

New Zealand's warmest and wettest winter on record

Temperature	Winter 2022 was the warmest winter on record in Aotearoa New Zealand, surpassing winter 2021 that set the record just last year. Temperatures were well above average (>1.20°C above average) for the North Island as well as parts of the West Coast, Tasman, Nelson, Marlborough and Canterbury. Temperatures were generally above average (+0.51°C to +1.20°C of average) for the remainder of the of the South Island with small pockets of near average temperatures (±0.50°C of average) in Otago and Southland. No areas experienced below average temperatures.
Rainfall	It was an exceptionally wet season with the vast majority of the country observing above normal (120-149% of normal) or well above normal (>149% of normal) rainfall. The wet winter was the result of multiple extreme weather events. The exceptions to the wet winter were parts of Waikato including the Coromandel, eastern parts of the North Island from East Cape to coastal Wairarapa, and southern Southland, where near normal rainfall (80-119% of normal) was observed.
Soil moisture	At the end of winter, soil moisture levels were near normal for a majority of the country. Above normal soil moisture was observed in eastern Marlborough, coastal South Canterbury, and interior Otago.

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Overview

Winter 2022 was the warmest winter on record in Aotearoa New Zealand. The nationwide average temperature was 9.8°C (1.4°C above the 1981-2010 average from NIWA's seven-station temperature series which begins in 1909) which surpassed the previous winter record set just last year (Figure 1). Winter 2020 held the record prior to 2021 which means that New Zealand has now experienced three consecutive record-warm winters, each warmer than the year prior. The winters of 1970 and 1971 were the last time New Zealand had two consecutive record warm winters prior to 2020 and 2021, however, three consecutive record warm winters have never occurred. Winter 2022 was also the first winter on record where the temperature anomaly exceeded +1.2°C for all three months of the season, relative to the 1981-2010 long-term average. Of the ten warmest winters on record, six have occurred since 2013. In line with the overall national record, 50 individual locations experienced record warm temperatures in winter 2022 and a further 33 locations experienced near-record warmth.



WINTER TEMPERATURE ANOMALIES

Relative to 1981-2010 average

Winter 2022 was NZ's warmest winter on record.
The previous record was briefly held by 2021.

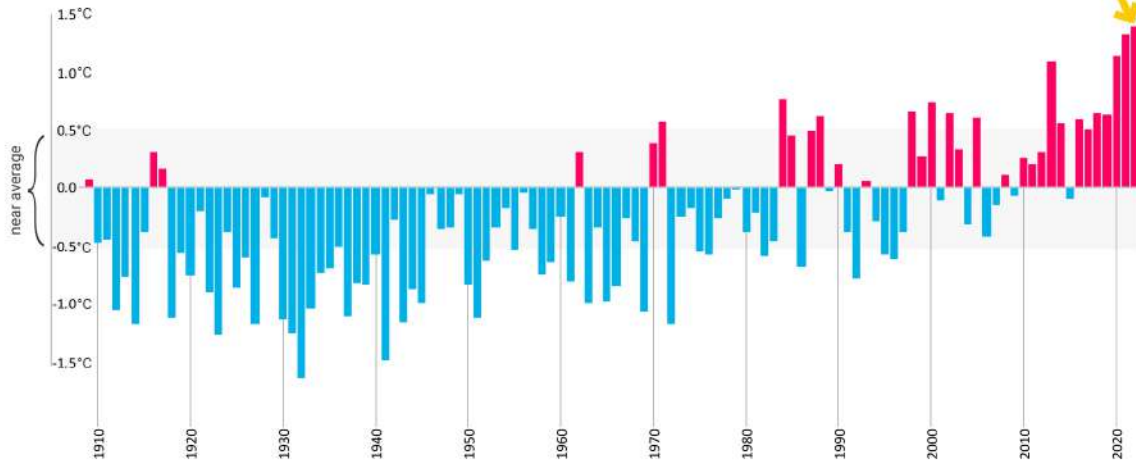


Figure 1: Winter temperature anomalies from NIWA’s seven-station series dating back to 1909, relative to the 1981-2010 average. The seven-station series is comprised of long running and high-quality temperature observations from Auckland, Masterton, Wellington, Hokitika, Nelson, Lincoln (Christchurch) and Dunedin. More information about this series can be found [here](#).

Winter 2022 was also our wettest on record based on analysis of rainfall anomalies from NIWA’s Virtual Climate Station Network which extends back to 1971 (Figure 2). Additionally, 18 locations experienced their wettest winter on record and a further 24 locations had a near-record wet winter. The overall wet season was the culmination of numerous extreme rainfall events (see [Highlights and extreme events](#) section) which affected almost every part of the country at some point. Flooding and slips were common, particularly during July and August. One of the most damaging events occurred from 16-20 August when an atmospheric river of moisture extending from the tropics led State of Emergency declarations in Nelson, Tasman, the West Coast, and Marlborough. Nelson was affected by severe flooding as the Maitai River burst its banks. An analysis by NIWA indicated that the atmospheric river which led to this event was the strongest on record for August and second-strongest for winter since at least 1959.

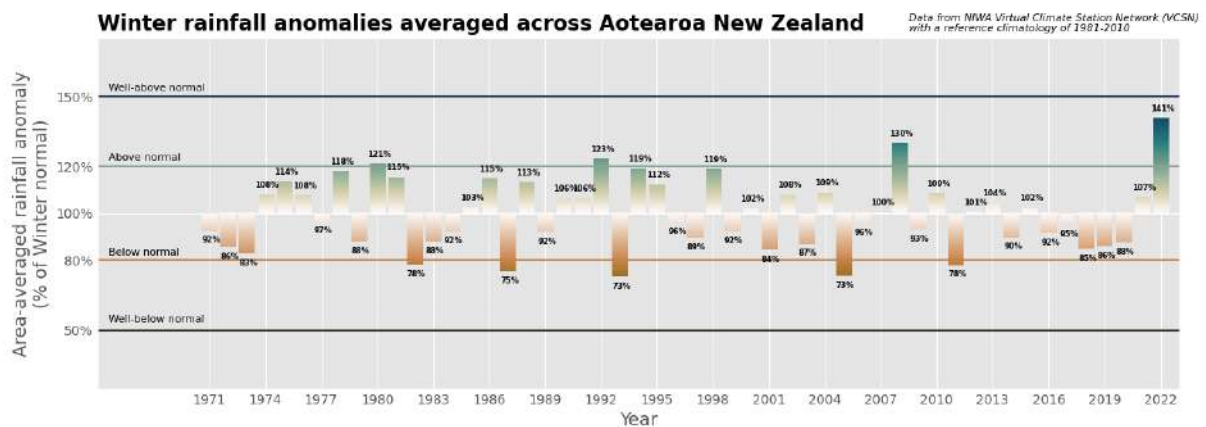


Figure 2: July rainfall anomalies for the month of July average across Aotearoa New Zealand based on the NIWA Virtual Climate Station Network (VCSN).

The combination of warm and wet conditions led to variable snow conditions around the country. A prolonged period of low pressure during the second week of June delivered considerable snowfall to mountainous areas in the South Island, as well as to lower elevations. The timing was ideal for ski areas, with several opening for the season in mid-June. July also delivered several rounds of snow to the South Island, which resulted in above normal snow depths at NIWA's high elevation snow and ice monitoring stations for the first two months of winter. Measurements at Mt Cook Village saw the deepest snowpack on record (since 2010) in mid-July, just prior to a large rain-on-snow event that caused avalanching and flooding throughout the region. After remaining well above normal most of winter, snow depths at all monitoring sites except Mt Larkins (1900m) and Muller Hut (1818m) dropped to well below normal in the second half of August due to warm, wet weather. Snow is currently absent from many sites on or to the west of the main divide (e.g., Castle Mount, Mt Philistine, and Ivory Glacier) and at lower elevations. In the North Island, the warmer and frequently humid conditions resulted in poor snow coverage for ski fields and limited opportunities to make snow.

Several factors contributed to New Zealand's record warm and wet winter. The overall air pressure pattern saw higher than normal pressures to the east of the country and was associated with more northerly quarter air flows. This allowed for frequent low-pressure systems to approach from the northwest, transporting warmth and moisture from the tropics. The distinctive lack of southerlies during winter replaced by more warm and wet airmasses is characteristic of La Niña – a key driver of our climate for the third consecutive record warm winter. The influence of La Niña also contributed to the warmest winter sea surface temperatures in New Zealand's coastal waters on record since at least 1982. Marine heatwave conditions occurred offshore of many regions and was ongoing for more than six months in the eastern Tasman Sea. The source region for several of New Zealand's atmospheric river events, the Coral Sea, also experienced a marine heatwave. These warm waters not only contributed to warmer temperatures on land but also provided extra moisture to low pressure systems approaching the country. The extra warmth in the Southwest Pacific culminated in a sub-tropical jet stream whose average position was farther south than normal, more commonly passing over the North Island. Since jet stream behaviour is modulated by temperature gradients (change in temperature over distance), the excess warmth in the sub-tropics likely allowed the gradient to sit farther south than what is typical, thus the jet more commonly blowing over the New Zealand region and bringing active weather.

Another influential climate driver later in the season was the developing negative phase of the Indian Ocean Dipole, marked by warmer than average seas in the tropical eastern Indian Ocean near Sumatra and cooler seas in the west near Africa. This was yet another moisture source for New Zealand, with pipelines of water vapour streaming across Australia into the Tasman and Coral Seas at times. The excessively warm seas meant that another driver, the Madden-Julian Oscillation (a tropical pulse of rain and cloud), was commonly active across Australasia. This was a boon to many a northerly low pressure system that affected New Zealand. Finally, the Southern Annular Mode (SAM), a proxy for the location of the polar jet stream and storm track, was in its negative phase for much of June, with the 30-day running average becoming negative for the first time since early September 2021. The negative phase of the SAM tends to be associated with more active weather around New Zealand. July and August were marked by a variable SAM.

These various drivers occurred against the backdrop of a warmer atmosphere due to climate change which is strongly contributing to New Zealand's temperature trend. Because a warmer atmosphere means water will be in its vapour state (which is fuel for rain), it is likely that the extreme rainfall events of winter 2022 were more intense because of climate change.

Further highlights for winter 2022:

- The highest temperature was 24.3°C, observed at Wairoa on 20 August.
- The lowest temperature was -11.6°C, observed at Aoraki/Mt Cook Airport on 17 July.
- The highest 1-day rainfall was 371 mm, recorded at Aoraki/Mt Cook Village on 18 July.
- The highest wind gust was 198 km/h, observed at Cape Turnagain on 9 July.
- Of the available, regularly reporting sunshine observation sites, the sunniest four regions in 2022 so far are Taranaki (1701 hours), Bay of Plenty (1675 hours), Greater Nelson (1621 hours) and Auckland (1564 hours).
- Of the six main centres in winter 2022, Auckland was the warmest, Tauranga was the sunniest, Christchurch was the coolest, Dunedin was the driest and Wellington was the wettest and least sunny.

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Temperature: Widespread record and near-record warmth

The nationwide average temperature for winter 2022 was 9.8°C (1.4°C above the 1981-2010 average from NIWA's seven station temperature series which begins in 1909), making winter 2021 the warmest winter on record.

Temperatures were well above average (>1.20°C above average) for the North Island as well as parts of the West Coast, Tasman, Nelson, Marlborough and Canterbury. Temperatures were generally above average (+0.51°C to +1.20°C of average) for the remainder of the of the South Island with small pockets of near average temperatures (±0.50°C of average) in Otago and Southland.

There was a plethora of locations that experienced record or near-record warm average temperatures in winter 2022:

- 83 locations observed mean winter temperatures within their top-four warmest on record.
- 67 locations recorded a top-four warmest mean maximum (i.e. daytime) temperature.
- 77 locations recorded a top-four warmest mean minimum (i.e. overnight temperature).
- No location recorded a record or near-record cool temperature for the season.

Record¹ 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				
Kaitaia	13.9	1.6	1948	Highest
Kerikeri	13.3	1.5	1945	Highest
Mokohinau	14.8	1.4	1994	Highest
Leigh	14.5	1.7	1966	Highest
Auckland (Whangaparāoa)	13.6	1.6	1982	Highest
Auckland (Whenuapai)	12.4	1.6	1945	Highest
Auckland (Western Springs)	13.1	1.8	1948	Highest
Whitianga	12.8	2.0	1962	Highest
Paeroa	12.2	1.9	1947	Highest
Tauranga	12.5	1.8	1913	Highest
Te Puke	11.6	1.7	1973	Highest
Whakatāne	12.0	2.1	1974	Highest
Rotorua	9.7	1.4	1964	Highest
Taupō	9.5	2.5	1949	Highest
Motu	9.2	2.8	1990	Highest
Auckland (Mangere)	13.2	1.9	1959	Highest
Whatawhata	11.6	1.8	1952	Highest
Hamilton (Ruakura)	11.1	1.7	1906	Highest
Hamilton (Airport)	10.8	1.6	1946	Highest
Port Taharoa	13.0	1.6	1973	Highest

¹ The rankings (1st, 2nd, 3rd 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.

Taumarunui	9.8	1.8	1947	Highest
Tūrangi	8.8	1.7	1968	Highest
New Plymouth	11.6	1.5	1944	Highest
Lower Retaruke	9.6	1.7	1966	Highest
Mt Ruapehu (Chateau)	4.9	1.5	2000	Highest
Masterton	9.8	1.9	1906	Highest
Dannevirke	9.9	1.6	1951	Highest
Castlepoint	11.8	1.6	1972	Highest
Martinborough	10.1	1.7	1986	Highest
Ngawi	12.3	1.5	1972	Highest
Hicks Bay	13.4	1.9	1969	Highest
Gisborne	12.3	2.3	1905	Highest
Napier	11.4	1.7	1870	Highest
Whakatu	10.7	2.1	1965	Highest
Wairoa (North Clyde)	11.7	2.0	1964	Highest
Māhia	11.9	1.6	1990	Highest
Paraparaumu	11.3	2.1	1953	Highest
Palmerston North	10.7	1.6	1928	Highest
Levin	10.8	1.7	1895	Highest
Porirua	10.9	1.6	1968	Highest
Wellington (Kelburn)	10.6	1.2	1928	Highest
Wellington (Airport)	11.5	1.4	1962	Highest
Upper Hutt	9.9	1.5	1939	Highest
Stratford	9.6	1.5	1960	Highest
Hāwera	10.9	1.9	1977	Highest
Waiouru	6.5	1.8	1962	Highest
Whanganui	11.6	1.6	1937	Highest
Waiau School	7.8	2.0	1974	Highest
Rangiora	8.3	1.7	1965	Highest
Le Bons Bay	8.8	1.0	1984	Highest
Whangārei	13.4	1.4	1967	2nd-highest
Matamata	10.9	2.3	1999	2nd-highest
Auckland (Pukekohe)	11.9	1.2	1969	2nd-highest
Waikeria	10.7	1.7	1957	2nd-highest
Te Kuiti	10.4	1.2	1959	2nd-highest
Hastings	10.5	1.9	1965	2nd-highest
Reefton	7.8	1.7	1960	2nd-highest
Ōkārīto	9.4	1.4	1982	2nd-highest
Blenheim	9.5	1.2	1932	2nd-highest
Cape Campbell	10.7	1.0	1953	2nd-highest
Kaikōura	9.9	1.2	1963	2nd-highest
Middlemarch	5.7	1.3	2000	2nd-highest
Dargaville	13.1	1.5	1943	3rd-highest
Takapau Plains	8.7	1.2	1962	3rd-highest
Westport	10.5	1.4	1937	3rd-highest
Arapito	10.3	1.3	1978	3rd-highest
Hokitika	9.3	1.4	1866	3rd-highest
Greymouth	9.9	1.3	1947	3rd-highest

Christchurch (Gardens)	8.4	1.6	1863	3rd-highest
Akaroa	9.7	1.7	1978	3rd-highest
Windsor	6.9	1.4	2000	3rd-highest
Dunedin (Musselburgh)	8.3	1.1	1947	3rd-highest
Five Rivers	5.8	1.1	1982	3rd-highest
Tākaka	9.6	1.3	1978	4th-highest
Haast	9.3	1.3	1949	4th-highest
Milford Sound	7.3	1.6	1934	4th-highest
Secretary Island	9.9	0.7	1985	4th-highest
Nelson	9.6	1.5	1862	4th-highest
Medbury	7.1	1.4	1927	4th-highest
Cheviot	7.5	0.8	1982	4th-highest
Lincoln (Broadfield)	8.0	1.2	1881	4th-highest
Orari Estate	6.8	1.1	1972	4th-highest
Timaru	7.3	0.9	1885	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				
Auckland (Mangere)	16.6	1.8	1959	Highest
Auckland (Whenuapai)	16.3	1.3	1945	Highest
Brothers Island	13.4	1.0	1997	Highest
Gisborne	16.9	2.0	1905	Highest
Hamilton (Airport)	15.5	1.3	1946	Highest
Hāwera	14.2	1.6	1977	Highest
Hicks Bay	16.1	1.6	1969	Highest
Levin	14.9	1.7	1895	Highest
Lower Retaruke	13.8	1.1	1966	Highest
Māhia	14.4	1.5	1990	Highest
Mokohinau	16.2	1.3	1994	Highest
Mt Ruapehu (Chateau)	8.5	1.4	2000	Highest
New Plymouth	15.1	1.3	1944	Highest
Ngawi	14.8	1.5	1972	Highest
Paeroa	16.3	1.5	1947	Highest
Palmerston North	14.9	1.7	1928	Highest
Paraparaumu	14.8	1.8	1953	Highest
Rotorua	13.8	1.6	1964	Highest
Tauranga	16.3	1.4	1913	Highest
Tūrangi	13.4	1.5	1968	Highest
Waikeria	15.6	1.4	1957	Highest
Waiouru	10.2	1.8	1962	Highest
Wellington (Airport)	14.1	1.3	1962	Highest
Whakatāne	16.6	1.5	1974	Highest

Whakatu	16.3	2.3	1965	Highest
Whanganui (Spriggens Park)	15.1	1.3	1937	Highest
Auckland (Whangaparāoa)	16.2	1.5	1982	Highest
Whangārei	17.4	1.5	1967	Highest
Whitianga	17.1	1.8	1962	Highest
Akaroa	14.2	1.6	1978	2nd-highest
Castlepoint	14.2	1.5	1972	2nd-highest
Christchurch (Gardens)	13.1	1.3	1863	2nd-highest
Dunedin (Musselburgh)	12.0	1.4	1947	2nd-highest
Greymouth	13.6	1.2	1947	2nd-highest
Kaikōura	12.9	1.4	1963	2nd-highest
Kerikeri	17.4	1.2	1945	2nd-highest
Le Bons Bay	11.3	1.0	1984	2nd-highest
Leigh	17.4	2.0	1966	2nd-highest
Masterton	14.6	1.3	1906	2nd-highest
Matamata, Hinuera	15.9	2.0	1999	2nd-highest
Middlemarch	11.8	1.9	2000	2nd-highest
Milford Sound	11.3	1.5	1934	2nd-highest
Motu	13.1	2.4	1990	2nd-highest
Napier	15.8	1.3	1870	2nd-highest
Porirua	14.2	1.3	1968	2nd-highest
Stratford	13.4	1.5	1960	2nd-highest
Taupō	13.8	2.3	1949	2nd-highest
Cromwell	11.0	1.6	1949	3rd-highest
Dannevirke	13.8	1.6	1951	3rd-highest
Five Rivers	10.6	1.1	1982	3rd-highest
Martinborough	14.4	1.3	1986	3rd-highest
Oamaru	12.4	1.2	1967	3rd-highest
Port Taharoa	15.6	0.9	1973	3rd-highest
Rangiora	13.3	1.4	1965	3rd-highest
Te Kuiti	15.4	1.4	1959	3rd-highest
Wairoa (North Clyde)	16.3	1.7	1964	3rd-highest
Whatawhata	15.4	1.4	1952	3rd-highest
Auckland (Western Springs)	16.9	1.8	1948	4th-highest
Dargaville	16.6	1.8	1943	4th-highest
Hamilton (Ruakura)	15.6	1.4	1906	4th-highest
Hastings	15.7	1.7	1965	4th-highest
Ōkārīto	13.3	0.7	1982	4th-highest
Tākaka	14.8	1.0	1978	4th-highest
Taumarunui	14.3	1.3	1947	4th-highest
Te Puke	15.7	1.0	1973	4th-highest
Wellington (Kelburn)	12.9	0.9	1928	4th-highest
Windsor	12.7	1.5	2000	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				
Arapito	6.2	1.7	1978	Highest
Auckland (Western Springs)	9.3	1.8	1948	Highest
Auckland (Whenuapai)	8.5	2.0	1945	Highest
Blenheim	4.9	1.7	1932	Highest
Cape Campbell	8.7	1.3	1953	Highest
Castlepoint	9.5	1.7	1972	Highest
Culverden	2.4	2.5	1928	Highest
Dannevirke	6.1	1.6	1951	Highest
Gisborne	7.9	2.4	1905	Highest
Hamilton (Ruakura)	6.6	2.0	1906	Highest
Hawera	7.6	2.2	1977	Highest
Hicks Bay	10.6	2.1	1969	Highest
Kaitaia	10.9	2.1	1948	Highest
Kerikeri	9.1	1.9	1945	Highest
Levin	6.7	1.8	1895	Highest
Lower Retaruke	5.4	2.3	1966	Highest
Māhia	9.4	1.6	1990	Highest
Martinborough	5.8	1.9	1986	Highest
Masterton	5.1	2.7	1906	Highest
Mokohinau	13.3	1.5	1994	Highest
Motu	5.3	3.2	1990	Highest
Mt Ruapehu (Chateau)	1.2	1.6	2000	Highest
Ngawi	9.8	1.5	1972	Highest
Paeroa	8.2	2.5	1947	Highest
Palmerston North	6.6	1.5	1928	Highest
Paraparaumu	7.8	2.3	1953	Highest
Porirua	7.6	1.8	1968	Highest
Port Taharoa	10.4	2.2	1973	Highest
Rangiora	3.3	2.1	1965	Highest
Reefton	3.5	2.1	1960	Highest
Taumarunui	5.2	2.2	1947	Highest
Taupō	5.2	2.6	1949	Highest
Tauranga	8.8	2.2	1913	Highest
Te Puke	7.4	2.4	1973	Highest
Turangi	4.1	1.7	1968	Highest
Upper Hutt	5.9	2.0	1939	Highest
Waiouru	2.7	1.9	1962	Highest
Wellington (Airport)	8.9	1.5	1962	Highest
Wellington (Kelburn)	8.3	1.5	1928	Highest
Whakatāne	7.4	2.8	1974	Highest
Whanganui	8.1	1.8	1937	Highest
Whatawhata	7.7	2.1	1952	Highest

Whitianga	8.6	2.3	1962	Highest
Auckland (Airport)	9.8	1.8	1959	2nd-highest
Hamilton (Airport)	6.1	1.9	1946	2nd-highest
Hastings	5.4	2.2	1965	2nd-highest
Hokitika	5.4	1.7	1866	2nd-highest
Leigh	11.6	1.3	1966	2nd-highest
New Plymouth	8.2	1.6	1944	2nd-highest
Oamaru	3.4	0.7	1967	2nd-highest
Ōkārito	5.5	2.2	1982	2nd-highest
Rotorua	5.6	1.2	1964	2nd-highest
Waikeria	5.8	1.9	1957	2nd-highest
Wairoa (North Clyde)	7.2	2.2	1964	2nd-highest
Westport	7.1	1.8	1937	2nd-highest
Auckland (Whangaparāoa)	11.1	1.6	1982	2nd-highest
Whangarei	9.9	1.7	1967	2nd-highest
Windsor	1.1	1.1	2000	2nd-highest
Kaikōura	6.8	1.0	1963	3rd-highest
Matamata	6.0	2.5	1999	3rd-highest
Medbury	2.0	2.0	1927	3rd-highest
Auckland (Pukekohe)	8.2	1.3	1969	3rd-highest
Stratford	5.7	1.4	1960	3rd-highest
Takapau Plains	5.0	1.7	1962	3rd-highest
Waiau School	2.2	2.3	1974	3rd-highest
Ashburton	2.4	1.1	1928	4th-highest
Dargaville	9.6	1.2	1943	4th-highest
Dunedin (Musselburgh)	4.6	0.9	1947	4th-highest
Greymouth	6.2	1.4	1947	4th-highest
Haast	5.8	1.6	1949	4th-highest
Le Bons Bay	6.2	1.0	1984	4th-highest
Middlemarch	-0.4	0.6	2000	4th-highest
Milford Sound	3.4	1.7	1934	4th-highest
Napier	7.0	2.1	1870	4th-highest
Te Kuiti	5.5	1.1	1959	4th-highest
Waipara West	3.9	1.0	1973	4th-highest
Whakatu	5.0	1.8	1965	4th-highest
Low records or near-records				
None observed				

Rainfall: Widespread wet winter

It was an exceptionally wet winter with the vast majority of the country observing above normal (120-149% of normal) or well above normal (>149% of normal) rainfall. The wet winter was the result of multiple extreme weather events which are expanded upon in the [highlights and extreme events](#) section. 18 locations experienced their wettest winter on record and a further 24 locations experienced a near-record wet month. Nationally, it was our wettest on record based on analysis of rainfall anomalies from NIWA's Virtual Climate Station Network which extends back to 1971

It was the wettest winter on record for Wellington (Kelburn) since records began in 1928. Surprisingly, it was not the wettest winter on record in Nelson but the 4th-wettest – the top 2 wettest winters on record occurred prior to 1880.

The exceptions to the wet winter were parts of Waikato including the Coromandel, eastern parts of the North Island from East Cape down through to coastal Wairarapa and southern Southland where near normal rainfall (80-119% of normal) was observed for the season as a whole.

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				
Te Puke	856	174	1973	Highest
Paraparaumu (Airport)	623	214	1945	Highest
Levin	549	185	1895	Highest
Wellington (Kelburn)	744	190	1928	Highest
Wellington (Airport)	577	188	1958	Highest
Stratford	980	165	1960	Highest
Tākaka	1340	230	1976	Highest
Hokitika	1176	170	1866	Highest
Greymouth	999	159	1947	Highest
Ōkārito	1231	170	1981	Highest
Appleby	578	207	1932	Highest
Blenheim	413	213	1927	Highest
Arthurs Pass	2040	200	1906	Highest
Mt Cook Village	1818	205	1928	Highest
Windsor	251	230	2000	Highest
Oamaru	386	334	1941	Highest
Cromwell	203	224	1949	Highest
Lauder	167	223	1924	Highest
Taumarunui	674	154	1913	2nd-highest
Palmerston North	460	173	1928	2nd-highest
Arapito	838	140	1978	2nd-highest
Haast	1270	131	1941	2nd-highest
Motueka (Riwaka)	806	194	1943	2nd-highest
Christchurch (Airport)	402	218	1863	2nd-highest

Lake Tekapo	383	228	1925	2nd-highest
Wānaka	362	195	1927	2nd-highest
Queenstown	430	214	1871	2nd-highest
Clyde	163	191	1978	2nd-highest
Kerikeri (Airport)	1103	193	1935	3rd-highest
Tūrangi	659	144	1968	3rd-highest
Lower Retaruke	602	136	1966	3rd-highest
Upper Hutt	647	166	1924	3rd-highest
Reefton	767	142	1960	3rd-highest
Franz Josef	1623	132	1926	3rd-highest
Nelson	746	297	1862	3rd-highest
Timaru	296	229	1881	3rd-highest
Auckland (Whenuapai)	643	163	1943	4th-highest
Auckland (Airport)	561	159	1959	4th-highest
Dannevirke	441	156	1951	4th-highest
Waipara West	312	184	1973	4th-highest
Manapouri	415	145	1961	4th-highest
Low records or near-records				
None observed				

Winter in the six main centres

It was the warmest winter on record for all North Island main centres. Temperatures were above average in Christchurch and Dunedin and it was the 3rd warmest winter on record in Dunedin. All of the main centres experienced above or well above normal winter rainfall. For Wellington, it was the wettest winter on record, while Christchurch had its 2nd wettest winter on record. Of the six main centres in winter 2022, Auckland was the warmest, Tauranga was the sunniest, Christchurch was the coolest, Dunedin was the driest and Wellington was the wettest and least sunny.

Winter 2021 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland ^a	13.2	+1.9	Well above average (warmest on record)
Tauranga ^b	12.5	+1.8	Well above average (warmest on record)
Hamilton ^c	10.8	+1.6	Well above average (warmest on record)
Wellington ^d	10.6	+1.2	Above average (warmest on record)
Christchurch ^e	7.5	+1.1	Above average
Dunedin ^f	8.3	+1.1	Above average (3 rd warmest on record)
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland ^a	547	148	Above normal
Tauranga ^b	589	167	Well above normal
Hamilton ^c	462	124	Above normal
Wellington ^d	744	190	Well above normal (wettest on record)
Christchurch ^e	402	218	Well above normal (2 nd wettest on record)
Dunedin ^f	285	167	Well above normal
Sunshine			
Location ²	Sunshine (hours)		
Auckland ^a	396		
Tauranga ^b	452		
Hamilton ^g	381 ³		
Wellington ^d	316		
Christchurch ^e	386		
Dunedin ^f	330		

^a Māngere ^b Tauranga Airport ^c Hamilton Airport ^d Kelburn ^e Christchurch Airport ^f Musselburgh ^g Ruakura

² Tauranga, Wellington and Christchurch record sunshine use Campbell-Stokes manual sunshine recorders, whereas Auckland, Hamilton and Dunedin record sunshine with high-precision electronic sensors.

³ 1.5 missing days

Highlights and extreme events

This section contains information pertaining to some of the more significant highlights and extreme events that occurred during winter 2022. Note that a more detailed list of significant weather events for winter 2022 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 [here](#).

Temperatures

The highest temperature during winter 2021 was 24.3°C, observed at Wairoa on 20 August.

The lowest temperature during winter 2021 was -11.6°C, observed at Aoraki/Mt Cook Airport on 17 July.

On 19 August, Kaitia recorded a minimum temperature of 18.2°C, the warmest August minimum temperature on record for all of New Zealand. Meanwhile, Whangārei and Auckland set records for their warmest August night for the third consecutive night. Numerous additional North Island locations also set their own record or near-record warmest August minimum temperature mark between 19-20 August. These extremely warm overnight temperatures were driven by an air mass reaching New Zealand directly from the tropics.

On 20 August, a continued northerly flow resulted in unusually warm temperatures across the North Island. Most notably, Wairoa reached 24.3°C, the 2nd-warmest August temperature on record in the North Island.

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				
Farewell Spit	20.2	Jun-01st	1971	Highest
Hawera	19.0	Jul-08th	1977	Highest
Ngawi	22.1	Aug-19th	1972	Highest
Waiau School	24.0	Aug-17th	1974	Highest
Wairoa (North Clyde)	24.3	Aug-20th	1964	Highest
Wellington (Airport)	19.3	Aug-26th	1937	Highest
Whangārei	23.0	Aug-20th	1967	Highest
Castlepoint	21.6	Jun-01st	1972	2nd-highest
Greymouth	19.0	Aug-18th	1947	2nd-highest
Matamata	20.6	Jun-01st	1999	2nd-highest
Porirua	19.2	Jul-26th	1968	2nd-highest
Queenstown	20.1	Aug-05th	1871	2nd-highest
Waipawa	23.8	Aug-20th	1945	2nd-highest
Whitianga	22.1	Jun-01st	1962	2nd-highest
Haast	18.6	Aug-26th	1949	Equal 2nd-highest
Ōkārito	18.6	Aug-26th	1982	Equal 2nd-highest
Stewart Is	17.0	Jun-07th	1975	Equal 2nd-highest
Te Puke	20.4	Jun-01st	1973	Equal 2nd-highest
Auckland (Airport)	21.2	Jun-01st	1959	3rd-highest
Auckland (Mangere)	21.2	Aug-20th	1959	3rd-highest

Culverden	22.7	Aug-17th	1928	3rd-highest
Hanmer Forest	23.4	Aug-17th	1906	3rd-highest
Medbury	22.1	Aug-17th	1927	3rd-highest
Mokohinau	19.1	Jun-01st	1994	3rd-highest
Ohakune	18.8	Aug-19th	1962	3rd-highest
South West Cape	16.6	Jun-01st	1991	3rd-highest
Te Kuiti	20.6	Jun-01st	1959	3rd-highest
Thames	21.2	Jun-01st	1946	3rd-highest
Waipara West	23.0	Aug-17th	1973	3rd-highest
Whakatāne	20.6	Jun-01st	1975	3rd-highest
Whanganui	21.4	Aug-20th	1937	3rd-highest
Auckland (Whangaparāoa)	19.9	Jun-01st	1982	3rd-highest
Arapito	19.4	Jul-26th	1978	Equal 3rd-highest
Kerikeri	21.3	Jun-01st	1945	Equal 3rd-highest
Auckland (Whenuapai)	20.8	Jun-01st	1945	4th-highest
Campbell Island	12.3	Jun-06th	1991	4th-highest
Gisborne	22.7	Aug-20th	1905	4th-highest
Hamilton (Airport)	20.3	Jun-01st	1946	4th-highest
Hamilton (Ruakura)	21.1	Jun-01st	1906	4th-highest
Hastings	23.8	Aug-21st	1965	4th-highest
Martinborough	20.4	Aug-18th	1986	4th-highest
Motu	18.9	Aug-21st	1990	4th-highest
Tauranga	20.9	Jun-01st	1913	4th-highest
Wellington (Kelburn)	18.1	Aug-19th	1928	4th-highest
Whakatu	23.5	Aug-21st	1965	4th-highest
Cromwell	20.6	Aug-05th	1949	Equal 4th-highest
Five Rivers	18.3	Aug-05th	1982	Equal 4th-highest
Hicks Bay	20.2	Jun-02nd	1969	Equal 4th-highest
Paraparaumu	19.5	Jul-26th	1953	Equal 4th-highest
Low records or near-records				
Kaikōura	4.3	Aug-09th	1972	4th-lowest
Waiau School	2.6	Aug-08th	1974	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
Low records or near-records				
Middlemarch	-11.2	Jun-23rd	2000	2nd-lowest
Dunedin (Airport)	-8.6	Jun-23rd	1962	Equal 2nd-lowest
Rotorua	-5.0	Aug-13th	1964	3rd-lowest
Manapouri	-8.2	Aug-10th	1963	3rd-lowest
Mt Ruapehu (Chateau)	-8.0	Aug-13th	2000	Equal 4th-lowest
High records or near-records				
Dargaville	17.4	Aug-19th	1951	Highest
Hamilton (Airport)	16.2	Aug-19th	1946	Highest
Hāwera	15.5	Aug-19th	1977	Highest

Kaitaia	18.2	Aug-19th	1948	Highest
Levin	16.1	Aug-19th	1950	Highest
Lower Retaruke	15.7	Aug-19th	1972	Highest
Māhia	14.8	Jun-02nd	1990	Highest
Martinborough	15.3	Aug-20th	1986	Highest
Masterton	15.7	Aug-20th	1943	Highest
Matamata	15.5	Aug-19th	1999	Highest
Motu	14.4	Aug-20th	1990	Highest
Ohakune	14	Aug-19th	1972	Highest
Paeroa	17.3	Aug-19th	1971	Highest
Paraparaumu	15.9	Aug-19th	1972	Highest
Port Taharoa	16.7	Aug-19th	1974	Highest
Reefton	12.3	Aug-20th	1972	Highest
Rakiura/Stewart Island	12	Jul-04th	1975	Highest
Taumarunui	15.6	Aug-19th	1947	Highest
Taupō	14.6	Aug-19th	1950	Highest
Te Kuiti	15.4	Aug-19th	1959	Highest
Upper Hutt	15.7	Aug-19th	1972	Highest
Waiouru	12.2	Aug-19th	1972	Highest
Waipawa	14.3	Aug-20th	1945	Highest
Wellington (Kelburn)	14.4	Aug-19th	1931	Highest
Whanganui (Spriggens Park)	16.8	Aug-20th	1972	Highest
Auckland (Whangaparāoa)	16.1	Jun-02nd	1982	Highest
Whangārei	17.6	Aug-19th	1967	Highest
Whitianga	16.8	Aug-19th	1971	Highest
Auckland (Whenuapai)	16.4	Aug-19th	1951	Equal highest
Castlepoint	16	Jun-02nd	1972	Equal highest
Mt Ruapehu (Chateau)	9.9	Aug-19th	2000	Equal highest
Waikeria	16.1	Aug-19th	1972	Equal highest
Auckland (Western Springs)	16.2	Aug-19th	1971	2nd-highest
Blenheim	15	Aug-20th	1947	2nd-highest
Campbell Island	9.3	Jun-01st	1991	2nd-highest
Culverden	15	Jul-19th	1930	2nd-highest
Franz Josef	12.6	Aug-18th	1953	2nd-highest
Hicks Bay	16.6	Jun-02nd	1972	2nd-highest
Medbury	14	Jul-19th	1927	2nd-highest
Mokohinau	16.9	Jun-02nd	1994	2nd-highest
Orari Estate	10.5	Aug-06th	1972	2nd-highest
Palmerston North	14.3	Aug-19th	1940	2nd-highest
South West Cape	12.3	Jun-01st	1991	2nd-highest
Stratford	13.3	Aug-19th	1972	2nd-highest
Turangi	13.3	Aug-20th	1968	2nd-highest
Wairoa (North Clyde)	16.5	Aug-19th	1972	2nd-highest
Wellington (Airport)	15	Aug-20th	1972	2nd-highest
Christchurch (Gardens)	11.9	Jun-01st	1863	Equal 2nd-highest
Farewell Spit	14	Aug-19th	1972	Equal 2nd-highest
Tautuku	10.5	Jun-02nd	1976	Equal 2nd-highest
Whakatāne	16.1	Aug-20th	1975	Equal 2nd-highest

Dannevirke	14	Aug-20th	1951	3rd-highest
Hastings	14.5	Aug-19th	1972	3rd-highest
Hokitika	13.3	Aug-18th	1866	3rd-highest
Kaikohe	16.3	Aug-19th	1973	3rd-highest
Kaikōura	13.5	Jun-02nd	1972	3rd-highest
Nelson	14.2	Aug-19th	1862	3rd-highest
Rotorua	13.9	Aug-19th	1972	3rd-highest
Westport	13.6	Aug-18th	1966	3rd-highest
Akaroa	13.4	Jun-01st	1978	Equal 3rd-highest
Appleby	13	Jun-01st	1941	Equal 3rd-highest
Gisborne	15.7	Aug-20th	1940	Equal 3rd-highest
Nugget Point	10.5	Jun-01st	1972	Equal 3rd-highest
Te Puke	15.3	Aug-19th	1973	Equal 3rd-highest
Whakatu	14.4	Jun-02nd	1972	Equal 3rd-highest
Cheviot	11.4	Jul-19th	1982	4th-highest
Dunedin (Musselburgh)	11.7	Jun-01st	1947	4th-highest
Hamilton (Ruakura)	15.6	Aug-19th	1940	4th-highest
Leigh	16.4	Jun-02nd	1966	4th-highest
Napier	15.6	Jun-02nd	1940	4th-highest
Nelson	14	Jun-01st	1862	4th-highest
New Plymouth	15.4	Jun-01st	1944	4th-highest
Ngawi	15.5	Aug-20th	1972	4th-highest
Peel Forest	10.4	Jun-02nd	1973	4th-highest
Tākaka	12.9	Aug-20th	1978	4th-highest
Thames	15.9	Jun-01st	1957	4th-highest
Waiau School	14.7	Jul-19th	1974	4th-highest
Greymouth	12.9	Aug-18th	1972	Equal 4th-highest
Kerikeri	16.7	Aug-19th	1952	Equal 4th-highest
Secretary Island	13	Jun-01st	1988	Equal 4th-highest
Tauranga	16	Aug-20th	1941	Equal 4th-highest

Rain and slips

The highest 1-day rainfall was 371 mm, recorded at Aoraki/Mt Cook Village on 18 July.

On 12 June, thunderstorms delivered periods of heavy rainfall to the Wellington region. Surface flooding was reported in Lower Hutt, Porirua, Plimmerton, and Waikanae, while SH59 at Paremata was closed due to flooding. Farther south, flooding was reported on SH6 between Cromwell and Luggate, and the intersection of Frankton and Perkins Roads in Queenstown.

On 11-12 July an atmospheric river of moisture brought heavy rain and strong winds large parts of the North Island and northern and eastern parts of the South Island. On the Coromandel Peninsula, State Highway 25 (SH25) was closed north of Whitianga due to a large slip. In Auckland, commuters were slowed by surface flooding and SH1 was blocked between Pūhoi and Warkworth. Several Auckland ferries were cancelled on Tuesday morning. In Palmerston North, firefighters attended two incidents for roofs lifting off houses. Power had been down in multiple parts of Horowhenua, with *Powerco* clearing trees from lines north of Foxton, which cut power to 26 properties.

In the South Island, SH1 between Blenheim and Seddon was closed for a time due to flooding. The heavy rain also meant the sewerage systems in Blenheim and Seddon were at full capacity and

residents were being asked not to flush toilets. In the Tasman District the Riuwaka River was swollen by heavy rain causing surface flooding at Cooks Corner. Tasman District Council reported that slips and trees had affected roads across the region, including around St Arnaud, Motueka Valley Highway, and Moutere. There had also been power cuts in Motueka that had affected 1000 connections in Kaiteriteri and Riwaka. In the West Coast, Buller Electricity reported multiple power outages.

On 18-19 July an active front brought persistent rain to the West Coast with large amounts of spillover into Otago as well as southern Canterbury and the high country. Flooding and a slip cut off the villages of Aoraki/Mount Cook and Lake Ōhau from SH8 Omarama to Tarras (Lindis Pass) and the section between Omarama and Twizel was also closed overnight due to slips. *Environment Canterbury* reported that some rivers and streams originating from the main divide - Ahuriri, Omarama and Otematata had caused localised flooding issues. Aoraki/Mt Cook Village experienced its wettest July day on record with records extending back to 1928. It was also the wettest July day on record at Tara Hills and Clyde with records beginning in 1949 and 1978, respectively.

On 21 July a deep low brought strong winds and persistent rain to the Greater Wellington region and the eastern South Island. Parts of Otago, Christchurch and Banks Peninsula experienced flooding. The Ōpāwaho/Heathcote River burst its banks, leaving some roads submerged in water. Some nearby properties were also impacted by the flooding and several roads around the city are closed. The Timaru District Council declared a State of Emergency for Pleasant Point (near Temuka) after damage to a stopbank.

On 25-26 July a sub-tropical low brought strong winds and heavy rain to the upper North Island before impacting the east of both the North and South islands. Two thousand properties around Waitangi and Paihia lost power and there were several school closures. In Auckland a number of public transport routes were impacted by the weather and all Gulf Harbour ferry services were cancelled. Flooding and slips affected the Coromandel overnight and much of the peninsula became cut off. A slip also blocked SH33 near Bay of Plenty. On 26 July, heavy rain caused surface flooding and closed roads in Christchurch, where the Avon and Heathcote Rivers burst their banks in places and worsened flooding across the central city. The heavy rain closed schools and shut streets. The Waitaki District Council warned people to stay home as flooding closed more than 20 roads. Four households were evacuated in Lyttelton and Redcliffs because of slips.

On 8 August, multiple slips due to heavy rain in Wellington led to road closures and home evacuations. Most notably, more than 25 residents living in eight homes were forced to evacuate after a steep bank collapsed at The Terrace. Other slips were reported in Horokiwi, Aro Valley, Wadestown, and Wilton, while there was flooding in Karaka Bay and Seatoun. The Seatoun Tunnel was closed due to the threat of a tree falling onto the road. Heavy rain on 8-9 August also caused flooding in Puhoi, with water overtopping roads near the village centre and affecting the Puhoi General Store. There were reports of a car trapped in floodwater.

From 16-20 August, an atmospheric river of moisture extending from the tropics impacted New Zealand with a long-duration heavy rain and flooding event. An analysis by NIWA indicated it was the strongest August atmospheric river in the New Zealand region on record since at least 1959 with a maximum integrated water vapour transport value of 1749 kg/m/s. Values above 1250 kg/m/s are considered exceptional. This resulted in a 1-in-120 year rain event in Nelson.

The most heavily impacted areas included Northland, Taranaki, Wellington, Tasman, Marlborough, but particularly Nelson, which observed severe flooding.. States of Emergency were declared in Nelson-Tasman, West Coast, and Marlborough, while \$200,000 was announced for the Nelson-

Tasman mayoral fund for immediate assistance. The mayor of Nelson said that the city's recovery may take years.

In Nelson, severe flooding was observed as the Maitai River burst its banks, with residents living near the river asked to evacuate. The river's flow reached a maximum of 459 cumecs on 17 August, well above its previous record flow of 237 cumecs in December 2011. Nearly 500 homes were evacuated in and around Nelson. On 17 August, a voluntary evacuation order was announced for parts of Westport, Seddonville, and Mokihinui in the West Coast, covering about 140 households. In the Wellington Region, heavy rainfall resulted in 170 slips between 18-21 August. In Taranaki, rivers rose rapidly on 18 August as extreme rainfall fell on Mt Taranaki, where more than a metre of rain was observed during the multi-day event. Four homes near Okato were evacuated due to the threat of the Stony River bursting its banks after it rose more than two metres. In Northland, the Kaeo River bridge along SH10 flooded on 18 August, as did SH1 at Rangiahua. Flooding cut off Kaitaia with no detours available, as nine local roads were closed due to flooding and slips, including SH1 through Mangamuka Gorge. Top Energy reported power cuts at six different places across the Far North, with a maximum of 1500 customers without power on 18 August.

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
Flemington	171	Jun-13th	1958	Highest
Māhia	538	Aug-05th	1990	Highest
Waikanae	117	Jun-12th	1969	Highest
Stratford	148	Aug-18th	1960	Highest
Mt Cook Village	371	Jul-18th	1928	Highest
Tara Hills	84	Jul-18th	1949	Highest
South West Cape Aws	172	Aug-27th	1991	Highest
Paraparaumu	68	Aug-18th	1951	2nd-highest
Reikorangi	106	Jun-12th	1969	2nd-highest
Lake Pukaki (Guide Hill)	105	Jul-18th	1963	2nd-highest
Moanaroa	103	Jul-26th	1964	2nd-highest
Oamaru	120	Aug-18th	1950	2nd-highest
Rakiura / Stewart Island	62	Jul-04th	1975	2nd-highest
Whangapoua	103	Jul-07th	1991	3rd-highest
New Plymouth	100	Aug-18th	1944	3rd-highest
Mt Ruapehu (Chateau)	97	Aug-06th	2000	3rd-highest
Judgeford	63	Jun-12th	1978	3rd-highest
Pelorus Sound	102	Jul-30th	1982	3rd-highest
Waimate	90	Jul-26th	1898	3rd-highest
Windsor	65	Jul-26th	2000	3rd-highest
Puhata	81	Jul-10th	1979	4th-highest
Marokopa	64	Jun-02nd	1957	4th-highest
Tākaka	173	Aug-17th	1976	4th-highest
Lyndhurst Limewood Farm	68	Jul-12th	1934	4th-highest
Prebbleton Valway	56	Jul-26th	1969	4th-highest
Clyde	26	Jul-18th	1978	4th-highest

Wind

The highest wind gust was 198 km/h, observed at Cape Turnagain on 9 July.

On 13 June, strong winds and high seas resulted in damaging waves along the West Coast, and inundation of coastal land by sea surges. The residents of Ngakawau, Granity, Hector and Mokihinui (north of Westport) were advised to evacuate due to large swells in the area. Farther north, swells of up to 6 metres occurred about the Kāpiti Coast. Waves were regularly crashing over Marine Drive (Eastern Bays, Wellington), however the road remained open. Foxton Beach also suffered flooding and debris issues because of high seas. The Kāpiti Coast District Council closed Reikorangi Road (southeast of Waikanae) due to the risk of falling trees, which left around 400 residents of the Reikorangi community isolated. Approximately 200 customers in the area were without power due to a downed tree damaging power lines. In Taranaki, power outages at around 1,000 properties were caused due to downed trees taking out power lines. By early evening, 270 properties in Waititi, Urenui, Tarata, New Plymouth and Waverley remained without power.

On 11 July, strong winds brought down power lines in Taranaki, causing power outages for approximately 300 properties across Warea, Eltham, Urenui and Okato.

On 18 July, strong winds in Canterbury and Otago caused power outages affecting more than 1000 homes. The wind also downed trees including on SH1 near Karitane and caused flights disruptions at Dunedin and Christchurch airports.

On 21 July a deep low brought strong southerly winds to the Greater Wellington region. The weather caused most flights in and out of Wellington to be cancelled as well as the Cook Strait ferry crossings. Large waves affected the southern coastal roads and caused widespread erosion.

On 5 August, high winds in Southland blew over a campervan and a truck on Mossburn-Five Rivers Road. SH77 was closed at Mount Hutt due to a fallen tree and downed powerlines. Strong winds cut power to several small settlements south of Lake Wakatipu, including Kingston and Athol.

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

Location	Extreme wind gust (km/h)	Date of extreme gust	Year records began	Comments
Mt Ruapehu (Chateau)	133	Aug-07th	2000	Highest
Martinborough	115	Jun-13th	2001	Highest
Farewell Spit	115	Jun-13th	1973	Highest
Wanaka	115	Aug-05th	1992	Highest
Middlemarch	165	Jun-30th	2000	Highest
Alexandra	141	Aug-05th	2001	Highest
Palmerston North	95	Jun-13th	1991	Equal highest
Clyde	102	Aug-05th	1983	Equal highest
Paeroa	109	Jul-25th	1991	2nd-highest
Baring Head	158	Jul-21st	1991	2nd-highest
Secretary Island	139	Aug-05th	1994	2nd-highest
Puysegur Point	180	Aug-05th	1986	2nd-highest
Winchmore	132	Jul-18th	1970	2nd-highest
Dargaville	106	Jun-13th	1997	3rd-highest
Upper Hutt	93	Jun-13th	1999	3rd-highest

Reefton	57	Jun-07th	1999	3rd-highest
Taupō	93	Jun-13th	1982	Equal 3rd-highest
New Plymouth	117	Jun-13th	1972	Equal 3rd-highest
Mt Cook (Airport)	141	Aug-05th	2000	Equal 3rd-highest
Windsor	91	Aug-02nd	2001	Equal 3rd-highest
Westport	111	Jun-13th	1973	4th-highest
Whitianga	78	Jun-13th	1991	Equal 4th-highest
Waiouru	115	Aug-18th	1970	Equal 4th-highest
Dunedin (Airport)	113	Aug-05th	1972	Equal 4th-highest
Mt Ruapehu (Chateau)	133	Aug-07th	2000	Highest

Snow and ice

From 7-14 June, a prolonged period of low pressure over and to the south of the South Island delivered considerable snowfall to mountainous areas, as well as to lower elevations. The timing was ideal for ski areas, with several opening for the season in mid-June. With that said, the large quantity of snowfall and snowdrifts meant considerable work was required to clear ski area access roads, carparks, and base lodge facilities. Many roads and mountain passes were closed due to snow, some for several consecutive days. Some of the key highlights of this event:

- On 11 June, snow fell to sea level in Stewart Island. The Milford Road was closed, with local contractors reporting half a metre of snow at the Homer Tunnel. The Lindis Pass also closed, and was only reopened on 14 June after several days of regular and relatively heavy snowfall.
- On 13 June, snow settled in several inland towns including Glenorchy, Wānaka, Cromwell, Omarama, Twizel and Lake Tekapo. In Wānaka, two schools were closed due to snow. All major mountain passes in the South Road were closed due to snow including SH6 from Haast to Makarora, SH7 from the Hanmer turnoff to Springs Junction, SH8 between Tekapo and Fairlie (Burkes Pass). The ski area manager of Coronet Peak (Queenstown) said the field faced unprecedented issues with avalanches over the ski field and access road.

On 8 July, snow fell to low elevations in many inland parts of the South Island, including Cromwell, Wānaka, and Lake Tekapo. The Crown Range Road was closed due to snow and black ice, while the Haast, Lindis and Burke's Passes were also closed due to snow.

On 12 July, the atmospheric river that brought flooding to parts of the country also brought snow to Canterbury and Otago. SH8 between Fairlie and Lake Tekapo was closed due to snow and ice. SH73 between Springfield and Castle Hill was also closed. Around 50 cm of snow was reported by mid-afternoon in Mount Cook Village.

On 18-19 July snow fell over high elevations in the South Island. NIWA's monitoring station at Mueller Hut (Aoraki/Mt Cook National Park) recorded over half a meter of new snow.

On 7-8 August, substantial snowfall fell to relatively low elevations across interior Canterbury and Otago, with a dusting observed in Dunedin. At elevations of 500-600 metres, amounts of 5-10 cm were observed, including at locations such as Ranfurly, St Bathans, and Methven. SH8 between Fairlie and Twizel was closed, as was SH85 from Kyeburn to Alexandra. Some additional inland routes such as SH77 remained open, but chains were essential for travel.

Lightning, hail, and tornadoes

June was a particularly stormy month for parts of New Zealand. Over 23,000 lightning strikes were recorded over the land or just offshore throughout the month, and several severe thunderstorms struck the greater Wellington Region, leading to hail and a series of powerful convective wind events.

On 1 June, squally thunderstorms struck the Kāpiti Coast in association with the passage of a cold front. Small tornadoes were reported in Waikanae and Otaihanga, causing damage to property including roofs and fences, and bringing down mature trees.

On 9 June, a possible tornado was reported in Waikanae, with two Norfolk Pine tree trunks smashing through the roof of a warehouse on Omaha Street. Further damage was reported on nearby Kapanui Road, with downed trees and fences there. A severe thunderstorm in Wellington caused power outages at Wellington Hospital, Parliament, the CDB, and Hutt Valley. Farther north, a water spout was seen off the coast of Waiti (north of New Plymouth).

On 12 June, lightning struck a power pylon on Horokiwi Road in Newlands (Wellington), causing a power outage to 4,000 customers in Newlands and Johnsonville. A funnel cloud was sighted off the coast of Waikanae in the afternoon, while two possible tornadoes caused damage to properties and infrastructure in Waikanae in the evening hours. In New Plymouth, large hailstones of around 2.5 cm were reported, while small hail of around 1 cm were reported in Wellington's CBD.

On 13 June, a funnel cloud was reported over Paraparaumu Beach, and a possible small tornado in Ngakawau (West Coast) lifted a garage off its foundations. Farther north, hail was reported in Hāwera during the passage of a thunderstorm.

Cloud and fog

Throughout winter, and for many weeks prior, numerous people sent messages to NIWA enquiring about vibrant colourful hues in the sky just before sunrise and just after sunset. Measurements from NIWA Lauder (Central Otago) confirmed unusual increases in aerosols in the stratosphere, about 20-25 km above New Zealand. These aerosols originated from the Hunga Tonga-Hunga Ha'apai volcanic eruption in January 2022, and were thought to be the cause of the colourful skies.

From 4-6 August, thick fog resulted in numerous flight cancellations each morning at Auckland Airport. Fog once again disrupted flights on 8 August.

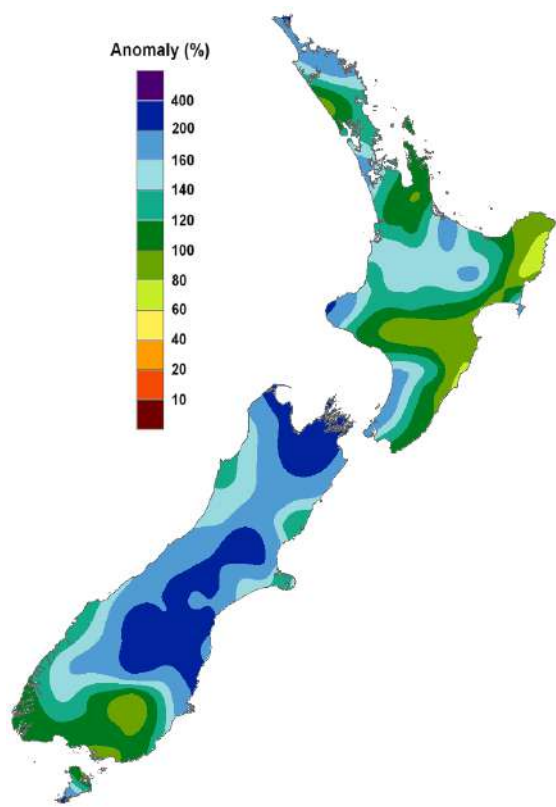
On 18 August, An Air New Zealand flight to Christchurch had to be diverted to Wellington due to fog. However, the plane couldn't land in Wellington due to strong winds. After two diversions, the aircraft finally touched down in Palmerston North.

For further information please contact:

Nava Fedaeff

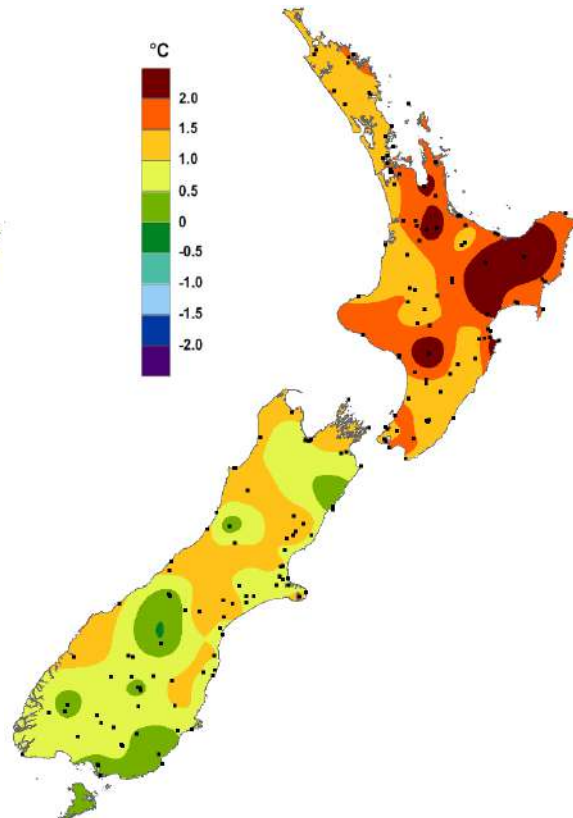
Forecaster / Science Communicator

Tel. 09 375 6337



Winter rainfall

Expressed as a percentage of the 1981-2010 normal.



Winter temperature

Expressed as a departure from the 1981-2010 average in degrees Celsius.

<https://www.niwa.co.nz/our-science/climate>

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