

National Climate Summary – March 2007: Severe flooding in Northland at the end of the month, but warm, dry, and sunny in many other regions

- **Rainfall: Extremely wet in Northland at the end of the month, with devastating floods; below normal in the east**
- **Temperature: Above average in most regions, especially Canterbury and Otago**
- **Soil moisture: Severe deficits in eastern regions from Gisborne to Marlborough, as well as Central Otago**
- **Sunshine: Above average in the east**

Historical daily rainfall records were swept aside in eastern parts of Northland as exceptionally high rainfall rates produced widespread flooding and extensive infrastructure damage. There were a number of other climate extremes with electrical storms and hail, high winds, and a tornado. The Northland event stands in marked contrast to the rest of the month: March was a summer-like month, with a mix of anticyclones and winds from the northerly sector producing warmth and plentiful sunshine, and mainly dry conditions in the east.

Rainfall ranging from 250 to over 400 mm occurred in eastern Northland over the 28-29th March. This was due to a stationary high pressure centre east of New Zealand preventing the progress of a band of heavy rain in a trough projecting humid northeasterlies across eastern Northland. This produced the most disastrous floods in the Northland region for many decades in the Far North and Whangarei districts, especially in the Bay of Islands area. Some buildings were washed away and homes flooded and many motorists were stranded on flooded roads. Initial estimates put the cost of damage from the floods up to \$80 million. Of this, about \$20 million is for damage to roads, clearing slips, and fixing bridges. The other \$60 million includes damage to property and infrastructure, including stormwater and sewerage systems. Stock and losses of agricultural production have also occurred in low-lying areas.

The Northland floods marred what was a remarkably warm, dry, and sunny month overall. The national average temperature was 16.6 °C (0.9°C above normal), with temperatures at least 1°C above average in Auckland, Wellington, and parts of the east of both islands. In many regions, daytime maximum temperatures were noticeably above normal (more than 2.5°C above normal in parts of Wairarapa, Marlborough, and Canterbury). The month's rainfall was 200 to 300 percent (twice to three times) of normal in Northland (due to the end of month floods), and also above normal in parts of Auckland, Thames-Coromandel, the central North Island plateau, parts of Buller and North Westland, and Southland. However, rainfall was low, being 25 percent (a quarter) or less of normal in parts of Gisborne, Hawke's Bay, and Marlborough, and below normal rainfall in other eastern regions. The relatively dry weather meant that severe soil moisture deficits (of at least 130 mm) occurred in many eastern regions from Gisborne to Marlborough, as well as Central Otago, while significant soil moisture deficits (at least 110 mm) affected other eastern regions, as well as parts of the Kapiti Coast and Wellington. Temperatures were above average throughout much of New Zealand, especially in the east, being least 1.5 °C above average in parts of Canterbury and Otago. March was also a sunny month, especially in the east, with Gisborne and Blenheim both recording one of their sunniest March's on record. Anticyclones ('highs') were more frequent than normal east of the North Island, resulting in more frequent northwesterlies than usual over much of the country.

Other Highlights:

- Extremely high rainfall totalling over 400 mm occurred in eastern parts of Northland resulting in severe flooding on the 28-29th. These amounts fell in eastern Northland in the area from Kaeo, to the Bay of Islands and just south of Whangarei. The two-day rainfall totals were amongst the highest on record for the area.
- There were also several other high rainfall events, between the 6th and 17th on the West Coast of the South Island. Flooding occurred in Westport on the 17th, along with slips and road closures.
- The highest temperature during March 2007 was 32 °C recorded at Darfield on the 5th, and Culverden on the 24th. The lowest air temperature during the month was -1.0 °C recorded at Mount Cook Village on the 15th.
- Unseasonable snowfall occurred at Lake Rotoiti on the 14th.
- Damaging winds, with gusts, exceeding 130 km/h, were measured in Auckland during westerly gales between the 13th and 15th of March. Winds blew over grape vines in part of Marlborough on the 14th.
- Damaging winds attributed to a tornado occurred in Stratford on the 21st.
- Lightning strikes resulted in power outages to many homes in the Wellington region over the night of 13/14 March. A thunderstorm, with heavy rainfall, hail, and high winds affected the Christchurch district on the 18th.
- Auckland was the warmest, Dunedin the driest, and Wellington the sunniest, of the five main centres. Rainfall was above normal in Auckland and Hamilton, and below normal in the other main centres. Temperatures were above normal in all five main centres. Sunshine hours were near normal in Auckland and Hamilton, and above normal in Wellington, Christchurch, and Dunedin.

Rainfall: Rainfall was 200 to 300 percent (twice to three times) of normal in Northland (due to the end of month floods), and also above normal in Auckland, Thames-Coromandel, the central North Island plateau, parts of Buller and North Westland, and Southland. In contrast rainfall was 25 percent (a quarter) or less of normal in parts of Gisborne, Hawke's Bay, and Marlborough, and 50 percent (half) or less of normal in parts of Wellington, and Central Otago. Rainfall was also below normal in Wairarapa, Nelson, and North Canterbury.

Temperature: Mean temperatures were above average throughout much of New Zealand. However, they were at least 1.0 °C above average in Auckland, Wanganui, Manawatu, and many eastern regions, and at least 1.5 °C above average in parts of inland Canterbury and Otago. Temperatures were near average in the Far North and on the West Coast.

Sunshine: March sunshine hours and/or solar radiation were more than 110 percent of normal in the east from Gisborne to Otago, and near or above normal in most other parts of New Zealand.

For further information, please contact:

**Dr Jim Salinger – Principal Scientist – Climate, NIWA National Climate Centre, Auckland,
Tel. (09) 375 2053 (work) or (027) 521 9468 (mobile) or (09) 576 9468 (Home).**

Stuart Burgess – Climatologist – NIWA National Climate Centre, Wellington, Tel. (04) 386 0569.

RAINFALL: EXTREMELY HIGH IN NORTHLAND, BELOW NORMAL IN MANY EASTERN REGIONS

Rainfall totals were 200 to 300 percent (twice to three times) of normal in Northland (due to the severe end of month floods), and at least 125 percent of normal in Auckland, Thames-Coromandel, the central North Island plateau, parts of Buller and North Westland, and Southland. In contrast rainfall was 25 percent (a quarter) or less of normal in parts of Gisborne, Hawke’s Bay, and Marlborough, and 50 percent (half) or less of normal in parts of Wellington, and Central Otago. Rainfall was 75 percent (three quarters) or less of normal in Wairarapa, Nelson, and North Canterbury. Rainfall was near normal elsewhere.

Near or record high March rainfall was recorded at:

Location	March Rainfall (mm)	Percentage of normal	Year Records began	Comments
Kerikeri EWS	366	297	1982	Highest
Kerikeri Airport	430	316	1978	Highest
Kaikohe	229	214	1973	Well above normal
Whangarei Airport	310	244	1937	3 rd highest
Warkworth	241	219	1973	3 rd highest
Henderson, Auckland	189	190	1986	3 rd highest
Whitianga Airport	293	180	1988	3 rd highest

*1-day missing

Near or record low March rainfall was recorded at:

Location	March Rainfall (mm)	Percentage of normal	Year Records began	Comments
Motu	17	11	1991	Lowest
Hicks Bay	56	37	1991	Equal 2 nd lowest
Wairoa, North Clyde	19	14	1992	2 nd lowest
Mahia	9	5	1992	Lowest
Awatere Valley	9	12	2001	Lowest
Kaikoura	10	11	1950	Lowest

TEMPERATURE: ABOVE AVERAGE IN MOST REGIONS, ESPECIALLY CANTERBURY AND OTAGO

Mean temperatures were 0.5 °C or more above average throughout much of New Zealand. However, they were at least 1.0 °C above average in Auckland, Taranaki, Wanganui, Manawatu, and many eastern regions, at least 1.5 °C above average in inland parts of Canterbury and Otago. Temperatures were near average in the Far North and on the West Coast. The national average temperature was 16.6 °C (0.9°C above normal).

Near or record high March mean air temperatures were recorded at:

Location	Mean air temperature (°C)	Departure from Normal	Year Records began	Comments
Henderson, Auckland	19.7	+1.3	1986	3 rd highest
Ngawi	18.7	+2.0	1973	Highest
Wellington Airport	18.3	+1.7	1962	Well above average
Blenheim Research	17.8	+1.6	1986	3 rd highest
Winchmore	16.3	+2.0	1950	2 nd highest
Darfield	17.1	+1.9	1939	2 nd highest
Wanaka Airport	15.9	+1.4	1993	Equal 2 nd highest
Dunedin Airport	14.7	+1.6	1963	3 rd highest
Queenstown	16.0	+1.6	1872	3 rd highest
Clyde	15.8	+1.6	1983	3 rd highest
Ettrick	15.2	+1.7	1985	Well above average
Invercargill Airport	14.1	+1.6	1949	2 nd highest

SUNSHINE: ABOVE AVERAGE IN THE EAST

March sunshine hours and/or solar radiation were more than 110 percent of normal in many eastern locations from Gisborne to Otago, as well as Manawatu, Wellington, North Westland and Nelson, and near or above normal in most other parts of New Zealand.

Near record high March sunshine hours were recorded at:

Location	March Sunshine (hrs)	Percentage of normal	Year Records began	Comments
Gisborne Airport	244	125	1905	4 th highest
Blenheim Research	258	125	1986	2 nd highest

MARCH'S CLIMATE IN THE FIVE MAIN CENTRES

Auckland was the warmest, Dunedin the driest, and Wellington the sunniest, of the five main centres. Rainfall was above normal in Auckland and Hamilton, and below normal in the other main centres. Temperatures were above normal in all five main centres. Sunshine hours were near normal in Auckland and Hamilton, and above normal in Wellington, Christchurch, and Dunedin.

March 2007 main centre climate statistics:

Location	Mar. Mean Temp. (°C)	Dep. from normal (°C)		Mar. rainfall (mm)	% of Normal		Mar. Sunshine (hours)	% of Normal	
Auckland	19.5	+0.9	Above normal	178 ^a	188	Above normal	183	100	Normal
Hamilton	18.2	+1.0	Above normal	99	114	Above normal	180	97	Near normal
Wellington	16.6	+0.8	Above normal	37	40	Below normal	233	122	Well above normal
Christchurch	16.3	+0.8	Above Normal	36	67	Below normal	213 ^b	117	Above normal
Dunedin	15.1 ^c	+1.3	Above normal	28	41	Below normal	183	130	Well above normal

^a Owairaka ^b Christchurch Airport ^c Dunedin Airport

HIGHLIGHTS AND EXTREME EVENTS

- **Temperature**

The highest temperature during March 2007 was 32 °C recorded at Darfield on the 5th, and Culverden on the 24th. The lowest air temperature during the month was -1.0 °C recorded at Mount Cook Village on the 15th. Alexandra recorded 6 days during March (the 1st, 3rd, 4th, 5th, 11th, and 24th) with maximum temperatures of 30 °C or more (about 5 days more than average).

- **High rainfall**

There were several high rainfall events, with at least 75 mm in 24 hours. These were:

Date	Region	Location	Rainfall (mm)*	Other comments
6 Mar.	Fiordland	Milford Sound	225	
7 Mar.	Westland	Franz Josef	82	
12 Mar.	Westland	Franz Josef	141	
16 Mar.	Westland	Lake Moeraki	100	
	Fiordland	Milford Sound	166	
17 Mar.	Buller	Westport	81	26 mm in 1-hour
28-29Mar.	Northland	Kerikeri EWS	328	Highest, records began in 1981
	“ “	Purerua	218	Highest, records began in 1983
	“ “	Kaikohe	180	2 nd highest, records began in 1956
	“ “	Whangarei	283	Highest, records began in 1943
	Auckland	Warkworth	199	2 nd highest, records began in 1972
	Coromandel	Whitianga Airport	184	-

(9am-9am) rainfall

Rainfall ranging from 250 to over 400 mm occurred in eastern Northland, due to a stationary high pressure centre east of New Zealand preventing the progress of a band of heavy rain in a trough projecting humid northeasterlies across eastern Northland. Highest 2-day totals occurred at Puhipuhi Hills (434 mm), east Whangarei (436 mm) western hills of Kerikeri (404 mm) and Kaeo (321 mm). These were the most disastrous floods in the Northland region for many decades in the Far North and Whangarei districts, especially in the Bay of Islands area. There were evacuations, some buildings were washed away and homes flooded, and many motorists were stranded on flooded roads. Initial estimates put the cost of damage from the floods up to \$80 million. Of this, about \$20 million is for damage to roads, clearing slips, and fixing bridges. The other \$60 million includes damage to property and infrastructure, including stormwater and sewerage systems. Stock and losses of agricultural production have also occurred in low-lying areas.

Paraparaumu was also hit by heavy rainfall on the 14th of March, with flooding affecting several streets and about half a dozen businesses at Raumati Beach.

Landslips, surface flooding, and road closures occurred in Westport on the 17th.

- **Electrical storms and hail**

Lightning strikes resulted in power outages to about 40,000 homes in the Wellington region (between Kapiti and Johnsonville as well as parts of the Hutt Valley) for several hours over the night of 13/14 March.

Thunderstorms occurred in Christchurch at about noon on the 18th, accompanied by lightning (resulting in power cuts in surrounding areas), heavy rainfall (and surface flooding), hail (some 10 mm in diameter), and high winds (which capsized a yacht in Lyttelton harbour, its occupants having to swim to shore).

- **Snowfall**

Unseasonable snowfall occurred at Lake Rotoiti on the 14th.

- **High winds**

Westerly gales with very high gusts, exceeding 130 km/h, were measured in Auckland between the 13th and 15th of March, the highest being 150 km/h at North Shore on the 14th. The high winds resulted in many fallen trees and branches, along with property damage, and power outages. Gusty westerlies blew over grape vines in part of Marlborough on the 14th.

- **Tornado**

Destructive localised winds were attributed to a tornado, which damaged a hall (lifting part of its roof) near Pembroke School in Stratford about 12.45 p.m. on the 21st of March. There was an incredible noise, and debris was seen flying up into the air.

For further information, please contact:

Dr Jim Salinger – Principal Scientist – Climate, NIWA National Climate Centre, Auckland,

Tel. (09) 375 2053 (work) or (027) 521 9468 (mobile) or (09) 576 9468 (Home);

Stuart Burgess – Climatologist – NIWA National Climate Centre, Wellington, Tel. (04) 386 0569;

Geoff Baird, NIWA Communications Manager Tel. (04) 386-0543 or (027) 229-6314.

www.niwascience.co.nz/ncc

Copyright NIWA 2007. All rights reserved.