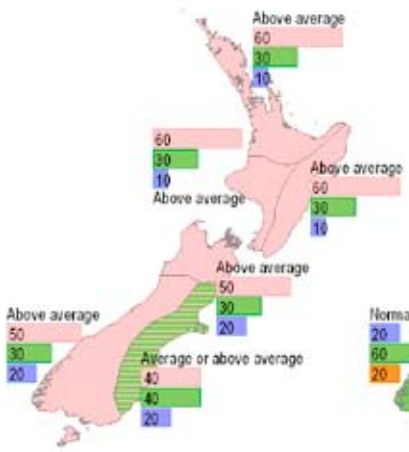
Outlook for June to August 2007

Mean sea level atmospheric pressures are expected to be higher than average to the south of the South Island for the coming season, but lower than average over and west of the North Island.

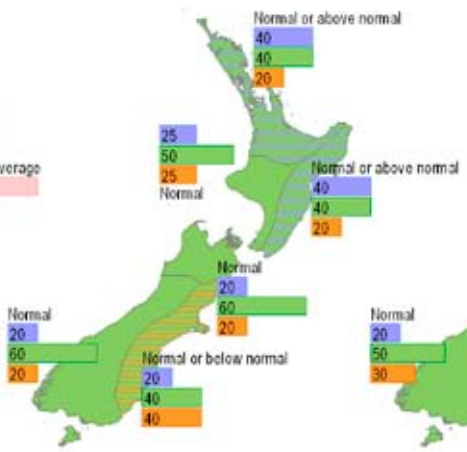
Air temperatures are likely to be above average in all regions, except for average or above average in the east of the South Island. Nevertheless, cold outbreaks typical of winter will occur from time to time.

Normal or above normal rainfall is likely in the north and east of the North Island, with normal or below normal rainfall in the east of the South Island, and normal rainfall elsewhere. Below normal soil moisture levels and streamflows are likely in the east of the South Island, and normal or below normal soil moisture levels are likely in the west of the North Island. Elsewhere, normal soil moisture and stream flows are likely.

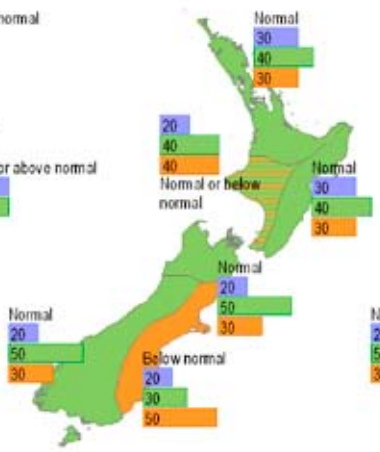
Mean air temperature



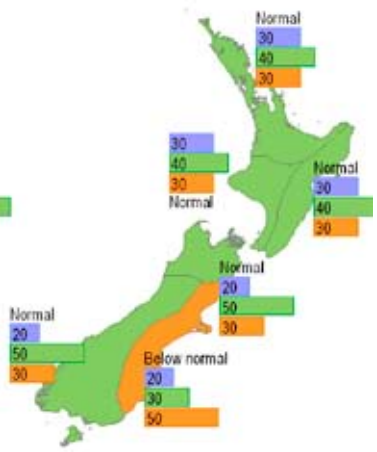
Rainfall



Available soil moisture

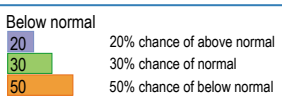


River flows



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).



Exceptional conditions in May

Temperature and rainfall

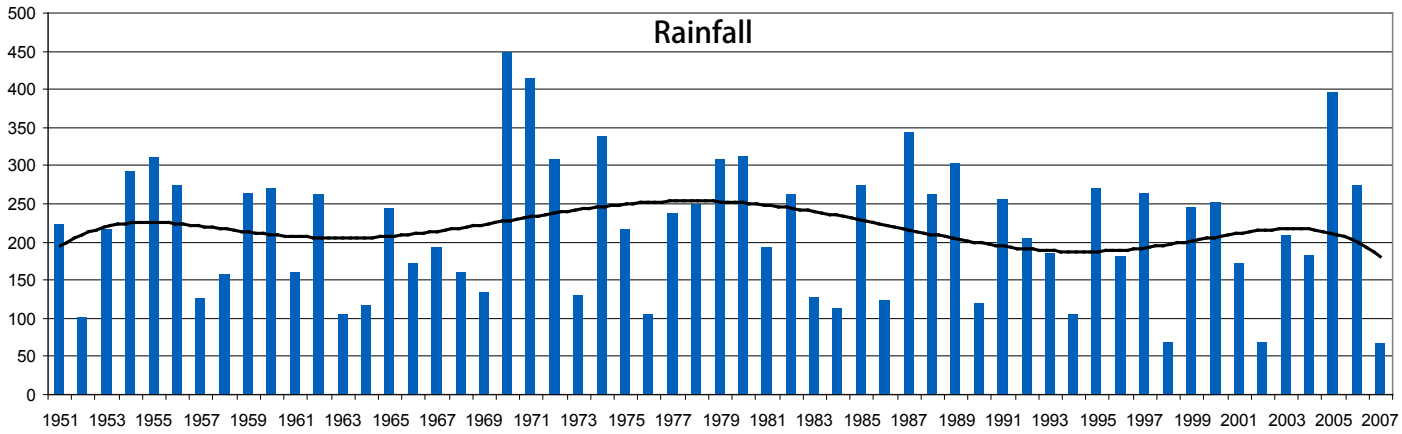
New Zealand was warmer in May than for the same month at any time in the 140-year instrumental record. Parts of the east coast of both islands recorded record low rainfalls for the month.

Hawke's Bay and parts of Wairarapa were most severely affected by the dry conditions. The figure below, 'Rainfall', shows total autumn rainfall at Napier Airport for the years 1951 to 2007. Total rainfall for March to May 2007 was 67.8 mm, similar to 2002 (69 mm) and 1998 (68.4 mm). Normal rainfall in autumn for the period is 217 mm.

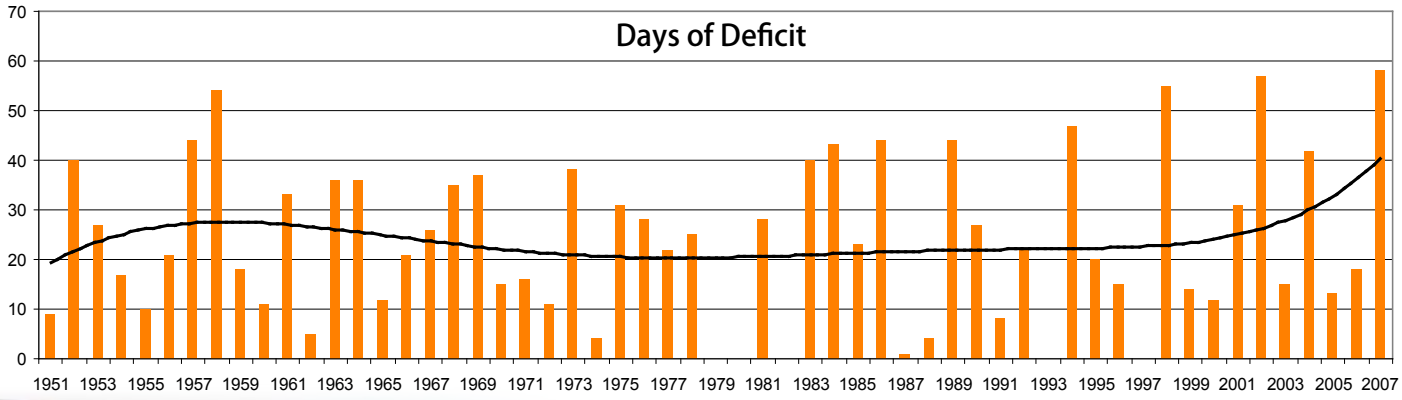
The low rainfall this autumn was in marked contrast to that of last two years, with 397 mm in 2005, and 275 mm in 2006.

Soil moisture

Typically, soil moisture levels in Hawke's Bay improve rapidly in April, as rainfall exceeds evaporation. This year, April rainfall made little impression on soil moisture levels in some areas, and severe moisture deficits in Hawke's Bay continued into May. Historically there are, on average, 3 days of deficit in May, but this year there were 21 days. The 'Days of Deficit' figure below shows total days of deficit for the three months of autumn, with 58 days in 2007, compared with an average since 1951 of 24. The data suggest that an autumn deficit of at least 50 mm can be expected about once every 14 years, but as can be seen the last three deficits of that magnitude have occurred since 1997.



Autumn rainfall (above) and days of soil moisture deficit (below) at Napier Airport.
The black smoothed curves are added to aid interpretation of trends in the data.



Grazing the water hole. Many east coast small dams were unusually dry in the May drought. Photograph: Richard Hilson.

Looking west from Ugly Hill Road, Hawke's Bay. North Island east coast farmers in some locations experienced the driest May since records began in the 19th Century.

Cover photo: *Richard Hilson*

The Climate Update is a monthly newsletter from NIWA's National Climate Centre, and is published by NIWA, Private Bag 14901, Wellington. It is also available on the web. Comments and ideas are welcome. Please contact Alan Porteous, Editor
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