

## A warm winter for most and dry in eastern Canterbury

<b>Temperature</b>	Winter temperatures were near average (-0.50°C to +0.50°C) for Taranaki, western Waikato, Tasman, Nelson, Marlborough and coastal Otago. Winter temperatures were above average (+0.51°C to +1.20°C) elsewhere.
<b>Rainfall</b>	Rainfall was near normal (80-119%) for the majority of New Zealand. Below normal (50-79%) or well below normal (< 50%) rainfall occurred for some eastern areas of the country including coastal Gisborne, Wairarapa and central and north Canterbury. Rainfall was either above normal (120-149%) or well above normal (> 149%) for parts of the Bay of Plenty and Hawke's Bay.
<b>Soil moisture</b>	At the end of winter 2016, soil moisture levels were below normal for the time of year across middle and northern Canterbury as well as coastal Wairarapa. Soil moisture levels for the remainder of the country were near normal for this time of year.
<b>Sunshine</b>	Winter sunshine was above normal (110-125% of normal) across the South Island as well as parts of Waikato and Hawke's Bay. Well above normal sunshine (>125% of normal) was observed for coastal Otago, Canterbury and Wairarapa locations.

Click on the link to jump to the information you require:

[Overview](#)

[Temperature](#)

[Rainfall](#)

[Sunshine](#)

[Winter climate in the six main centres](#)

[Highlights and extreme events](#)

### Overview

Winter 2016 got off to a warm start, with the 3<sup>rd</sup>-warmest June on record and the 10<sup>th</sup>-warmest July on record. During the first two months of the season, winds were frequently from the north and west, while sea surface temperatures around New Zealand were warmer than average (especially to the north and west). These two factors worked in tandem to bring unusually mild temperatures to the country and contributed to a delayed start to the ski season.

In August, the seas surrounding New Zealand cooled (but were still slightly above normal), and southerly and south-easterly winds became more frequent. As a result, August was the first cooler than average month of 2016. Snow settled to sea level in parts of the South Island during the first week of August and overloaded transmission lines in the Hawke's Bay leaving thousands without power (see *Highlights and Extreme Events* section for more detail). The arrival of milder temperatures at the tail end of the season meant that winter temperatures as whole were generally near average (-0.50°C to +0.50°C of the winter average) or slightly above average +0.51°C to +1.20°C

above the winter average) for most New Zealand locations. The nation-wide average temperature in winter 2016 was 9.0°C (0.6°C warmer than the 1981-2010 winter average, using NIWA's seven-station temperature series which begins in 1909). This makes the winter of 2016 the 8<sup>th</sup>-warmest winter on record.

The warmer than usual ocean surrounding New Zealand for much of the winter not only contributed to unseasonable warmth on land, but also created an environment that was more conducive for strong storms. Consequently, northern and eastern parts of the North Island saw a number of floods during the winter months as described in the *Highlights and Extreme Events* section. Periodic heavy rain meant that rainfall for the season as a whole was either above normal (120-149% of the winter normal) or well above normal (> 149% of the winter normal) for parts of the Bay of Plenty and Hawke's Bay. Heavy rain events which caused flooding during June and August for Auckland and Northland were not enough to leave an imprint on seasonal rainfall however, where the amount of rain received for the upper North Island was near normal for the winter as a whole.

The prevalence of winds from northerly and westerly directions during the first two months of winter was reflected in the rainfall totals observed in central and eastern Canterbury and coastal Wairarapa. These areas were often in the rain shadow of the prevailing winds and very dry as a result. Well below normal rainfall (< 50% of the winter normal) was observed there and by the end of winter 2016 seasonal soil moisture levels were also below normal. Soil moisture levels for the remainder of the country were near normal for the time of year.

Winter sunshine was plentiful across the South Island as well as parts of Waikato and Hawke's Bay. Well above normal sunshine (>125% of normal) was observed for coastal Otago, Canterbury and Wairarapa locations.

#### **Further Highlights:**

- The highest temperature was 25.1°C, observed at Napier on 10 June.
- The lowest temperature was -14.1°C, observed at Mt Cook Airport on 8 August.
- The highest 1-day rainfall was 225 mm, recorded at North Egmont on 13 July.
- The highest wind gust was 195 km/hr, observed at Cape Turnagain on 24 July.
- Of the six main centres in winter 2016, Auckland was the warmest and wettest, Christchurch was the coolest, driest and sunniest and Dunedin the least sunniest.
- Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2016 so far (1 January – 31 August) were Richmond (1855 hours), Blenheim (1708 hours), New Plymouth (1646 hours) and Takaka (1632 hours).

#### **For further information, please contact:**

**Mr Chris Brandolino**

NIWA Forecaster – NIWA National Climate Centre

Tel. (09) 375 6335, Mobile (027) 866 0014

---

## Temperature: Near average or above average across New Zealand

Winter 2016 got off to a warm start, with the 3<sup>rd</sup>-warmest June on record and the 10<sup>th</sup>-warmest July on record. August was the first cooler than normal month of the year, and the first since September of 2015. The arrival of these subdued colder temperatures at the tail end of the season meant that winter temperatures as whole were generally near average (-0.50°C to +0.50°C) or slightly above average (+0.51°C to +1.20°C) for most New Zealand locations.

The exceptional warmth experienced during the first two thirds of winter was largely fuelled by warmer than normal seas surrounding New Zealand, particularly to the north and west of the country, and winds from a northerly and westerly direction. It was the warm day time temperatures rather than warm nights that were most exceptional, and several locations observed record or near-record mean maximum temperatures this winter. Motu was the only location to observe a near record low minimum temperature, no other locations observed low mean, mean minimum or mean maximum temperatures for winter 2016.

The nation-wide average temperature in winter 2016 was 9.0°C (0.6°C warmer than the 1981-2010 winter average, using NIWA's seven-station temperature series which begins in 1909). This makes the winter of 2016 the 8<sup>th</sup>-warmest winter on record.

### Record<sup>1</sup> or near-record mean air temperatures for winter were recorded at:

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Kaikohe	13.0	1.6	1973	Highest
Whatawhata	11.5	1.7	1952	Highest
Christchurch (Riccarton)	8.7	1.8	1863	Highest
Mokohinau	14.0	0.7	1994	2nd-highest
Kaikoura	9.8	1.1	1963	2nd-highest
Lauder	4.9	1.6	1924	2nd-highest
Kaitia	13.2	0.9	1948	3rd-highest
Whangarei	12.8	0.8	1967	3rd-highest
Auckland (Whangaparaoa)	12.8	0.7	1982	3rd-highest
Hicks Bay	12.4	0.9	1969	3rd-highest
Puysegur Point	9.3	0.8	1978	3rd-highest
Masterton	9.3	1.5	1992	4th-highest
Ngawi	11.5	0.8	1972	4th-highest
Paraparaumu	10.1	0.8	1953	4th-highest
Cape Campbell	10.4	0.7	1953	4th-highest
Le Bons Bay	8.5	0.7	1984	4th-highest

<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.

Wanaka	5.5	1.2	1955	4th-highest
Low records or near-records				
None observed				

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Paraparaumu	14.1	1.2	1953	Highest
Christchurch (Riccarton)	15.1	3.2	1863	Highest
Kaikohe	16.1	1.8	1973	2nd-highest
Mokohinau	15.7	0.9	1994	2nd-highest
Whatawhata	15.7	1.7	1952	2nd-highest
Hicks Bay	15.8	1.2	1969	2nd-highest
Gisborne	16.1	1.2	1905	2nd-highest
Napier	15.7	1.5	1870	2nd-highest
Hastings	15.6	1.6	1965	2nd-highest
Whanganui (Airport)	15.1	1.4	1937	2nd-highest
Puysegur Point	11.7	0.9	1978	2nd-highest
Cheviot	13.6	1.2	1982	2nd-highest
Mt Cook	9.4	1.8	1929	2nd-highest
Winchmore	13.1	1.7	1928	2nd-highest
Lincoln (Broadfield)	12.9	1.3	1881	2nd-highest
Dunedin (Musselburgh)	11.9	1.3	1947	2nd-highest
Manapouri	10.4	1.7	1963	2nd-highest
Lumsden	10.9	1.5	1982	2nd-highest
Cromwell	11.0	1.6	1949	2nd-highest
Invercargill	11.7	1.6	1905	2nd-highest
Kaitia	16.7	1.0	1948	3rd-highest
Auckland (Mangere)	16.0	1.0	1959	3rd-highest
Masterton	14.2	0.9	1906	3rd-highest
Wairoa	15.8	1.2	1964	3rd-highest
Mahia	13.8	0.9	1990	3rd-highest
Reefton	11.8	1.0	1960	3rd-highest
Milford Sound	11.2	1.1	1934	3rd-highest
Hanmer Forest	12.6	1.6	1906	3rd-highest
Kaikoura	12.9	1.4	1963	3rd-highest
Waiau	13.1	1.4	1974	3rd-highest
Waipara West	13.6	0.9	1973	3rd-highest
Orari Estate	12.3	1.1	1972	3rd-highest
Tara Hills	9.6	1.4	1949	3rd-highest
Dunedin (Airport)	12.1	1.0	1962	3rd-highest
Ngawi	14.1	0.8	1972	4th-highest
Levin	14.2	1.0	1895	4th-highest
Blenheim	14.4	0.8	1941	4th-highest

Lauder	10.3	2.0	1924	4th-highest
Low records or near-records				
None observed				

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Whatawhata	7.3	1.7	1952	2nd-highest
Kaikohe	9.8	1.5	1973	3rd-highest
Ngawi	9.0	0.7	1972	3rd-highest
Cape Campbell	8.3	0.9	1953	3rd-highest
Kaikoura	6.7	0.9	1963	3rd-highest
South West Cape	6.5	0.8	1991	3rd-highest
Mokohinau	12.4	0.5	1994	4th-highest
Puysegur Point	6.8	0.8	1978	4th-highest
Le Bons Bay	6.0	0.7	1984	4th-highest
Low records or near-records				
Motu	0.7	-1.4	1990	2nd-lowest

## Rainfall: A dry season for parts of Canterbury and the Wairarapa

Rainfall for the winter season as a whole was near normal for the majority of New Zealand, however, there were some exceptions. Well below normal rainfall (< 50% of normal) was recorded across central and northern Canterbury as well as coastal Wairarapa. Castlepoint in the Wairarapa had its driest winter on record with records extending back to 1902. The rainfall deficit in these eastern regions was also clearly represented when looking at the soil moisture levels, which were lower than normal for the time of year by the end of winter.

Conversely, winter rainfall was above normal (120-149%) or well above normal (> 149%) for parts of the Bay of Plenty and Hawke's Bay. This was largely driven by a handful of heavy rainfall events and caused flooding in the east of the North Island as described in the *Highlights and Extreme Events* section. No locations observed record or near record high winter rainfall totals.

Record or near-record winter rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
None observed				
Low records or near-records				
Castlepoint	110	35	1902	Lowest

Secretary Island	520	62	1985	Lowest
Masterton	167	53	1992	2nd-lowest
Waipara West	73	43	1973	2nd-lowest
Lumsden	148	74	1982	3rd-lowest
Nugget Point	121	60	1930	3rd-lowest

---

## Sunshine: Sunny skies over the South Island

Winter sunshine was above normal (110-125% of normal) across the South Island as well as parts of Waikato and Hawke's Bay. Well above normal sunshine (>125% of normal) was observed for coastal Otago, Canterbury and Wairarapa locations.

The sunny skies over the South Island saw many locations experience record or near-record sunshine hours. In particular Ashburton and Lake Tekapo had their sunniest winter with records extending back to 1930 and 1928 respectively.

Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2016 so far (1 January – 31 August) were Richmond (1855 hours), Blenheim (1708 hours), New Plymouth (1646 hours) and Takaka (1632 hours).

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

Location	Sunshine hours	Percentage of normal	Year records began	Comments
<b>High records or near-records</b>				
Cheviot	501	154	1983	Highest
Ashburton	539	138	1930	Highest
Lake Tekapo	524	116	1928	Highest
Timaru	540	132	1930	Highest
Balclutha	428	147	1964	Highest
Dannevirke	388	117	1963	2nd-highest
Christchurch	466	117	1930	2nd-highest
Paraparaumu	459	123	1953	3rd-highest
Takaka	509	104	1985	3rd-highest
Queenstown	455	163	1930	3rd-highest
Cromwell	415	123	1979	3rd-highest
Invercargill	368	123	1913	3rd-highest
Te Kuiti	377	122	1962	4th-highest
Blenheim	538	110	1947	4th-highest
<b>Low records or near-records</b>				
None recorded				

---

## Winter climate in the six main centres

Temperatures were near average in Christchurch and above average for all other main centres during winter 2016. Christchurch also received well below normal rainfall (47% of normal), while the remaining main centres had near normal rainfall for winter 2016. Sunshine was above normal in Wellington, below normal in Tauranga, and near normal for the remaining main centres. Of the six main centres in winter 2016, Auckland was the warmest and wettest, Christchurch was the coolest, driest and sunniest and Dunedin, while sunnier than normal had the least sunshine hours for winter.

### Winter 2016 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland <sup>a</sup>	12.4	+0.9	Above average
Tauranga <sup>b</sup>	11.4	+0.7	Above average
Hamilton <sup>c</sup>	10.2	+0.7	Above average
Wellington <sup>d</sup>	10.9	+0.9	Above average
Christchurch <sup>e</sup>	7.0	+0.5	Near average
Dunedin <sup>f</sup>	7.7	+0.6	Above average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland <sup>a</sup>	388	105%	Near normal
Tauranga <sup>b</sup>	339 <sup>2</sup>	95%	Near normal
Hamilton <sup>c</sup>	353	102%	Near normal
Wellington <sup>d</sup>	359	92%	Near normal
Christchurch <sup>e</sup>	87	47%	Well below normal
Dunedin <sup>f</sup>	138	81%	Near normal
Sunshine			
Location	Sunshine (hours)	% of normal	Comments
Auckland <sup>a</sup>	428	108%	Near normal
Tauranga <sup>b</sup>	382	83%	Below normal
Hamilton <sup>g</sup>	395	104%	Near normal
Wellington <sup>d</sup>	409	112%	Above normal
Christchurch <sup>e</sup>	466	117%	Near normal
Dunedin <sup>f</sup>	355 <sup>3</sup>	108%	Near normal

<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

<sup>2</sup> Missing 1 day of data

<sup>3</sup> Missing 3 days of data

## Highlights and extreme events

This section contains information pertaining to some of the more significant highlights and extreme events that occurred during winter 2016. Note that a more detailed list of significant weather events for winter 2016 can be found in the *Highlights and extreme events* section of NIWA's monthly Climate Summaries. These monthly summaries are available online, and may be viewed at the following website: <http://www.niwa.co.nz/climate/summaries/monthly>

### Temperatures

On 10 June, a foehn effect initiated by north-westerly winds contributed to record and near-record high minimum temperatures and high maximum temperatures at several eastern New Zealand locations. In particular, Napier experienced its warmest winter day on record with records extending to 1868.

On 3 July parts of Waikato observed near-record low daily maximum temperatures. Persistent low cloud and fog contributed to the cool temperatures.

On 8 August, extremely cold temperatures froze part of the Otago Harbour and burst water pipes in Dunedin homes and businesses. The wintry blast kept Dunedin's plumbers and electricians busy with calls. Consultant hydrologist David Stewart said that the rugby field-sized frozen portion of the harbour was "highly unusual." The lowest temperature of this winter was also recorded on this day which was -14.1°C, observed at Mt Cook Airport.

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

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Kopua	20.9	Jul-23rd	1962	Highest
Gisborne	23.2	Jun-10th	1905	Highest
Napier (Airport)	25.1	Jun-10th	1868	Highest
Wairoa	24.2	Jun-10th	1964	Highest
Taihape	20.0	Jun-10th	1972	Highest
Manapouri	18.2	Jun-9th	1963	Highest
South West Cape	18.0	Jun-21st	1991	Highest
Auckland (Ardmore)	22.9	Jun-14th	1969	2nd-highest
Waione	21.8	Jun-10th	1991	2nd-highest
Hastings	24.4	Jun-10th	1965	2nd-highest
Waiouru	17.2	Jun-10th	1962	2nd-highest
Cheviot	22.9	Jun-22nd	1982	2nd-highest
Dannevirke	21.0	Jun-10th	1951	Equal 2nd-highest
Hicks Bay	20.6	Jun-11th	1969	Equal 2nd-highest
Stewart Island	17.0	Jun-10th	1975	Equal 2nd-highest
Waipawa	22.4	Jun-10th	1945	3rd-highest
Mahia	20.7	Aug-26th	1990	3rd-highest
Hawera	18.3	Jun-10th	1977	3rd-highest



Puysegur Point	17.3	Jun-8th	1978	3rd-highest
Kerikeri	21.1	Jun-10th	1981	4th-highest
Stephens Island	15.7	Jun-24th	1973	4th-highest
Hanmer Forest	21.7	Jun-9th	1906	4th-highest
Waipara West	22.1	Jun-22nd	1973	4th-highest
Christchurch (Riccarton)	23.1	Jun-10th	1863	4th-highest
Kaikoura	23.5	Jun-10th	1963	Equal 4th-highest
Naseby Forest	18.0	Jun-9th	1983	Equal 4th-highest
Winton	19.0	Jun-9th	1951	Equal 4th-highest
<b>Low records or near-records</b>				
Farewell Spit	8.4	Aug-5th	1972	Lowest
Tautuku	4.0	Jul-31st	1976	Equal lowest
Takaka	6.4	Aug-5th	1978	2nd-lowest
Le Bons Bay	3.4	Aug-5th	1984	2nd-lowest
Taupo	4.6	Aug-6th	1950	3rd-lowest
Te Kuiti	6.4	Jul-3rd	1959	3rd-lowest
Whatawhata	6.9	Jul-3rd	1952	Equal 4th-lowest
Waione	7.3	Aug-8th	1993	Equal 4th-lowest
Kaikoura	4.5	Aug-5th	1972	Equal 4th-lowest

**Record or near-record daily minimum air temperatures for winter were recorded at:**

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
<b>Low records or near-records</b>				
Motu	-8.4	Jul-3rd	1990	Lowest
Stewart Island	-8.5	Jul-7th	1975	Lowest
Le Bons Bay	-0.3	Aug-5th	1984	2nd-lowest
Lumsden	-8.3	Jul-1st	1982	2nd-lowest
Dunedin (Musselburgh)	-3.7	Aug-7th	1947	3rd-lowest
Kaitaia	0.6	Jul-2nd	1948	Equal 4th-lowest
Takaka	-4.3	Aug-7th	1978	Equal 4th-lowest
Puysegur Point	0.1	Aug-7th	1978	Equal 4th-lowest
<b>High records or near-records</b>				
Whangaparaoa	15.8	Jun-10th	1982	Highest
Auckland (Whenuapai)	16.4	Jun-10th	1951	Highest
Auckland (Henderson)	16.4	Jun-10th	1971	Highest
Whitianga	16.4	Jun-10th	1971	Highest
Thames	17.2	Jun-10th	1957	Highest
Paeroa	16.9	Jun-10th	1971	Highest
Tauranga	16.5	Jun-10th	1941	Highest
Te Puke	15.8	Jun-10th	1973	Highest
Whakatane	16.3	Jun-10th	1975	Highest
Port Taharoa	15.6	Jun-10th	1974	Highest

Te Kuiti	15.2	Jun-10th	1959	Highest
Masterton	14.6	Jun-23rd	1992	Highest
Reefton	11.7	Jun-23rd	1972	Highest
South West Cape	11.7	Jun-10th	1991	Highest
Ngawi	16.0	Jun-23rd	1972	Equal highest
Farewell Spit	14.0	Jun-22nd	1972	Equal highest
Kerikeri	16.5	Jun-10th	1981	2nd-highest
Kaikohe	16.6	Jun-10th	1973	2nd-highest
Mokohinau	16.7	Jun-10th	1994	2nd-highest
Castlepoint	15.5	Jun-11th	1994	2nd-highest
Hicks Bay	16.3	Jun-10th	1972	2nd-highest
Waiouru	10.4	Jun-23rd	1972	2nd-highest
Secretary Island	13.1	Jun-22nd	1988	2nd-highest
Taumarunui	13.9	Jun-10th	1947	Equal 2nd-highest
Tautuku	10.5	Jun-18th	1976	Equal 2nd-highest
Whangarei	16.3	Jun-10th	1967	3rd-highest
Hamilton	15.7	Jun-10th	1946	3rd-highest
Waione	14.6	Jun-11th	1993	3rd-highest
Hastings	14.1	Jun-23rd	1972	3rd-highest
Wairoa	15.8	Jul-24th	1972	3rd-highest
Hawera	13.7	Jun-10th	1977	3rd-highest
Okarito	12.3	Jun-22nd	1983	3rd-highest
Puysegur Point	12.8	Jun-10th	1978	3rd-highest
Motueka	11.9	Jun-23rd	1972	3rd-highest
Rotorua	13.5	Jun-10th	1972	Equal 3rd-highest
Auckland (Airport)	16.4	Jun-10th	1961	Equal 3rd-highest
Auckland (Pukekohe)	15.9	Jun-10th	1969	Equal 3rd-highest
Mahia	13.6	Jun-11th	1990	Equal 3rd-highest
Nelson	13.5	Jun-23rd	1943	Equal 3rd-highest
Dargaville	15.8	Jun-10th	1951	4th-highest
Auckland (North Shore)	16.4	Jun-10th	1994	4th-highest
Whatawhata	15.6	Jun-10th	1952	4th-highest
Ohakune	11.1	Jun-23rd	1972	4th-highest
Cheviot	10.6	Jun-24th	1982	4th-highest
Lumsden	10.7	Jun-18th	1982	4th-highest
Kaitia	16.5	Jun-10th	1948	Equal 4th-highest
Whanganui (Spriggens Park)	14	Jun-23rd	1972	Equal 4th-highest
Haast	12.4	Jun-22nd	1949	Equal 4th-highest

### Rain and slips

On 29 June, heavy rain in the Auckland region caused flash flooding, trapping one person in a factory and several people in their cars in West Auckland. A primary school was forced to close due to water and electrical damage. Several homes were also flooded, prompting removal of the floodwater by bucket and multiple fire service callouts. Some bus services were also impacted by the flooding.

Heavy rain on 8 July caused localised flooding in eastern parts of Coromandel and Bay of Plenty. The small Coromandel township of Tairua was temporarily isolated as floodwaters closed SH25 to the

north and south. Flooding forced the closure of Opoutere, Hikuai and Waihi Beach schools. State Highway 2 north of Katikati was closed due to flooding, and SH25a east of Kopu was closed due to a slip. Farther north, isolated flash flooding was reported in Warkworth, Leigh and Matakana as thundery rain passed through in the early hours of the morning. Auckland’s wettest June hour in recorded history was observed on this day.

On 13 July heavy rain caused a slip that partially blocked SH6 near Haast. Minor surface flooding was reported on roads near Wanaka. Some inland parts of the South Island received more rainfall on this day than the total they had received in the previous four weeks or more. Tara Hills (near Omarama) recorded 38.6 mm of rainfall – more than the total rainfall recorded there over the previous 46 days.

On 6-7 August, SH2 was closed between Tutira and Wairoa in Hawke’s Bay due to flooding and a slip. Tutira received a remarkable 259.8 mm of rain which is more rain than the combined total for May, June, and July 2016 (251.4 mm).

On 8 August, part of McVicar Rd in the Te Haroto district of Hawke’s Bay washed out, cutting off a remote community of about a dozen residents.

On 10 August, SH16 closed between Kaukapakapa and Wellsford due to heavy flooding. Wayby Valley and Whangaripo Valley Roads in the Warkworth and Wellsford areas also closed. A motorist was trapped by rising floodwaters on Waiteitei Rd, north of Wellsford in the Auckland region.

**Record or near record winter extreme 1-day rainfall totals were recorded at:**

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Motu	126	Jun-22nd	1990	Highest
Miranda	87	Jun-22nd	1978	Highest
Takaka	198	Jul-13th	1995	Highest
Campbell Island	45	Jun-29th	1991	Highest
Te Puke	117	Jun-22nd	1973	2nd-highest
Edgecumbe	123	Jun-29th	1990	2nd-highest
Waitoa	63	Jun-23rd	1987	3rd-highest
Kopuriki	124	Jun-22nd	1962	3rd-highest
Leigh	102	Aug-9th	1967	4th-highest
Te Aroha	73	Jun-22nd	1992	4th-highest
Rainbow Point	45	Jun-22nd	1978	4th-highest
Greatford	39	Jul-28th	1978	4th-highest
Raetihi	58	Jul-23rd	1979	4th-highest

**Wind**

On 27 June, low pressure passing over the north of the North Island resulted in high winds that ripped trees from their roots, causing about 500 houses to lose power in Coatesville, 900 houses in Titirangi, and 1200 houses in Greenhithe. Gusts of 150km/h occurred at Manukau Heads and 85km/h on the Auckland Harbour Bridge.

On 13 July a bus carrying 30 passengers was blown off the road on SH8 near Burkes Pass. Nelson was hit by strong winds in the evening, and approximately 900 customers lost power in Redwoods Valley, Atawhai and Moutere due to damaged power lines.

On 18 July strong southerlies contributed to large swells in Cook Strait. A trailer unit was lost overboard from a Bluebridge ferry crossing when the ferry was struck by a particularly large wave.

On 24 July strong winds contributed to stormy seas which buffeted coastal parts of Porirua and the Kapiti Coast and caused considerable coastal erosion. Several roads were closed after being engulfed by high seas and breaking waves. In Plimmerton, 10 metres of seawall was washed away. In Whanganui, strong winds brought down power lines which cut power to 60 homes. Farther north, a carport was blown over in Ngaruawahia, and several homes in rural South Auckland were flooded due to a king tide. Strong winds reportedly brought down trees and power lines in west Auckland, and the South Island's West Coast and Marlborough Sounds. Approximately 180 customers in the Marlborough Sounds were without power due to downed power lines.

**Record or near record winter extreme wind gusts were recorded at:**

Location	Extreme wind gust (km/hr)	Date of extreme gust	Year records began	Comments
Napier	104	Aug-27th	1973	Equal 2nd-highest
Palmerston North	93	Jul-24th	1991	Equal 2nd-highest
Hawera	102	Jul-29th	1986	Equal 2nd-highest
Motu	106	Jun-23rd	1991	3rd-highest
Westport	109	Jul-24th	1973	Equal 3rd-highest
Auckland (North Shore)	80	Aug-26th	1994	4th-highest
Rotorua	98	Jul-29th	1972	4th-highest
Castlepoint	152	Jun-10th	1972	4th-highest
Whanganui (Airport)	109	Jul-24th	1977	4th-highest
Taupo	91	Jul-8th	1982	Equal 4th-highest

**Snow and ice**

June saw a mild start to winter with several ski fields including Mt Ruapehu, Porters and Treble Cone delaying their opening due to a lack of snow.

During the first three days of July, heavy frosts were observed in many parts of the country. On 1 July, a number of car accidents in Dunedin were attributed to icy roads, and the runway at Dunedin Airport was closed for a time due to black ice.

On 8 July, a heavy overnight frost in Southland and eastern parts of Otago was followed by light rain in the early hours of the morning, creating widespread issues with black ice. A number of flights at Dunedin Airport were cancelled, and Police reported attending 30 car accidents where ice was a factor in south Otago, Gore and Invercargill.

On 24 July, snow fell and settled to around 100 metres above sea level in parts of Southland, with snowfall also reported in the hill suburbs of Dunedin. Motorists were advised to take extra care on

SH87 from Outram to Middlemarch, SH8 from Tarras to Omarama and SH96 from Nightcaps to Ohai due to snow. Farther north, SH73 from Springfield to Otira was closed to towing vehicles due to snow. All other vehicles required chains.

Late on 30 July and into 31 July, snow fell and settled to low levels in the lower South Island and Central Plateau in the North Island. A number of roads were closed due to snow including SH93 from Mataura to Clinton and the Desert Road (SH1). Motorists were warned to take extra care on SH1 from Palmerston to Balclutha, SH97 from Kyeburn to Mosgiel, the Lindis Pass (SH8), SH73 from Springfield to Otira, the Lewis Pass (SH7) and SH6 from Murchison to Wakefield due to snow and ice.

On 1 August, two families with four young children were rescued after they were trapped by snow after spending an unplanned night in the remote Kahurangi National Park.

On 5 August, snow and ice settled in Dunedin, interrupting taxi and bus services and leading to the closure and delay of several schools. Dunedin's Northern Motorway was also closed for a time.

On 6 August, more than 10,000 people were without power in Hawke's Bay, particularly in Napier and Hastings, after snow overloaded transmission lines. The wild weather brought down 200 power poles across the region.

On 6-8 August, snow across the North Island closed SH 1 through the Desert Road and the Napier-Taupo Road. Trucks were stranded for several days and motorists faced detours of up to five hours. On 9 August, the Napier-Taupo road reopened after being closed by snow for almost four days. Despite opening the route, the NZTA asked drivers to avoid using it after 5.30pm unless "absolutely necessary," because of the cold weather.

### **Lightning and hail**

In the early hours of 8 July, thunderstorms were reported in northern parts of the North Island, particularly in Auckland. Approximately 1400 lightning strikes were recorded between midnight and 1 a.m.

On 28 July, lightning strikes in Taranaki damaged power infrastructure, and resulted in power outages in Strathmore, Hurdon and Omata.

On 31 July, lightning and hail showers were reported in parts of Auckland, with at least 350 households losing power in the suburbs of Glen Eden and Kaukapakapa.

### **Cloud and fog**

On 30 June, fog caused disruptions to more than 40 flights at Auckland International Airport and delayed ferry services.

On 1 and 2 July, many parts of the Mackenzie Country observed freezing fog which persisted throughout daylight hours. On 2 July, the maximum temperature at Pukaki Airport was just -0.8°C.

On 3 and 4 July fog caused the cancellation of flights at Hamilton Airport. Fog was also reported in other parts of the North Island including Auckland, Rotorua and Whangarei.

On 17 and 18 August, morning fog delayed flights departing from Timaru Airport.

On 18 August, a flight from Christchurch to Hamilton was cancelled due to dense morning fog.

---

**For further information, please contact:**

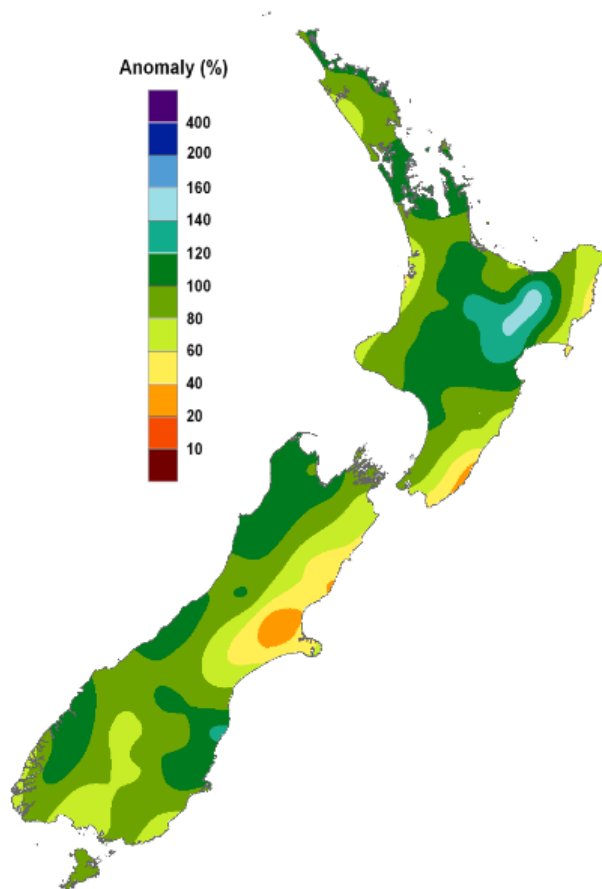
**Mr Chris Brandolino**

NIWA Forecaster – NIWA National Climate Centre  
Tel. 09 375 6335, Mobile 027 866 0014

For climate data enquiries, please contact:

**Ms Nava Fedaeff**

Climate Scientist, NIWA Auckland  
Tel. 09 375 6337



*Winter 2016 total rainfall, expressed as a departure from the 1981-2010 average (%).*

*Rainfall was near normal (80-119% of normal) for the majority of New Zealand. Below normal (50-79%) or well below normal (< 50%) rainfall occurred for some eastern areas of the country including coastal Gisborne, Wairarapa and central and north Canterbury. Rainfall was either above normal (120-149%) or well above normal (> 149%) for parts of the Bay of Plenty and Hawke's Bay.*

<http://www.niwa.co.nz/climate> © Copyright NIWA 2016.

All rights reserved. Information presented in this summary is based on data available at the time of publication, which is subject to ongoing quality assurance procedures.