

## Widespread dryness and soil moisture deficit

<b>Rainfall</b>	Record low rainfall for parts of Northland, Auckland, and the Bay of Plenty. Widespread dryness – with under a quarter of normal February rainfall observed around Taupo, in parts of Gisborne, Hawkes Bay, and on the West Coast South Island; and under a half of February normal rainfall experienced in most other regions.
<b>Soil moisture</b>	Extreme deficit (more than 130 mm of deficit) evident in Northland, Auckland, Waikato, the Bay of Plenty region (including Taupo), Gisborne, Hawkes Bay, Wairarapa, between Wanganui and Palmerston North, parts of Marlborough, Canterbury, and Central Otago. Significant deficit (more than 110 mm of deficit) generally observed elsewhere in the North Island, as well as in the Waimea Plains, and across eastern Otago. An adverse event due to drought was declared in Northland on 27 February.
<b>Sunshine</b>	An extremely sunny February, with many records broken.
<b>Temperature</b>	Afternoon temperatures were well above February average, and morning temperatures generally below average, in most regions.

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### Overview

February 2013 was characterised by anticyclones ('highs') which were slow moving over New Zealand. These highs, or anticyclones, kept rain-bearing weather systems such as lows and fronts away, resulting in an extremely dry and sunny February for many regions of the country.

February rainfall totalled less than 15 mm (and also less than 15 percent of February normal) in parts of Northland, Auckland, and the Bay of Plenty. It was the driest February on record for Leigh (north Auckland), and Milford Sound. In the case of Leigh, it was also the driest month (of any month) in records which began in 1966.

The dryness was widespread. Rainfall was less than 25 percent, or a quarter, of February normal around Taupo, in parts of Gisborne and Hawkes Bay, and along the West Coast of the South Island. Less than half (50 percent) of normal February rainfall was generally observed across the remainder of the country. The exceptions were between Wanganui and Wellington, in Central Otago and the

Lakes District (with near normal rainfall); and Marlborough and the Kaikoura coast (with rainfall between 50 and 80 percent of February normal).

As at 1 March 2013, extreme soil moisture deficit (more than 130 mm of deficit) was evident in Northland, Auckland, Waikato, the Bay of Plenty region (including Taupo), Gisborne, Hawkes Bay, Wairarapa, between Wanganui and Palmerston North, parts of Marlborough, Canterbury, and Central Otago. Significant soil moisture deficit (more than 110 mm of deficit) was generally observed elsewhere in the North Island, as well as in the Waimea Plains, and across eastern Otago. An adverse event due to drought was declared in Northland on 27 February.

The dominance of high pressures during February resulted in an extremely sunny month across New Zealand. Sunshine totals were well above normal (exceeding 125 percent of February normal) across most of the North Island (south of Auckland), on the West Coast South Island, along the Southern Alps, as well as north Canterbury and the Kaikoura coast. Elsewhere, sunshine totals were also above normal (between 110 and 124 percent of February normal). It was the sunniest February on record for numerous locations across both Islands. Notably, Wellington and Hamilton recorded their sunniest February on record, Tauranga experienced its second sunniest February, Christchurch observed its third sunniest February, and Dunedin recorded its 5th sunniest February.

Mean temperatures in February were above average (between 0.5°C and 1.2°C above the February average) across the west and south of the South Island, as well as in inland regions of the North Island. In contrast, below average February temperatures (between 0.5°C and 1.2°C below the February average) were observed around the Kaikoura Coast, as well as the east coast of the North Island. Elsewhere, mean temperatures were near average (within 0.5°C of the February average). The nation-wide average temperature in February 2013 was 17.1°C (0.2°C below the 1971-2000 February average), using NIWA's seven-station temperature series which begins in 1909.

Notably, however, in most regions, afternoon temperatures were typically well *above* February average, and morning temperatures *below* February average, due to the clear skies and relatively light winds associated with the prevailing high pressures.

**Further Highlights:**

- The highest temperature was 34.6 °C, recorded at Alexandra on 1 February.
- The lowest temperature was -1.1°C, observed at Mount Ruapehu on 6 February.
- The highest 1-day rainfall was 278 mm, recorded at North Egmont on 4 February.
- The highest wind gust was 145 km/hr, at Southwest Cape, Stewart Island, on 10 February.
- Of the six main centres in February 2013, Wellington was the sunniest but also the wettest; Auckland the warmest, Dunedin the coolest, and Christchurch the driest.
- Of the available, regularly reporting sunshine observation sites, the sunniest four centres so far in 2013 (January and February) are New Plymouth (634 hours), Whakatane (608 hours), Lake Tekapo (606 hours) and Tauranga (575 hours).

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**Rainfall: Extremely dry across the north and east of the North Island, as well as the West Coast South Island. Very dry for most other regions of New Zealand.**

February rainfall totalled less than 15 mm (and also less than 15 percent of February normal) in parts of Northland, Auckland, and the Bay of Plenty. It was the driest February on record for Leigh (north Auckland), and Milford Sound. In the case of Leigh, it was also the driest month (of any month) in records which began in 1966.

The dryness was widespread. Rainfall was less than 25 percent, or a quarter, of February normal around Taupo, in parts of Gisborne and Hawkes Bay, and along the West Coast of the South Island. Less than half (50 percent) of normal February rainfall was generally observed across the remainder of the country. The exceptions were between Wanganui and Wellington, in Central Otago and the Lakes District (with near normal rainfall); and Marlborough and the Kaikoura coast (with rainfall between 50 and 80 percent of February normal).

As at 1 March 2013, extreme soil moisture deficit (more than 130 mm of deficit) was evident in Northland, Auckland, Waikato, the Bay of Plenty region (including Taupo), Gisborne, Hawkes Bay, Wairarapa, between Wanganui and Palmerston North, parts of Marlborough, Canterbury, and Central Otago. Significant soil moisture deficit (more than 110 mm of deficit) was generally observed elsewhere in the North Island, as well as the Waimea Plains, and across eastern Otago. An adverse event due to drought was declared in Northland on 27 February.

**Record<sup>1</sup> or near-record February rainfall totals were recorded at:**

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments [*any-month rank]
<b>Low records or near-records</b>				
Kaitaia (Airport)	7	5	1948	2nd-lowest
Leigh	6	8	1966	Lowest [*Equal lowest]
Whangaparaoa	5	9	1946	4th-lowest
Whakatane	11	13	1952	2nd-lowest
Waione	19	32	1991	4th-lowest
Westport	41	32	1944	2nd-lowest
Hokitika	28	14	1866	3rd-lowest
Greymouth	39	24	1947	3rd-lowest
Haast	75	23	1941	3rd-lowest
Milford Sound	76	17	1929	Lowest
Secretary Island	169	54	1985	4th-lowest
Lumsden	33	39	1982	4th-lowest

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<sup>1</sup> The rankings (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>.etc) in all Tables in this summary are relative to climate data from a *group* of nearby stations, some of which may no longer be operating. The current climate value is compared against all values from any member of the group, without any regard for homogeneity between one station's record, and another. This approach is used due to the practical limitations of performing homogeneity checks in real-time.

## Sunshine: An extremely sunny February, with many records broken.

The dominance of high pressures during February resulted in an extremely sunny month across New Zealand. Sunshine totals were well above normal (exceeding 125 percent of February normal) across most of the North Island (south of Auckland), on the West Coast South Island, along the Southern Alps, as well as north Canterbury and the Kaikoura coast. Elsewhere, sunshine totals were also above normal (between 110 and 124 percent of February normal).

It was the sunniest February on record for numerous locations across both Islands (see Table below). Notably, five of the six main centres were exceptionally sunny. Wellington and Hamilton recorded their sunniest February on record, Tauranga experienced its second sunniest February, Christchurch observed its third sunniest February, and Dunedin recorded its 5th sunniest February (not shown until page 7).

Of the available, regularly reporting sunshine observation sites, the sunniest four centres so far in 2013 (January and February) are New Plymouth (634 hours), Whakatane (608 hours), Lake Tekapo (606 hours) and Tauranga (575 hours).

### Record or near-record February sunshine hours were recorded at:

Location	Sunshine hours	Percentage of normal	Year records began	Comments
<b>High records or near-records</b>				
Tauranga	275	126	1933	2nd-highest
Hamilton	253	127	1936	Highest
New Plymouth	330	147	1972	Highest
Te Kuiti	251	143	1962	Highest
Turangi	269	138	1976	Highest
Dannevirke	265	140	1963	Highest
Martinborough	267	141	1986	Highest
Waipawa	242	141	1945	3rd-highest
Paraparaumu	287	137	1953	Highest
Palmerston North	252	132	1930	4th-highest
Wellington	281	133	1928	Highest
Stratford	271	136	1963	Highest
Greymouth	245	137	1947	Highest
Blenheim	289	129	1947	Highest
Cheviot	265	137	1983	Highest
Mt Cook	229	137	1930	Highest
Christchurch	235	120	1930	3rd-highest
Lake Tekapo	281	128	1928	2nd-highest
Cromwell	268	118	1979	4th-highest
Balclutha	222	137	1964	3rd-highest

Temperature: Above average for the west and south of the South Island, as well as inland areas of the North Island. Below average for the Kaikoura Coast and eastern North Island. Near average elsewhere.

Mean temperatures in February were above average (between 0.5°C and 1.2°C above the February average) across the west and south of the South Island, as well as in inland regions of the North Island. In contrast, below average February temperatures (between 0.5°C and 1.2°C below the February average) were observed on the Kaikoura coast and for much of the east coast North Island. Elsewhere, mean temperatures were near average (within 0.5°C of the February average).

However, because of the dominance of high pressures, light winds, and clear skies/sunny conditions during the month, the *difference* between morning and afternoon temperatures was typically much larger than usual. Maximum (afternoon) temperatures were generally above average, but morning temperatures tended to be below average, compared to a typical February, in most regions of the country.

The nation-wide average temperature in February 2013 was 17.1°C (0.2°C below the 1971-2000 February average), using NIWA's seven-station temperature series which begins in 1909<sup>2</sup>.

**Record or near-record mean minimum air temperatures for February were recorded at:**

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Puysegur Point	12.9	1.6	1978	2nd-highest
South West Cape	11.5	1.4	1991	2nd-highest
<b>Low records or near-records</b>				
Warkworth	12.9	-1.4	1966	4th-lowest
Whatawhata	11.9	-1.7	1952	4th-lowest
Te Kuiti	10.3	-2.6	1959	2nd-lowest
Taumarunui	9.7	-2.4	1947	3rd-lowest
Turangi	9.4	-2.0	1968	4th-lowest
Takapau Plains	9.3	-1.7	1962	3rd-lowest
Dannevirke	10.4	-1.8	1951	4th-lowest
Waione	10.3	-2.2	1991	Lowest
Martinborough	9.4	-2.4	1986	Lowest
Mahia	14.1	-1.0	1990	4th-lowest
Wallaceville	8.7	-3.3	1939	Lowest
Appleby	10.0	-2.5	1932	4th-lowest
Hanmer Forest	5.4	-2.9	1906	Lowest
Waiau	9.3	-1.0	1974	4th-lowest
Cheviot	8.5	-2.0	1982	Lowest

<sup>2</sup> Interim monthly value

**Record or near-record mean maximum air temperatures for February were recorded at:**

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Leigh	26.3	3.3	1966	Highest
Hamilton (Ruakura)	27.5	3.2	1906	2nd-highest
Masterton	27.1	3.2	1992	2nd-highest
Dannevirke	24.9	2.3	1951	3rd-highest
Waione	25.7	1.2	1991	4th-highest
Gisborne	27.8	3.6	1905	2nd-highest
Ohakune	23.4	2.2	1962	3rd-highest
Hanmer Forest	25.5	2.6	1906	4th-highest
Arthurs Pass	21.5	2.7	1973	3rd-highest
Waiau	25.9	2.2	1974	3rd-highest
Mt Cook	24.7	4.2	1929	2nd-highest
Tara Hills	26.1	2.8	1949	4th-highest
Ranfurly Ews	24.1	2.6	1975	2nd-highest
Lauder Ews	26.1	3.4	1924	3rd-highest
Tiwai Point Ews	19.2	1.4	1970	4th-highest
<b>Low records or near-records</b>				
Cape Campbell	17.7	-1.6	1953	3rd-lowest

## February climate in the six main centres

February rainfall was well below normal at all of the main centres except Wellington. Wellington experienced near normal February rainfall, but almost all of this (65 mm) was recorded in one event, on the 4th. It was an exceptionally sunny February for all of the six main centres, with Wellington and Hamilton experiencing their sunniest February on record, and Tauranga, Christchurch and Dunedin observing their 2nd, 3rd and 5th sunniest February on record, respectively. Mean monthly temperatures in February were near average at all of the six main centres. However, due to the high frequency of anticyclones during the month (associated with light wind and clear sky conditions), afternoon temperatures were slightly higher than usual, at all of the six main centres except for Wellington (where they were near average).

In February 2013, Wellington was the sunniest but also the wettest of the six main centres; Auckland was the warmest, Dunedin the coolest, and Christchurch the driest.

### February 2013 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland <sup>a</sup>	19.9	-0.1	Near average
Tauranga <sup>b</sup>	19.8	0.0	Average
Hamilton <sup>c</sup>	18.4	-0.4	Near average
Wellington <sup>d</sup>	17.2	0.0	Average
Christchurch <sup>e</sup>	16.6	-0.2	Near average
Dunedin <sup>f</sup>	15.4	0.4	Near average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland <sup>a</sup>	27	38%	Well below normal
Tauranga <sup>b</sup>	31	35%	Well below normal
Hamilton <sup>c</sup>	23	31%	Well below normal
Wellington <sup>d</sup>	66	93%	Near normal
Christchurch <sup>e</sup>	21	48%	Well below normal
Dunedin <sup>f</sup>	31	45%	Well below normal
Sunshine			
Location	Sunshine (hours)	% of normal	Comments
Auckland <sup>a</sup>	229	117%	Above normal
Tauranga <sup>b</sup>	275	126%	2nd highest February sunshine since 1933
Hamilton <sup>g</sup>	253	127%	Highest February sunshine since 1936
Wellington <sup>d</sup>	281	133%	Highest February sunshine since 1928
Christchurch <sup>e</sup>	235	120%	3rd highest February sunshine since 1930
Dunedin <sup>f</sup>	191	121%	5th highest February sunshine since 1948

<sup>a</sup> Mangere <sup>b</sup> Tauranga Airport <sup>c</sup> Hamilton Airport <sup>d</sup> Kelburn <sup>e</sup> Christchurch Airport <sup>f</sup> Musselburgh <sup>g</sup> Ruakura

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## Highlights and extreme events

### Rain and slips

The highest 1-day rainfall experienced in February was 278 mm recorded at North Egmont on 4 February.

On 4 February, a thunderstorm with accompanying heavy rain caused localised flooding and slips in the Wellington region. Slips closed the Akatarawa Road between Waikanae and Upper Hutt, and also affected the Rimutaka Hill section of SH2, but the road remained open. Traffic had to be diverted around a flooded section of SH1 at Paekakariki during the early hours of 5 February. One plane was unable to land at Wellington Airport and was diverted to Christchurch. In Queenstown, after heavy rain overnight and during the morning, a large macrocarpa tree fell on to the road, just missing a motorist.

On 7 February, several beaches in the Wellington area were closed for swimming because of contamination following the torrential rain on the 4th.

#### Record or near record February extreme 1-day rainfall totals were recorded at:

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Paraparaumu	66	4th	1951	2nd-highest

### Wind

The highest wind gust recorded in February was 145 km/hr at Southwest Cape, Stewart Island, on 10 February.

On 5 February wind warnings were issued for SH6 between Harihari and Haast. In Rotorua, the wind brought down trees and blew branches on to shops in Pukuatua Street. In New Plymouth, flights were delayed and some flights were diverted to Palmerston North and Wanganui.

#### Record or near record February extreme wind gusts were recorded at:

Location	Extreme wind gust (km/hr)	Date of extreme gust	Year records began	Comments
New Plymouth	93	5th	1972	2nd-highest
Baring Head	130	5th	1991	3rd-highest
Hawera	82	5th	1986	4th-highest
Wanganui	91	5th	1977	Equal 2nd-highest



## Temperatures

The highest temperature observed during February was 34.6 °C, recorded at Alexandra on 1 February. This is the 4th-highest February temperature observed there, in records beginning 1992.

An unusually cool southerly for the time of year affected the lower North Island on 5 February (see Table below). The lowest temperature recorded during February was -1.1°C, observed at Mount Ruapehu on the morning of 6 February. This is the 3rd-lowest February temperature recorded there, in records beginning in 2000.

### Record or near-record daily minimum air temperatures for February were recorded at:

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
<b>Low records or near-records</b>				
Whangaparaoa	11.8	6th	1982	3rd-lowest
Cheviot	2.1	23rd	1982	3rd-lowest
Le Bons Bay	6.3	5th	1984	3rd-lowest
Dunedin	-0.3	22nd	1962	4th-lowest
Balclutha	-0.2	22nd	1964	Lowest
<b>High records or near-records</b>				
Puysegur Point	18.6	1st	1978	Highest
Lumsden	19.4	10th	1982	2nd-highest
Gore	17.4	10th	1972	Equal 4th-highest
South West Cape	15.7	2nd	1991	Equal 3rd-highest

### Record or near-record daily maximum air temperatures for February were recorded at:

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
<b>High records or near-records</b>				
Leigh	29.5	19th	1966	Equal 2nd-highest
Masterton	33.5	2nd	1992	Highest
Waione	33.3	1st	1991	2nd-highest
Mt. Cook	30.8	28th	1929	Equal 4th-Highest
<b>Low records or near-records</b>				
Takapau Plains	11.7	5th	1972	Lowest
Castlepoint	13.6	5th	1972	Equal lowest
Napier	14.1	5th	1940	3rd-lowest
Hastings	14.9	5th	1972	Lowest
Waipawa	13.7	5th	1945	2nd-lowest
Wairoa	14.6	5th	1972	2nd-lowest
Mahia	15.5	5th	1990	Equal 2nd-lowest
Stratford	13.5	5th	1972	2nd-lowest
Hawera	15.3	5th	1977	4th-lowest
Ohakune	10.8	5th	1972	Equal 2nd-lowest
Wanganui	14.6	5th	1972	Lowest

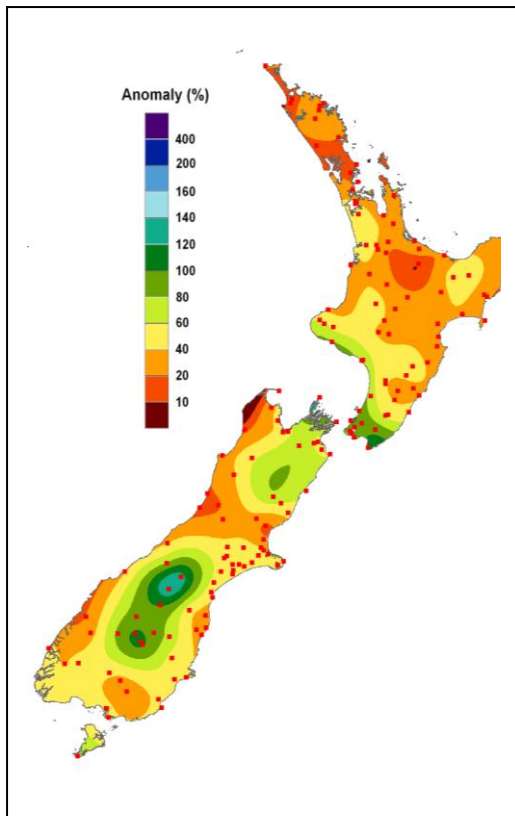
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*February 2013 rainfall, expressed as a percent of February normal.*

*The orange colour shows rainfall less than 40% of February normal (much of the north and east of the North Island, as well as the West Coast South Island and north Canterbury). The yellow shade indicates rainfall less than 60 percent of February normal. Green colours indicate rainfall between 60 and 120 percent of February normal.*

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