

A dry autumn for most areas of the country

Rainfall	Rainfall totals were below normal (50-79% of the autumn normal) or well below normal (<50 % of the autumn normal) in parts of nearly every New Zealand region. The exceptions were West Coast, Marlborough, Wellington and Wairarapa where near normal (80-119% of the autumn normal) rainfall totals were observed.
Soil moisture	An ongoing lack of rainfall throughout autumn resulted in below normal soil moisture for many parts of the country. Meteorological drought receded significantly during March, but remained in place across parts of Northland, Auckland, and far northern Waikato in early April, with severe meteorological drought across the Coromandel Peninsula. By the end of autumn 2020, soils were drier than normal for many northern, central and eastern parts of the North Island, as well as eastern, inland and southern parts of the South Island. Soil moisture was generally near normal for remaining parts of the country.
Temperature	Temperatures across the country were mostly near average (within 0.50°C of the autumn average).

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Overview

Autumn 2020 was characterised by air pressures that were generally near normal over the country and lower than normal over the Tasman Sea. This was associated with slightly more westerly airflows than normal over the country. The main theme for the season was an ongoing lack of rainfall, with many parts of the country receiving considerably less rainfall than usual. Notably, it was the driest autumn on record for Auckland, Tauranga, and parts of southern Otago. The lack of rainfall meant drier than usual soils and meteorological drought were a feature for many parts of the country during autumn 2020. This created considerable water shortage issues, particularly in places which had also observed a dry summer such as Northland, Auckland, Waikato and Hawke's Bay.

Autumn temperatures were near average for most New Zealand locations. This was reflected by the nationwide average temperature for autumn 2020, which was 13.4°C (0.1°C above the 1981-2010 average from NIWA's seven station temperature series which begins in 1909). The season got off to a hot start, with record or near-record high autumn temperatures recorded during the early days of March (refer to the [highlights and extreme events](#) section for further details). Cheviot recorded 32.8°C on 3 March, which was New Zealand's highest temperature recorded during autumn 2020.

This was closely followed by Hanmer Forest, which recorded 32.6°C on 2 March; Hanmer Forest’s highest autumn temperature since records began in 1906. Heavy frosts struck inland parts of the North Island towards the latter part of May, with Ohakune and Turangi each observing their coldest autumn temperature on record (-6.7°C and -5.6°C, respectively).

Further Highlights:

- The highest temperature was 32.8°C observed in Cheviot on 3 March.
- The lowest temperature was -8.2°C, observed at Middlemarch on 31 May.
- The highest 1-day rainfall was 219 mm, recorded at Milford Sound on 21 May.
- The highest wind gust was 161 km/h, observed at South West Cape on 30 April.
- Of the six main centres in autumn 2020, Auckland was the warmest, Tauranga was the sunniest, Wellington was the wettest, and Dunedin was the driest, coolest, and least sunny.

For further information, please contact:

Gregor Macara
Climate Scientist
Tel. 04 386 0509

Rainfall: Record and near-record low rainfall in many areas

Autumn 2020 was notable for both a persistent and widespread lack of rainfall. Tauranga received just 35% of normal rainfall for the season; its driest autumn since records began in 1898. It was also very dry at Dunedin Airport (approximately 25 km inland from the CBD), where only 39% of normal autumn rainfall was recorded. Dunedin city itself recorded 53% of normal autumn rainfall. Other very dry areas included Cromwell, Clyde, Napier and Wairoa where autumn rainfall ranged from 39-46% of normal.

Record¹ or near-record autumn 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				
Tauranga	114	35	1898	Lowest
Auckland (Mangere)	150	55	1959	Lowest
Dunedin (Airport)	63	39	1962	Lowest
Balclutha	90	55	1964	Lowest
Whakatane	158	54	1952	Equal lowest
Auckland (Western Springs)	179	62	1948	2nd-lowest
Clyde	44	42	1978	2nd-lowest

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.

Rotorua	193	48	1963	3rd-lowest
Whatawhata	246	66	1952	3rd-lowest
Wairoa	154	42	1964	3rd-lowest
Arapito	352	66	1978	3rd-lowest
Akaroa	121	53	1977	3rd-lowest
Nugget Point	116	54	1930	3rd-lowest
Mt Cook (Airport)	465	43	1928	4th-lowest
Lincoln	67	45	1881	4th-lowest
Cromwell	40	39	1949	4th-lowest

Temperature: Near average throughout the country

The nationwide average temperature for autumn 2020 was 13.4°C (0.1°C above the 1981-2010 average from NIWA's seven station temperature series which begins in 1909). Relatively few locations observed record or near-record mean temperatures during the season. Notably, Te Kuiti observed both its lowest mean minimum temperature and second-highest mean maximum temperature on record. It is likely this was a result of clearer skies than normal, allowing both enhanced daytime heating (i.e. bright sunshine heating the air) and radiative cooling at night (i.e. a lack of cloud cover to 'trap' heat overnight). Sunshine data supports this concept, as Te Kuiti observed 32% more sunshine than normal for autumn.

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

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Farewell Spit	16.4	1.7	1971	2nd-highest
South West Cape	11.8	1.1	1991	3rd-highest
Low records or near-records				
Taumarunui	11.8	-1.3	1947	3rd-lowest

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Farewell Spit	20.9	2.4	1971	Highest
Te Kuiti	21.4	1.7	1959	2nd-highest
South West Cape	14.1	1.2	1991	3rd-highest
Hamilton (Ruakura)	21.6	1.8	1906	4th-highest
Low records or near-records				
None observed				

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
None observed				
Low records or near-records				
Te Kuiti	6.5	-2.1	1959	Lowest
Taumarunui	4.7	-2.6	1947	Lowest
Turangi	4.7	-1.9	1968	Lowest
Appleby	5.7	-2.1	1932	2nd-lowest
South West Cape	9.5	1.0	1991	3rd-highest
Matamata	7.8	-0.4	1999	3rd-lowest
Hanmer Forest	2.1	-1.6	1906	3rd-lowest
Clyde	2.8	-1.6	1978	3rd-lowest
Porirua	9.5	-0.8	1968	4th-lowest
Balclutha	4.5	-1.3	1964	4th-lowest

Autumn climate in the six main centres

Auckland and Tauranga each observed their driest autumn on record. It was also a dry season in Dunedin and Christchurch, where autumn rainfall was just 53% and 70% of normal, respectively. Temperatures were near average for all main centres. Of the six main centres in autumn 2020, Auckland was the warmest, Tauranga was the sunniest, Wellington was the wettest, and Dunedin was the driest, coolest, and least sunny.

Autumn 2020 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland ^a	16.2	0.0	Near average
Tauranga ^b	16.0	+0.3	Near average
Hamilton ^c	14.2	0.0	Near average
Wellington ^d	13.9	+0.1	Near average
Christchurch ^e	12.0	+0.1	Near average
Dunedin ^f	11.5	0.0	Near average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland ^a	150	55%	Lowest on record
Tauranga ^b	114	35%	Lowest on record
Hamilton ^c	228	82%	Near normal
Wellington ^d	279	99%	Near normal
Christchurch ^e	104	70%	Below normal
Dunedin ^f	95	53%	Below normal
Sunshine			
Location ²	Sunshine (hours)		
Auckland ^a	565		
Tauranga ^b	567		
Hamilton ^g	545		
Wellington ^d	534		
Christchurch ^e	498		
Dunedin ^f	470		

^a Mangere ^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.

Highlights and extreme events

This section contains information pertaining to some of the more significant highlights and extreme events that occurred during autumn 2020. Note that a more detailed list of significant weather events for autumn 2020 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: <https://niwa.co.nz/climate/monthly>

Rain, slips and dryness

On 12 March, Agriculture Minister Damien O'Connor classified the drought in the North Island, upper South Island, and the Chatham Islands as a large-scale adverse event, unlocking up to \$2 million in government funding to support farmers and growers through to June 2021. Drought relief was also extended to Wairarapa and Hawke's Bay with \$90,000 in funding.

Heavy rain from 28-30 March across the lower North Island and northern Canterbury resulted in substantial improvements in soil moisture levels, especially in Wairarapa and Kaikoura.

On 15 April, *Watercare* reported that Auckland's nine water storage dams were only 50% full, saying such low levels in April had not been seen since 1994. On 17 April, drought conditions in Northland were reported as the worst experienced there in at least 20 years.

On 7 May, in response to one of the most severe droughts in Auckland's history, Auckland Council's Emergency Committee voted to introduce mandatory 'Stage 1' water restrictions. These restrictions came into effect across the region from 16 May, prohibiting the use of outdoor hoses and water-blasters, as well as the watering of sports fields, plants and/or paddocks. Commercial car washes were allowed to operate using recyclable water.

On 31 May, heavy rain fell in parts of the upper North Island. The Coromandel Peninsula was particularly hard hit and there were numerous reports of slips and debris on the roads throughout the area. SH25 between Hikuai and Whitianga was closed overnight due to flooding, and at least two vehicles were trapped in floodwaters.

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

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Homeburn Station	110	Mar-28th	1969	Highest
Whitianga	163	May-30th	1961	2nd-highest
Te Wharau, Glenburn	105	Mar-28th	1923	2nd-highest
Masterton	96	Mar-28th	1926	3rd-highest
Waikoukou, Longbush	97	Mar-28th	1947	3rd-highest
Glenthorne Lower Station	57	Mar-27th	1985	3rd-highest
Lichfield	76	Mar-22nd	1996	4th-highest
Gladstone, Te Kopi	88	Mar-28th	1953	4th-highest
The Downs (Ponotahi)	83	Mar-28th	1946	4th-highest
Pirinoa	93	Mar-27th	1967	4th-highest

Temperatures

Between 1-4 March, multiple locations across New Zealand set autumn high maximum temperature records or near-records. This was due to warm northerly winds affecting the North Island, while Foehn northwesterlies off the Southern Alps brought hot temperatures to Canterbury.

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

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Whitianga	30.3	Mar-4th	1962	Highest
Hanmer Forest	32.6	Mar-2nd	1906	Highest
Tiri Tiri Lighthouse	25.5	Mar-23rd	1982	2nd-highest
Ohakune	27.9	Mar-1st	1962	2nd-highest
Farewell Spit	26.2	Mar-20th	1971	2nd-highest
Five Rivers	28.2	Mar-2nd	1982	2nd-highest
Hawera	25.9	Mar-3rd	1977	Equal 2nd-highest
Leigh	29.3	Mar-8th	1966	3rd-highest
Hamilton (Ruakura)	30.3	Mar-3rd	1906	3rd-highest
Te Kuiti	31.1	Mar-1st	1959	3rd-highest
Cheviot	32.8	Mar-3rd	1982	3rd-highest
Rangiora	31.5	Mar-3rd	1965	3rd-highest
Auckland (Airport)	27.9	Mar-1st	1959	Equal 3rd-highest
Port Taharoa	27.7	Mar-3rd	1973	Equal 3rd-highest
Wairoa	31.8	Mar-3rd	1964	Equal 3rd-highest
Whatawhata	29.8	Mar-1st	1952	4th-highest
Hamilton (Airport)	29.1	Mar-1st	1946	4th-highest
Le Bons Bay	27.1	Mar-3rd	1984	4th-highest
Kaitaia	28.6	Mar-3rd	1948	Equal 4th-highest
Hicks Bay	26.5	Mar-4th	1969	Equal 4th-highest
Low records or near-records				
None observed				

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

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
Low records or near-records				
Turangi	-5.6	May-22nd	1968	Lowest
Ohakune	-6.7	May-22nd	1962	Lowest
Taumarunui	-4.9	May-23rd	1947	2nd-lowest
Takapau Plains	-3.4	May-21st	1962	2nd-lowest

Stratford	-1.8	May-21st	1960	Equal 2nd-lowest
Waiouru	-6.9	May-13th	1962	3rd-lowest
Te Kuiti	-2.5	May-23rd	1959	Equal 4th-lowest
High records or near-records				
Whangaparaoa	20.1	Mar-4th	1982	Highest
Thames	21.7	Mar-4th	1957	Highest
Mokohinau	20.8	Mar-4th	1994	2nd-highest
Port Taharoa	20.1	Mar-4th	1974	2nd-highest
Ophir	17.5	Mar-3rd	1924	Equal 2nd-highest
Whakatane	20.3	Mar-4th	1975	3rd-highest
Cape Reinga	19.9	Mar-2nd	1971	Equal 3rd-highest
Paeroa	20.4	Mar-4th	1971	Equal 3rd-highest
Kaitaia	21.2	Mar-4th	1948	4th-highest
Kaikohe	19.8	Mar-4th	1973	4th-highest
Lower Retaruke	18.3	Mar-4th	1972	4th-highest

Wind

On 17 March, gusty winds in New Plymouth resulted in several calls to FENZ for a variety of incidents including: a fallen tree blocking part of SH3, loose roofing iron, trampolines becoming airborne, trees falling on powerlines and a roof, and mobile scaffolding blowing across a street and hitting parked cars.

On 15 April, a deep low centred east of the South Island generated strong southerly winds and large swells. Coastal parts of Wellington were inundated by large waves, measured to be at least 5.5 m high by a NIWA buoy near Baring Head. The large waves deposited debris over coastal roads and caused damage to private property, including garage doors and walls. The occupants of five properties were forced to evacuate. One person was swept out to sea, but was rescued shortly thereafter suffering moderate injuries.

On 3 May, strong winds battered much of the country. In South Taranaki, a roof was lifted off a cottage, trampolines were upended, and power lines were downed, causing outages to approximately 150 properties. In Wellington, a strong gust of wind lifted the roof of a house in Crofton Downs, and a tree fell onto Wilton Road. In Auckland, a tree fell into the roof at a home in Hillcrest, while in Paengaroa (Bay of Plenty), a tree came down onto an unoccupied car.

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

Location	Extreme wind gust (km/h)	Date of extreme gust	Year records began	Comments
Hawera	111	May-3rd	1986	Highest
Oamaru	100	Mar-23rd	1984	Highest
Motu	106	Apr-13th	1991	2nd-highest
Secretary Island	146	Apr-27th	1994	2nd-highest
Reefton	61	May-2nd	1999	3rd-highest
South West Cape	161	Apr-30th	1991	3rd-highest
Tara Hills	80	Apr-12th	1985	4th-highest

Snow and ice

On 23-24 March, light snow occurred behind a southerly change in the lower South Island. Three centimetres of snow was reported in Naseby, with a dusting on the hills near Mossburn. Dansey's Pass Road was restricted to four-wheel drive only.

On 14 April, snow fell to low elevations in parts of Otago and Southland. Approximately 5cm of snow was reported in Kingston, with a dusting on the hilltops near Dunedin. The Milford Road (SH94) and Crown Range Road were temporarily closed due to snow, with a warning in place on SH6 between Athol and Garston due to snow.

Lightning and hail

On 30 March, a lightning strike early in the morning took out power to most customers north of the city of Gisborne in the Gisborne Region. However, power was restored to customers within about 25 minutes.

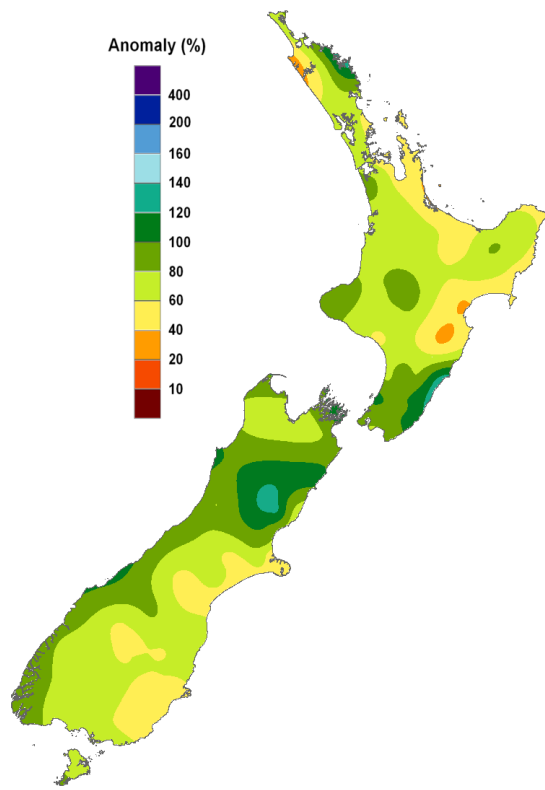
On 5 May, more than 400 homes in Hawera were without power after a suspected lightning strike damaged the electricity supply.

Cloud and fog

On 14 May, morning fog caused delays for the first wave of COVID-19 alert level 2 domestic flights in and out of Christchurch.

For further information or climate data enquiries please contact:

Gregor Macara
Climate Scientist
Tel. 04 386 0509



Autumn 2020 rainfall, expressed as a percentage of normal (1981-2010 normal).

It was a very dry season for many areas of New Zealand. Most notable was Tauranga, which received a total of 114 mm of rain. This was only 35% of normal, and was the city's driest autumn since records began in 1898.

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

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