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New Zealand national climate summary 2011: A year of extremes

The year 2011 will be remembered as one of extremes. Sub-tropical lows during January produced record-breaking rainfalls. The country melted under exceptional heat for the first half of February. Winter arrived extremely late – May was the warmest on record, and June was the 3rd-warmest experienced. In contrast, two significant snowfall events in late July and mid-August affected large areas of the country. A polar blast during 24-26 July delivered a bitterly cold air mass over the country. Snowfall was heavy and to low levels over Canterbury, the Kaikoura Ranges, the Richmond, Tararua and Rimutaka Ranges, the Central Plateau, and around Mt Egmont. Brief dustings of snow were also reported in the ranges of Motueka and Northland. In mid-August, a second polar outbreak brought heavy snow to unusually low levels across eastern and alpine areas of the South Island, as well as to suburban Wellington. Snow also fell across the lower North Island, with flurries in unusual locations further north, such as Auckland and Northland. Numerous August (as well as all-time) low temperature records were broken between 14 – 17 August. And torrential rain caused a State of Emergency to be declared in Nelson on 14 December, following record-breaking rainfall, widespread flooding and land slips.

Annual mean sea level pressures were much higher than usual well to the east of the North Island in 2011, producing more northeasterly winds than usual over northern and central New Zealand. The northeasterly winds resulted in above average annual temperatures and well above normal rainfall for the northeast North Island and the north of the South Island.

The large-scale climate setting was primarily driven by a very strong La Niña event at the start of 2011, which eased to neutral in winter, but redeveloped to moderate levels during spring.

Mean annual temperatures were above average (between 0.5°C and 1.2°C above the long-term average) in the northeast of the North Island, and over the north of the South Island. Mean annual temperatures were generally near average (within 0.5°C of the long-term average) elsewhere. The nation-wide average temperature for 2011 was 12.8°C, 0.3°C above the 1971–2000 annual average, using NIWA's seven-station temperature series which begins in 1909. 2011 was the 17th warmest year since 1909, based on this 7-station series.

In broad terms, six months of the year were wetter than normal and two were drier than normal. Four months were mixed, with large geographical differences between very wet regions and areas of extreme dryness. Annual rainfall totals for 2011 as a whole were above normal (more than 120 percent of annual normal) in parts of: Northland, Auckland, Coromandel, Bay of Plenty, Nelson, and Central Otago; as well as around New Plymouth, Napier, Wanganui and Palmerston North. In contrast, it was a relatively dry year (with annual rainfall totals between 50 and 79 percent of annual normal) for the Kaikoura Coast and Canterbury, as well as much of Fiordland and Westland. Elsewhere, annual rainfall was in the near normal range (80 to 119 percent of normal).

Above normal sunshine was observed in central North Island, and for much of western and southern South Island (with annual sunshine totals between 110 and 125 percent of normal). Parts of Wellington region received below normal (between 75 and 90 percent of normal) sunshine totals for 2011. Elsewhere, sunshine totals were generally close to the annual normal.

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Section 1: Prevailing climate patterns –La Niña to start and end the year; negative SAMmid-year

Annual mean sea level pressures were higher than usual to the east of the North Island in 2011, producing more northeasterly winds than usual over northern and central New Zealand, on average for the year. The northeasterly winds resulted in above average annual temperatures and well above normal rainfall, for many areas of the North Island, and the north of the South Island. Mean sea level pressures were also slightly above normal across the South Island, producing a somewhat drier than usual year for much of the South Island (with the exceptions of Nelson and Central Otago, which were much wetter than usual).

Tropical climate patterns to the north of the country affected New Zealand climate at the start, and also the end, of 2011. A strong La Niña event in the equatorial Pacific dominated our climate during the first half of the year, but had eased back to neutral by winter. A redevelopment of a weak to moderate La Niña occurred during the spring (Figure 1).

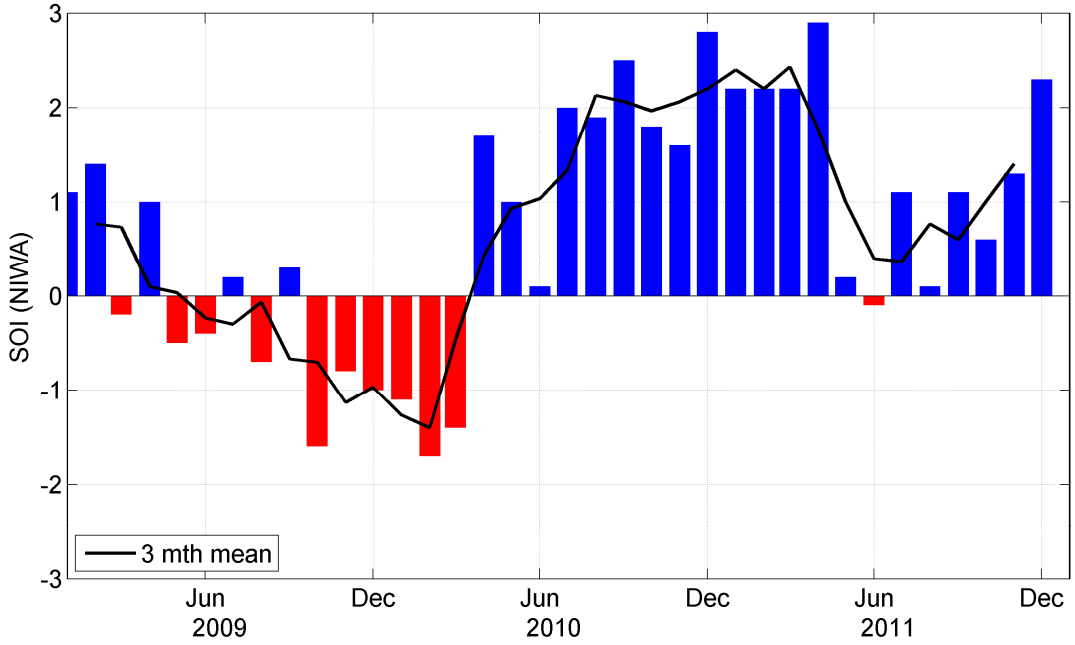


Figure 1: The monthly mean Southern Oscillation Index (SOI) for 2009-2011. The SOI is an index of the El Niño-Southern Oscillation (ENSO) cycle and measures the strength of the tropical Pacific trade winds. Values of the SOI above +1 indicate La Niña conditions, and those below -1 indicate El Niño.

At the same time, to the south of New Zealand, the other major climate pattern that influences New Zealand, the Southern Annular Mode (SAM) was predominantly in its negative phase, especially mid-year. The SAM is one of the most prominent features of southern hemisphere climate on monthly and seasonal time scales. It controls where and how strongly the middle-latitude westerly winds blow, and where the tracks of storms and anticyclones lie across the southern middle latitudes. In the negative phase of the SAM, storm activity tends to increase over New Zealand, with more unsettled weather, while windiness and storm activity ease over the southern oceans. The SAM was predominately negative for much of 2011 (Figure 2), with three notable exceptions (February, May, and December), in which it went strongly positive. These three months were notable for northerly quarter flows, above average temperatures, and (regional) heavy rainfall events.

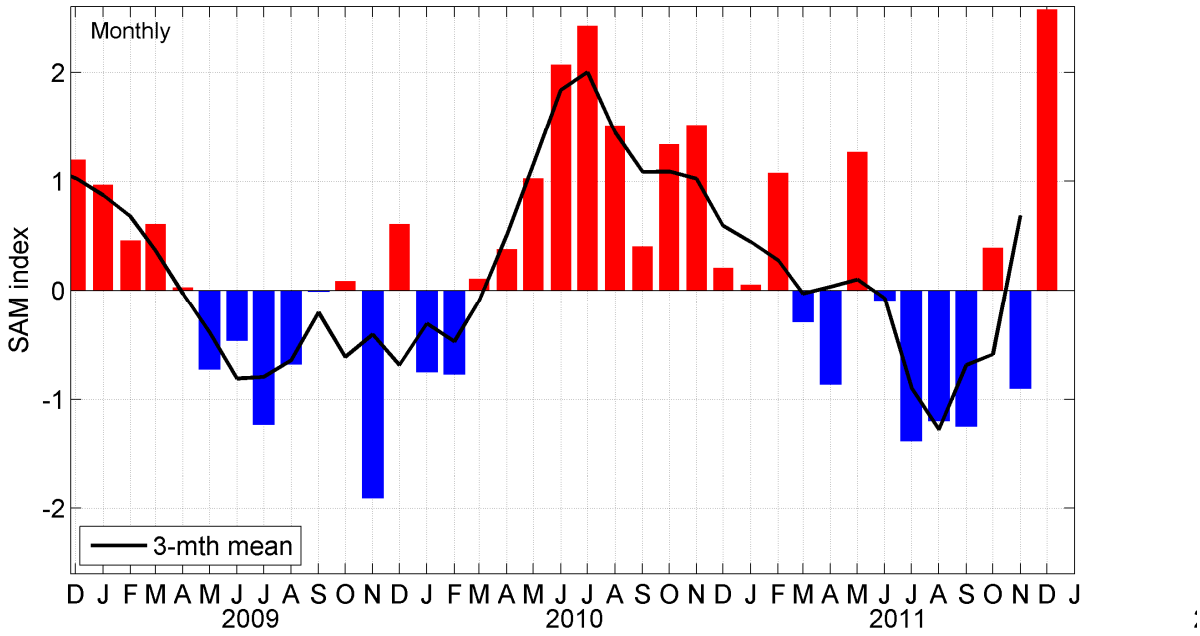


Figure 2: The monthly mean Southern Annular Mode (SAM) index for 2009-2011. The index is related to the strength of the westerly winds over the southern Oceans. Positive values indicate stronger than normal southern ocean westerlies and higher than normal pressures at New Zealand latitudes, while negative values indicate weakened southern ocean westerlies and lower than normal pressures over New Zealand.

Section 2: The year in review

The monthly sequence of New Zealand climate (with clear geographical exceptions) was as follows:

- January: Unsettled, wet and warm for the North Island and West Coast of South Island.
- February: Scorching heat waves in the first half of the month. Extremely dry over most of the North Island, but very wet for the southern half of the South Island. Soil moisture deficits developed over the lower North Island, as well as Marlborough and north Canterbury.
- March: A wet month for the North Island, Marlborough Sounds, coastal Southland and Otago. Soil moisture deficit continued in Tasman District, Marlborough, and parts of Canterbury.
- April: Extreme rain initiated a State of Emergency in Hawkes Bay. Cool conditions in eastern areas of both islands.
- May: Warmest May on record. Extremely wet for much of the North Island, as well as the north and east of the South Island.
- June: 3rd warmest June on record. Very cloudy. Dry across much of the South Island.
- July: Extremely windy and stormy. Polar blast with heavy snow 24-26 July.
- August: Frequent southerly winds. Record-breaking cold temperatures and unusual low-level snowfalls mid-month.
- September: Dry, sunny and cool.
- October: Wet and cloudy for many regions, with frequent easterly winds.
- November: Extremely dry north of Taupo. Wet over much of South Island. Soil moisture deficit developed Taupo northwards, as well as in Gisborne, Hawkes Bay, Marlborough and central Otago.
- December: State of Emergency declared in Nelson following record-breaking rainfall on 14 December.

January 2011: Tropical visitors produce wild weather
Lows to the north of New Zealand resulted in frequent easterly winds over the country during January. Three lows of tropical origin brought torrential rain and gales; former tropical cyclones Vania and Zelia produced heavy rain on the 18th on the West Coast, resulting in the Fox River bursting its banks. A low of tropical origin (which formed near New Caledonia) moved towards New Zealand on January 22/23, producing extremely heavy rainfall, flooding, slips and road closures over much of the North Island, north of about Wanganui. Lastly, Tropical Cyclone Wilma moved rapidly across the northeastern North Island on the 28th/29th, causing widespread deluge rainfalls, severe flooding and slips, in northeastern regions of the North Island.

February 2011: A tale of two islands
Weather conditions were generally settled over the North Island during February 2011. It was an extremely dry February for parts of Northland and Auckland, the Central Plateau, parts of southern Hawkes Bay and the Wairarapa, and parts of Marlborough, with rainfalls less than 20 percent of February normal in these regions. Rainfall was also well below normal (less than half of February normal) across much of the North Island, as well as in Nelson. In contrast, it was a record wet month for central Otago, with more than double normal February rainfall experienced. Much of this rain fell in a single extreme event on February 6th, along with record-breaking heat wave conditions. Over the southern half of the South Island, rainfall was also above normal. At the end of February, significant soil moisture deficit (deficit more than 110 mm) was evident in southern Taranaki, Manawatu, Kapiti coast, Wellington, Wairarapa, Nelson, Marlborough and north Canterbury.

March 2011: A mixed-bag start to autumn
Anticyclones dominated to the east of New Zealand in March, bringing more northeasterly winds than normal to the country. The first week of the month was unsettled, as were the periods March 21/22 and 26/27. This resulted in a very wet March across the North Island, as well as for the Marlborough Sounds, coastal Southland, and most of Otago. But autumnal anticyclones brought dry, settled weather to many areas for the remainder of the month.

April 2011: Record April rainfall for Hawkes Bay; cool conditions in eastern areas of both islands
In April 2011, New Zealand was affected by more southeast winds than usual. These produced extremely high rainfalls in the east of the North Island, as well as on the Kaikoura coast. Treble normal (more than 300 percent) April rainfall was experienced in Hawkes Bay. Most of this rain fell in two days (between 26 and 28 April), and a State of Emergency was declared there on 28 April, due to flooding and slips. In contrast, it was a relatively dry month for the west and south of the South Island. The southeast winds caused below average April temperatures in most eastern areas, but gave a very sunny month for the West Coast of the South Island.

May 2011: Warmest May on record
It was the warmest May on record, using NIWA's seven-station temperature series which begins in 1909. The nation-wide average temperature for May was 12.9°C (2.2°C above the 1971–2000 May average). Monthly mean temperatures for May were at least 2°C above May average between Waikato and Christchurch, as well as in the South Island Lakes District, with many records broken. For the remainder of the country, monthly mean temperatures were also well above average (between 1.2°C and 2°C above May average). May was a month of extremes, with more northerly winds than usual. The month started with a heat wave on the West Coast of the South Island; on the 1st of May, 26.7°C was observed at Hokitika and 25.0°C at Westport (both new May records at these sites). A tornado swept through Albany (Auckland) on the 3rd. Flood-producing rains affected Otago on May 7/8, and Nelson and Takaka on May 25/26.

June 2011: The 3rd-warmest June on record, and very gloomy

It was the 3rd-warmest June on record, using NIWA's seven-station temperature series which begins in 1909. Only June 2003 and June 1971 have been warmer. The nation-wide average temperature in June 2011 was 10.0°C (1.5°C above the 1971–2000 June average). Monthly mean temperatures for June were well above average (at least 1.2°C above June average) across the north and west of both Islands. Many June temperature records were broken in the North Island and the northern South Island on 5 June, associated with a very mild, northerly airstream brought down from the sub-tropics. The frequent northeasterly wind flows during the month produced a rather gloomy month overall.

July 2011: Lows anchored south of country; freezing polar blast

Low pressures were anchored south of New Zealand and the Chatham Islands during July, producing an extremely windy and stormy month overall. Mean sea level pressures over the southern half of the South Island were unusually low for the month as a whole, and the monthly "westerly wind" index for Christchurch southwards was the second-strongest for July, since records began in 1941. The month of July started out unusually warm in eastern areas of both islands, but a polar blast during 24-26 July delivered a bitterly cold air mass over the country – so that mean temperatures for July were near average, overall, for many regions of the country. Extremely cold air affected Canterbury, the Kaikoura coast, Nelson, Wellington, Wairarapa, Manawatu, Hawkes Bay and Taranaki during 25-26 July, and snowfall was heavy and to low levels over Canterbury, the Kaikoura Ranges (both Inland and Seaward), the Richmond, Tararua and Rimutaka Ranges, the Central Plateau, and around Mt Egmont. Brief dustings of snow were also reported in the ranges of Motueka and Northland on the 25th. The frequent westerly winds during July resulted in a very wet month for western areas of both islands. In sharp contrast, the entire eastern South Island was extremely dry (with less than half of July normal rainfall).

August 2011: Snow & sunshine - very dry overall in north & west

August was characterised by frequent southerly winds, and higher pressures than usual, over New Zealand. A polar outbreak affected New Zealand mid-month, bringing heavy snow to unusually low levels across eastern and alpine areas of the South Island, as well as Wellington. Snow also fell across the lower North Island, with flurries in unusual locations further north. The long-lived southerly winds between August 14 and 17 delivered extremely cold air over the country. Numerous August low temperature records were broken between the 14th and 17th. Anticyclones (highs) then prevailed over New Zealand between August 19 and 24, resulting in extremely icy or frosty mornings. The last week of the month was mostly dry and sunny in many regions, with some unusually warm and 'spring-like' temperatures experienced. While the southerly winds brought above normal monthly precipitation (rain, snow, or sleet) to eastern areas of both Islands, the remainder of the country stayed extremely dry overall, due to the dominance of anticyclones during the month. August precipitation was mostly well below average (less than 50 percent of August normal) for western, northern and alpine areas of the South Island, as well as for Taupo northwards.

September 2011: Dry, sunny and cool start to spring

Higher pressures than normal were observed over the Tasman Sea during September, with more southwest winds than usual over New Zealand. The high pressures produced a very dry and extremely sunny month, for most regions. Less than half of normal September rainfall was recorded in Bay of Plenty, Gisborne, on the West Coast, and in the Mackenzie country. It was generally very dry elsewhere, with the only exceptions being coastal Southland, Central Otago and Auckland. Soil moisture levels at the end of September were below normal for the time of year in north Canterbury, Mackenzie country and central Otago, as well as parts of the North Island. September sunshine totals were well above normal (more than 125 percent of normal) across much of the North Island, and the north and east of the South Island. It was the sunniest September on record for Dargaville, New Plymouth, Tauranga, Dannevirke, Gisborne, Waipawa, Takaka, and Cheviot.

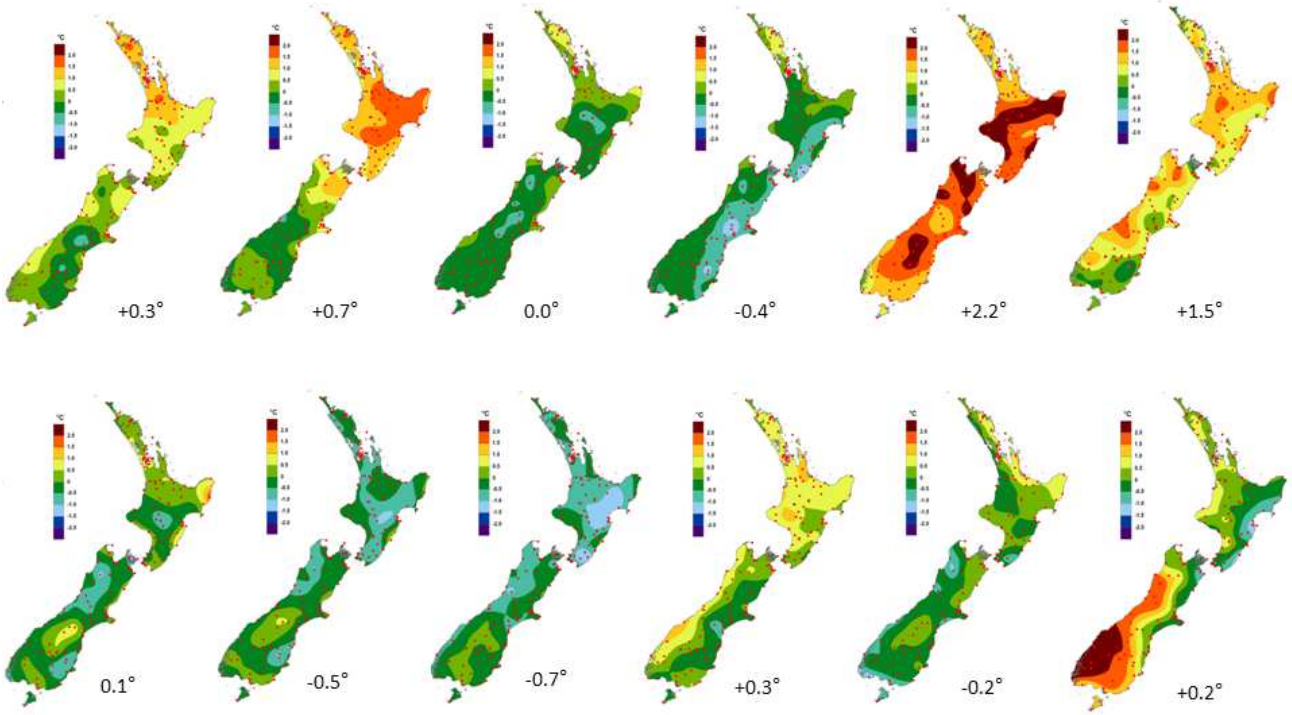
October 2011: Wet and cloudy for many regions; easterlies prevail

October was characterised by periods of northeasterly winds over New Zealand. Higher pressures than normal were observed south of the country, with lower pressures than normal over the north Tasman Sea. The easterly events produced a wet and cloudy month for many regions, and a cooler October for the east coast of the South Island. In comparison, it was unusually warm, sunny and dry along the West Coast.

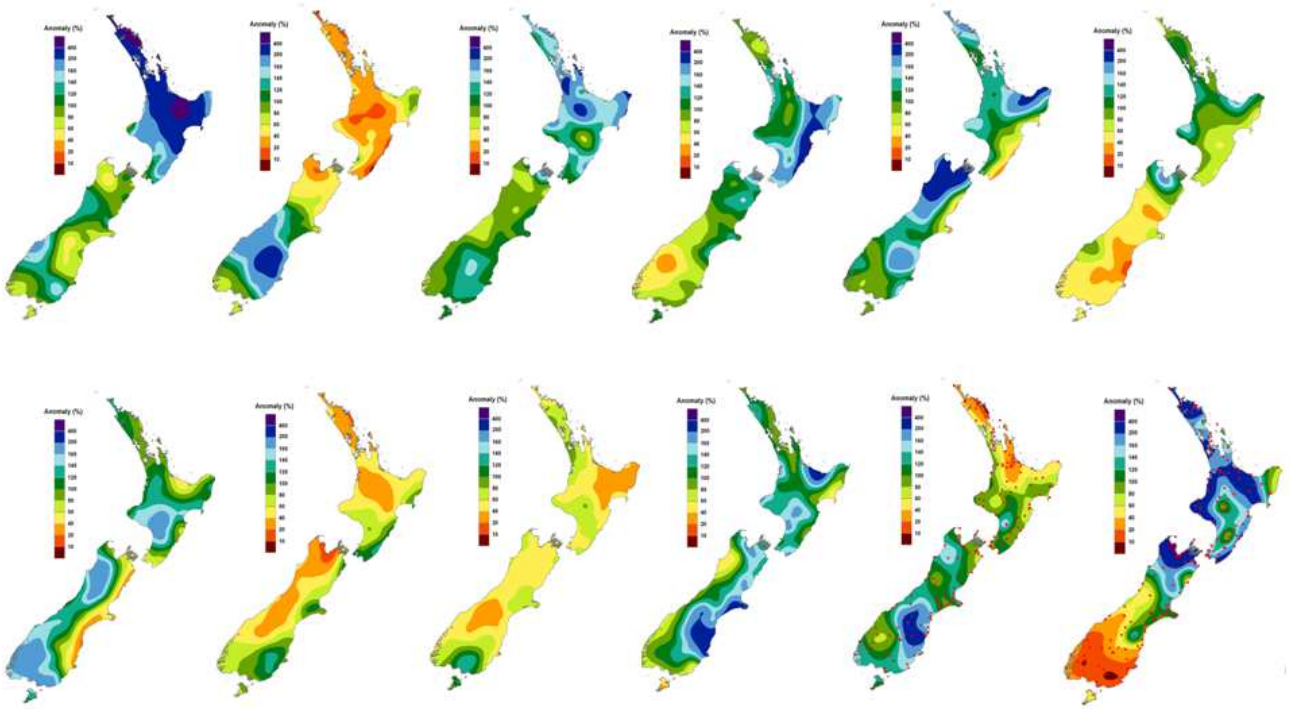
November 2011: Extremely dry north of Taupo; wet over South Island
Much stronger than normal southwest winds affected New Zealand during November 2011, squeezed between higher than normal pressures over the Tasman Sea and lower pressures to the southeast of the country. The southwesterly winds produced a cooler than usual month along the southern and western coastline of the South Island, but a warmer than average month in the sheltered northeast coast of the North Island. These winds also produced an extremely dry month for regions north of Taupo, but in contrast it was an unsettled and very wet month across much of the South Island. Significant soil moisture deficit (more than 110 mm of deficit) was observed in regions north of Taupo, also Hawkes Bay, Gisborne, Marlborough, and central Otago, at the end of November.

December 2011: State of Emergency declared in Nelson due to record-breaking rain
More northeast winds than normal affected New Zealand during December 2011, bringing generally warm conditions across the country. Well above normal rainfall for December was experienced in most of the North Island and northern South Island. Nelson received more than six times and Takaka received more than eight times their normal December rainfall. Highest December rainfall totals were also recorded in Kerikeri, Te Puke, Rotorua, Hamilton, Stratford, Hawera, Wanganui and Motueka. Conversely, in the south and west of the country, rainfall was well below normal. Record lowest December rainfall totals were recorded in Milford Sound, Puysegur Point, Dunedin, Manapouri, Queenstown, Lumsden, Gore, Invercargill, Balclutha and Tiwai Point.

Section 3: Monthly temperature anomaly (departures in Degrees Celsius from monthly average). Figure shows monthly temperature anomalies for each month of 2011, starting in the top left with January.



Section 4: Monthly rainfall anomaly (departures as percentage from monthly normal). Figure shows monthly rainfall anomalies for each month of 2011, starting in the top left with January.



Section 5: The numbers

NIWA analyses of month-by-month records show:

- Leigh (north Auckland) recorded the highest annual average temperature for 2011(16.7°C), followed by North Shore (Auckland) with 16.4 °C and Whangarei with 16.3 °C.
- The highest recorded extreme temperature of the year (41.3°C) occurred at Timaru on 6 February (a new all-time high temperature record in the area). The second highest temperature for the year was40.3 °C recorded at Timaru Airport on the same day (a new all-time high record at this site). The third highest was 36.3 °C which occurred in Gisborne on 2 February (the second highest February temperature in the area), and the 4th highest temp recorded was 36.0 °C observed at Orari on 6 February.
- The lowest air temperature of the year was–10.2 ºC recorded at Manapouri on 26 July (a new all-time low temperature recording the area),followed by –10.1°Cat Lake Rotoiti (Nelson Lakes)and -9.5 °C at Chateau, Ruapehu, both observed on 16 August and both new August low temperature records at these sites.
- The nation-wide average temperature for 2011 was 12.8°C (0.3°C above the 1971–2000 annual average), using NIWA's seven-station temperature series which begins in 1909. 2011was the 17th warmest year since 1909, based on this seven-station series.
- The highest confirmed wind gust for the year (as archived in the NIWA climate database) was189 km/h at Cape Turn again on 12 July. The next highest wind gusts observed were both 183 km/hr, recorded at Southwest Cape, Stewart Island, on 12 May and 24 October, respectively.
- The top 1-day rainfall in 2011was 392 mm recorded at Takaka on 14 December (a new all-time daily rainfall record there), followed by 331 mm at Aramoana[1], Hawkes Bay, on 26 April, and 301 mm at North Egmont on 25 May.
- The driest rainfall recording locations (based on data available at time of writing) were: Clyde with 395mm of rainfall recorded for the year, followed by Rangiora with 498mm, and then Middlemarch with 501mm.
- Of the regularly reporting gauges (based on data available at time of writing), the wettest locations in 2011 were Cropp River (West Coast) with 9493 mm, North Egmont with 8236 mm and Doon (Fiordland) with 6107 mm.
- Nelson was the sunniest location in 2011, recording 2487 hours, followed by Tekapo (2463 hours) and Whakatane (2380 hours).
- Of the six main centres, for 2011 as a whole, Tauranga was the sunniest (2271 hours) but also the wettest (1698 mm), Christchurch was the driest (621 mm), and Auckland the warmest (15.9 °C).

Ranked annual means and totals for the stations available at time of writing are displayed on the following page.

[1]The Aramoana daily rainfall reading was a manual one, and was not available at the time of writing the April 2011 Climate Summary.

Location	Mean temp (°C)
LEIGH 2	16.7
NORTH SHORE, AUCKLAND	16.4
WHANGAREI AERO AWS	16.3
KAITAIA AERO EWS	16.2
DARGAVILLE 2 EWS	15.9
AUCKLAND, MANGERE EWS	15.9
KAITAIA EWS	15.9
KERIKERI EWS	15.9
AUCKLAND AERO	15.8
TAURANGA AERO AWS	15.7
PORT TAHAROA AWS	15.7
HICKS BAY AWS	15.4
PAEROA AWS	15.1
PUKEKOHE EWS	15.1
WHITIANGA AERO AWS	15
GISBORNE AWS	14.8
WHAKATANE AERO AWS	14.8
WARKWORTH EWS	14.8
TE PUKE EWS	14.6
NGAWI AWS	14.5
WHATAWHATA 2 EWS	14.3
WAIROA, NORTH CLYDE	14.3
WANGANUI,SPRIGGENS P	14.3
FAREWELL SPIT AWS	14.3
MAHIA AWS	14.2
WANGANUI AWS	14.2
HAMILTON AWS	14.1
NEW PLYMOUTH AWS	14.1
NAPIER AERO AWS	14
WELLINGTON AERO	13.7
PALMERSTON NORTH AWS	13.6
LEVIN AWS	13.6
TE KUITI EWS	13.6
CASTLEPOINT AWS	13.5
PALMERSTON NORTH EWS	13.5
NELSON AWS	13.5
PARAPARAUMU AERO	13.4
HAMILTON, RUAKURA 2	13.4
WHAKATU EWS	13.3
PARAPARAUMU AERO AWS	13.3
NELSON AERO	13.3
WESTPORT AERO AWS	13.1
BLENHEIM RESEARCH EW	13.1
WELLINGTON, KELBURN	13
ROTORUA AERO AWS	13
MARTINBOROUGH EWS	12.9
MOTUEKA, RIWAKA EWS	12.7
KAIKOURA AWS	12.5
BLENHEIM AERO AWS	12.5
WALLACEVILLE EWS	12.4
APPLEBY 2 EWS	12.3
TAUPO AWS	12.2
STRATFORD EWS	12.2
REEFTON EWS	12.2
HOKITIKA AWS	12
HOKITIKA AERO	12
RANGIORA EWS	11.9
CHATHAM ISLANDS AWS	11.8
LINCOLN, BROADFIELD	11.6
CHRISTCHURCH AERO	11.6
HAAST AWS	11.5
TARA HILLS AWS	11.4
LE BONS BAY AWS	11.4
DUNEDIN, MUSSELBURGH	11.3
FRANZ JOSEF EWS	11.2
WINCHMORE EWS	11.1
PUYSEGUR POINT AWS	11.1
WANAKA AERO AWS	10.9
TIWAI POINT EWS	10.8
MILFORD SOUND	10.8
WINDSOR EWS	10.8
CLYDE EWS	10.7
TIMARU AERO AWS	10.5
DUNEDIN AERO AWS	10.3
HANMER FOREST EWS	10.2
NUGGET POINT AWS	10.1
INVERCARGILL AERO	10
GORE AWS	10
QUEENSTOWN AERO AWS	9.9
LUMSDEN AWS	9.7
MANAPOURI, WEST ARM	9.4
LAKE TEKAPO EWS	9.3
MT COOK EWS	9.1
MT RUAPEHU, CHATEAU	7.6

Location	Rainfall (mm)
CROPP RIVER	9493
NORTH EGMONT	8236
DOON	6107
MILFORD SOUND	5553
HOKITIKA AERO	2642
TE PUKE EWS	2388
WHITIANGA AERO AWS	2230
KERIKERI EWS	2197
WESTPORT AERO AWS	2078
REEFTON EWS	2007
KAIKOHE AWS	2001
ROTORUA AERO AWS	1997
NEW PLYMOUTH AWS	1955
WHAKATANE AERO AWS	1837
TAURANGA AERO AWS	1698
WARKWORTH EWS	1614
WAIROA, NORTH CLYDE	1591
HAMILTON AWS	1539
KAITAIA OBSERVATORY	1537
MOTUEKA, RIWAKA EWS	1535
AUCKLAND, MANGERE EW	1521
PUKEKOHE EWS	1498
CAPE REINGA AWS	1482
NELSON AERO	1477
HICKS BAY AWS	1468
APPLEBY 2 EWS	1393
AUCKLAND AERO	1390
RAOUL ISLAND AWS	1340
DARGAVILLE 2 EWS	1260
WHANGAREI AERO AWS	1258
INVERCARGILL AERO	1235
TAUPO AWS	1225
LEVIN AWS	1224
WANGANUI,SPRIGGENS P	1216
PALMERSTON NORTH AWS	1180
GISBORNE AWS	1143
TIWAI POINT EWS	1119
PAEROA AWS	1113
PALMERSTON NORTH EWS	1096
WALLACEVILLE EWS	1058
NAPIER AERO AWS	1047
PARAPARAUMU AERO	1034
MOKOHINAU AWS	1033
HANMER FOREST EWS	1013
WELLINGTON AERO	981
GORE AWS	970
CHATHAM ISLANDS AWS	930
MAHIA AWS	904
NUGGET POINT AWS	876
MANAPOURI AERO AWS	854
MARTINBOROUGH EWS	825
BLENHEIM AERO AWS	772
BLENHEIM RESEARCH EW	699
DUNEDIN AERO AWS	697
LE BONS BAY AWS	679
DUNEDIN, MUSSELBURGH	660
CAPE CAMPBELL AWS	642
LINCOLN, BROADFIELD	630
TIMARU AERO AWS	628
CHRISTCHURCH AERO	621
QUEENSTOWN AERO AWS	621
TARA HILLS AWS	575
RANFURLY EWS	562
AWATERE VALLEY, DASH	548
LAKE TEKAPO EWS	543
LAUDER EWS	542
WANAKA AERO AWS	525
KAIKOURA AWS	519
MIDDLEMARCH EWS	501
RANGIORA EWS	498
CLYDE EWS	395

Location	Sunshine (hours)
NELSON AERO	2487
LAKE TEKAPO EWS	2463
WHAKATANE SUNSHINE	2380
BLENHEIM RESEARCH EW	2358
TAKAKA EWS	2312
TAURANGA AERO	2271
KAITAIA OBSERVATORY	2122
GISBORNE AERO	2094
PARAPARAUMU AERO	2052
CHRISTCHURCH AERO	2029
NEW PLYMOUTH AERO	2025
AUCKLAND, MANGERE EW	2009
WELLINGTON,KELBURN	1955
HAMILTON, RUAKURA 2	1941
DARGAVILLE 2 EWS	1935
MARTINBOROUGH EWS	1917
STRATFORD EWS	1836
HOKITIKA AERO	1826
DUNEDIN, MUSSELBURGH	1804
INVERCARGILL AERO	1754
PALMERSTON NORTH EWS	1632
MT COOK EWS	1622
FRANZ JOSEF EWS	1598

Section 6: Temperature – Above average annual mean temperatures in the northeast North Island, and over the north of the South Island.

Mean annual temperatures were above average (between 0.5°C and 1.2°C above the long-term average) in the northeast of the North Island, and over the north of the South Island. Mean annual temperatures were generally near average (within 0.5°C of the long-term average) elsewhere.

The nation-wide average temperature for 2011 was 12.8 °C, 0.3 °C above the 1971–2000 annual average, using NIWA's seven-station temperature series which begins in 1909. 2011 was the 17th warmest year since 1909, based on this 7-station series.

Overall, it was the warmest year on record at Kerikeri and Te Puke[†].Mean annual temperatures were also record or near-record high in other parts of Northland, as well as in Auckland, Bay of Plenty, the Taranaki and Ruapehu regions, as well as in the north of the South Island (see Tables below).

Table 1: Near-record or record high or low annual average temperatures for 2011:

Location	Mean temperature (°C)	Departure (°C)	Year records began	Comments
Mean Temperature				
Kerikeri	15.9	0.6	1981	Highest
Dargaville	15.9	0.7	1943	3rd-highest
Whangarei	16.3	0.6	1967	3rd-highest
Leigh	16.8	0.9	1966	2nd-highest
Whangaparoa	16.1	0.7	1982	4th-highest
Tauranga	15.7	1.1	1913	3rd-highest
Te Puke	14.7	0.8	1973	Highest
Port Taharoa	15.7	0.6	1973	2nd-highest
Hawera	13.1	0.6	1977	3rd-highest
Ohakune	11.3	1.1	1962	2nd-highest
Lake Rotoiti	10.1	1.0	1965	2nd-highest
Reefton	12.2	0.9	1960	2nd-highest
Mean Maximum Temperature				
Kerikeri	20.5	0.5	1981	4th-highest
Leigh	20.6	1.8	1966	Highest
Whangaparaoa	19.3	1.3	1982	3rd-highest
Te Puke	19.4	0.6	1973	4th-highest
Mahia	17.5	0.4	1990	4th-highest
Port Taharoa	19.3	0.7	1973	4th-highest
Ohakune	16.0	1.0	1962	3rd-highest
Lake Rotoiti	15.8	1.3	1965	2nd-highest
Reefton	17.5	0.9	1960	4th-highest
Mt Cook	15.3	1.4	1929	3rd-highest
Mean Minimum Temperature				

[†]The rankings (1st, 2nd, 3rd….etc) in Tables1 to 13 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 because of the practical limitations of performing homogeneity checks in real-time.

Kerikeri	11.4	0.9	1981	2nd-highest
Dargaville	12.3	1.6	1943	3rd-highest
Whangarei	12.4	0.7	1967	3rd-highest
Whenuapai	11.0	1.2	1945	Highest
Whitianga	10.9	1.1	1962	2nd-highest
Paeroa	10.5	1.0	1947	3rd-highest
Te Puke	9.9	0.8	1973	3rd-highest
Whatawhata	10.0	0.7	1952	2nd-highest
Port Taharoa	12.2	0.5	1973	2nd-highest
Stratford	8.2	0.8	1960	Highest
Hawera	9.2	0.8	1977	Highest
Ohakune	6.5	1.0	1962	Highest
Farewell Spit	11.0	1.4	1971	4th-highest
Reefton	7.0	1.0	1960	Highest
Nelson	8.8	1.1	1943	4th-highest
Culverden	6.0	0.9	1928	4th-highest
Alexandra	5.1	1.0	1983	2nd-highest

Record-breaking high temperatures (and humidity) were experienced over much of the North Island on 18/19 January, as tropical air was delivered to the country by ex-tropical cyclones Vania and Zelia. The entire country was affected by scorching temperatures between 2 and 7 February, as long-fetch northwest winds became slow-moving over New Zealand. Timaru recorded 41.3°C on 6 February, a new all-time record in the area there since records began in the area in 1885. Many, many sites recorded temperatures in excess of 30.0°C during February 5 and 6. Unusually, the heat continued into April and May on occasion, with easterly winds causing temperatures of 28.4 °C at Westport on 26 April, and a heat wave on the West Coast of the South Island and in Nelson on 1 May.

In contrast, the snowfall events 24-26 July and August 15-16 delivered exceptionally cold conditions to New Zealand, with numerous all-time low temperature records broken (see Tables below).

Table 2: Near-record or record high or low annual temperature extremes for 2011:

Location	Temperature (°C)	Date of occurrence	Year records began	Comments
Highest extreme maximums				
Kerikeri	29.2	Feb-3rd	1981	4th-highest
Leigh	29.5	Feb-5th	1966	Highest
Whangaparaoa	27.9	Feb-5th	1982	2nd-highest
Paeroa	31.9	Jan-17th	1947	2nd-highest
Te Puke	31.2	Feb-5th	1973	4th-highest
Dannevirke	31.5	Jan-18th	1951	4th-highest
Wellington (Airport)	29.4	Jan-18th	1962	2nd-highest
Hawera	30.7	Jan-18th	1977	Highest
Ohakune	29.5	Jan-17th	1962	2nd-highest
Waiouru	28.2	Jan-17th	1962	4th-highest
Takaka	33.0	Feb-6th	1978	Highest
Nelson (Airport)	31.0	Feb-2nd	1943	4th-highest
Kaikoura	34.3	Feb-2nd	1963	Highest
Timaru (Airport)	40.3	Feb-6th	1990	Highest
Timaru	41.3	Feb-6th	1885	Highest
Dunedin (Musselburgh)	34.4	Feb-6th	1947	4th-highest

Lumsden	30.3	Feb-6th	1982	2nd-highest
Highest extreme minimums				
Kaitaia	21.5	Jan-18th	1985	2nd-highest
Kerikeri	20.8	Jan-18th	1981	3rd-highest
Kaikohe	20.9	Jan-18th	1973	Highest
Paeroa	21.2	Feb-5th	1971	2nd-highest
Te Puke	20.8	Feb-4th	1973	2nd-highest
Rotorua	20.3	Feb-4th	1972	2nd-highest
Taupo	19.7	Feb-5th	1950	4th-highest
Takapau Plains	20.0	Feb-6th	1972	Highest
Martinborough	22.1	Feb-6th	1986	Highest
Ngawi	21.7	Feb-7th	1972	Highest
Hicks Bay	20.4	Jan-19th	1972	Equal 3rd-highest
Gisborne	23.2	Jan-19th	1940	2nd-highest
Hastings	22.9	Jan-19th	1972	Highest
Wairoa	23.3	Jan-19th	1972	3rd-highest
Wallaceville	19.2	Feb-7th	1972	Equal 4th-highest
Hawera	19.6	Feb-4th	1977	3rd-highest
Ohakune	17.8	Feb-5th	1972	Highest
Lake Rotoiti	16.9	Feb-7th	1972	3rd-highest
Reefton	20.4	Feb-7th	1972	Highest
Hanmer Forest	23.5	Feb-6th	1972	2nd-highest
Arthurs Pass	16.3	Feb-7th	1973	Highest
Waipara West	21.0	Dec-13th	1973	Equal 4th-highest
Lumsden	17.2	Jan-16th	1982	2nd-highest
Lowest extreme maximums				
Kaitaia	10.9	Aug-15th	1985	4th-lowest
Kaikohe	9.5	Aug-15th	1973	Lowest
Dargaville	9.2	Aug-16th	1951	Lowest
Whangarei	9.6	Aug-16th	1967	Lowest
Leigh	10.4	Aug-16th	1966	4th-lowest
Warkworth	8.1	Aug-16th	1966	Lowest
Whenuapai	8.8	Aug-16th	1951	Lowest
Paeroa	8.1	Aug-15th	1971	Lowest
Rotorua	5.7	Aug-15th	1972	Lowest
Taupo	4.7	Aug-15th	1950	2nd-lowest
Auckland (Airport)	8.1	Aug-15th	1961	Lowest
Te Kuiti	7.5	Aug-15th	1959	4th-lowest
New Plymouth	6.7	Jul-25th	1944	2nd-lowest
Takapau Plains	2.2	Aug-15th	1972	Lowest
Martinborough	3.5	Aug-15th	1986	Lowest
Ngawi	6.2	Aug-15th	1972	Lowest
Hicks Bay	8.8	Aug-15th	1972	2nd-lowest
Waipawa	5.5	Aug-17th	1945	3rd-lowest
Wairoa	7.4	Jul-25th	1972	2nd-lowest
Paraparaumu	6.1	Aug-15th	1972	4th-lowest
Wellington (Airport)	6.8	Aug-15th	1972	2nd-lowest
Wallaceville	4.2	Aug-15th	1972	Lowest
Stratford	4.8	Jul-25th	1972	Lowest
Hawera	7.1	Jul-25th	1977	Lowest

Waiouru	-1.0	Aug-15th	1972	Lowest
Farewell	9.1	Aug-15th	1972	3rd-lowest
Lake Rotoiti	-0.5	Aug-15th	1972	Lowest
Appleby	6.6	Aug-15th	1943	2nd-lowest
Nelson	6.1	Aug-15th	1943	2nd-lowest
Hanmer Forest	0.1	Aug-15th	1972	Lowest
Kaikoura	3.5	Aug-15th	1972	Lowest
Arthurs Pass	-2.5	Aug-15th	1973	Lowest
Waipara West	2.6	Aug-15th	1973	Lowest
Manapouri	0.9	Jul-24th	1973	2nd-lowest
Lumsden	1.0	Jul-24th	1982	3rd-lowest
Nugget Point	3.6	Aug-14th	1972	4th-lowest
Lowest extreme minimums				
Kerikeri	0.4	Jul-26th	1981	4th-lowest
Leigh	2.6	Aug-16th	1966	Lowest
Whangaparaoa	2.3	Aug-16th	1982	2nd-lowest
Te Puke	-2.2	Aug-16th	1973	2nd-lowest
Rotorua	-5.2	Aug-16th	1964	Lowest
Port Taharoa	0.1	Aug-16th	1973	Lowest
New Plymouth	-2.6	Jul-26th	1944	Lowest
Ngawi	0.6	Aug-15th	1972	2nd-lowest
Hicks Bay Aws	1.0	Aug-16th	1969	4th-lowest
Stratford	-4.6	Aug-16th	1960	3rd-lowest
Lake Rotoiti	-10.1	Aug-16th	1965	2nd-lowest
Haast	-3.5	Aug-15th	1949	Lowest
Milford Sound	-6.1	Jul-11th	1934	Lowest
Blenheim	-6.2	Aug-16th	1932	3rd-lowest
Kaikoura	-1.0	Aug-15th	1963	Lowest
Timaru	-7.8	Jul-26th	1990	2nd-lowest
Manapouri	-10.2	Jul-26th	1963	Lowest
Queenstown	-8.9	Jul-26th	1871	3rd-lowest

Section 7: Rainfall – Above normal for the northeast of the North Island, Nelson, and Central Otago, as well as parts of the southwest North Island, and Napier. Below normal for the Kaikoura Coast, Canterbury, and much of Westland and Fiordland.

In broad terms, six months of the year were wetter than normal and two were drier than normal. Four months were mixed, with large geographical differences between very wet regions and areas of extreme dryness. Annual rainfall totals for 2011 as a whole were above normal (more than 120 percent of annual normal) in parts of: Northland, Auckland, Coromandel, Bay of Plenty, Nelson, and Central Otago; as well as around New Plymouth, Napier, Wanganui and Palmerston North. It was the wettest year on record for Wanganui, since records began there in 1987.

In contrast, it was relatively dry year (with annual rainfall totals between 50 and 79 percent of annual normal) for the Kaikoura Coast and Canterbury, as well as much of Fiordland and Westland. Elsewhere, annual rainfall was in the near normal range (80 to 119 percent of normal).

Table 3: Near-record or record annual rainfall for the year 2011:

Location	Rainfall (mm)	Percentage of normal	Year records began	Comments
Cape Reinga	1482	145	1919	2nd-highest
Kerikeri	2197	131	1981	3rd-highest
Te Puke	2388	145	1973	2nd-highest
Whatawhata	2073	130	1952	3rd-highest
Hamilton	1539	127	1935	3rd-highest
Wanganui	1222	138	1987	Highest
Takaka	3009	150	1976	Highest
Appleby	1393	145	1941	3rd-highest
Nelson	1477	157	1941	2nd-highest
Timaru	628	111	1990	4th-highest
Alexandra	459	126	1983	3rd-highest
Manapouri	854	75	1961	2nd-lowest
Lumsden	832	88	1982	4th-lowest

The driest rainfall recording locations (based on data available at time of writing) were: Clyde with 395 mm of rainfall recorded for the year, followed by Rangiora with 498 mm, and then Middlemarch with 501 mm. Of the regularly reporting gauges, Cropp River in the Hokitika River catchment recorded the highest rainfall with 9493 mm, followed by North Egmont with 8236 mm, then Doon (Fiordland) with 6107mm.

The top 1-day rainfall in 2011 was 392 mm recorded at Takaka on 14 December (a new all-time daily rainfall record there), followed by 331 mm at Aramoana on 26 April, and 301 mm at North Egmont on 25 May.

In 2011, there were five very significant rainfall events. A low of tropical origin (which formed near New Caledonia) moved towards New Zealand on 22/23 January, producing significant heavy rainfall, flooding, slips and road closures over much of the North Island, north of about Wanganui. Tropical Cyclone Wilma moved rapidly across the northeastern North Island on 28 January, causing widespread deluge rainfalls, severe flooding and slips, in northeastern regions of the North Island. Otago and Southland experienced very heavy rainfall on 6 February during severe northwesterly conditions and an associated frontal passage. On 25 and 26 April, heavy rain and winds caused flooding and slips across central North Island regions. Hawkes Bay was particularly hard hit, as deluge rainfall hit the coastal settlements around Aramoana on the 26th, causing severe land slips. Residents were evacuated from Te Awanga, east of Hastings, after the heavy rain, and Aramoana was completely cut off. And extraordinary rainfall totals were observed during a humid,

northerly airstream which affected the Nelson region on 14 December (with records broken at both Takaka and Nelson), resulting in a State of Emergency being declared.

Table 4: One day rainfall extremes for 2011:

Location	1-day extreme rainfall (mm)	Date	Year records began	Comments
Cape Reinga	130	Jan-28th	1919	3rd-highest
Kaitaia	137	Jan-28th	1985	3rd-highest
Kerikeri	252	Jan-28th	1981	Highest
Kaikohe	210	Jan-28th	1956	Highest
Whangarei	211	Jan-28th	1943	3rd-highest
Leigh	194	Jan-28th	1967	Highest
Warkworth	161	Jan-28th	1967	3rd-highest
Whangaparaoa	150	Jan-28th	1946	2nd-highest
Whitianga	220	Jan-28th	1961	3rd-highest
Te Puke	175	Jan-28th	1973	2nd-highest
Taupo	114	Jan-23rd	1949	3rd-highest
Taumarunui	120	Jan-23rd	1913	2nd-highest
Stratford	164	Jan-23rd	1960	3rd-highest
Ohakune	125	Jan-23rd	1961	Highest
Waiouru	86	Jan-23rd	1950	3rd-highest
Wanganui	125	Jan-23rd	1937	Highest
Takaka	392	Dec-14th	1976	Highest
Nelson	168	Dec-14th	1941	Highest
Lumsden	57	Feb-6th	1982	3rd-highest
Alexandra	68	Feb-6th	1983	Highest
Balclutha	73	Feb-6th	1964	3rd-highest
Nugget Point	63	Feb-6th	1930	2nd-highest

Section 8: Sunshine –Sunny between Franz Josef and Tekapo, and in Otago and Southland. Near normal sunshine totals elsewhere.

Above normal sunshine was observed in central North Island, and for much of western and southern South Island (with annual sunshine totals between 110 and 125 percent of normal). Parts of Wellington region received below normal (between 75 and 90 percent of normal) sunshine totals for 2011. Elsewhere, sunshine totals were generally close to the annual normal.

Nelson was the sunniest location in 2011, recording 2487 hours, followed by Tekapo (2463 hours) and Whakatane (2380 hours).

Table 5: Near-record or record sunshine hours for the year 2011:

Location	Sunshine (hours)	Percent of normal	Records began	Comments
Te Kuiti	1926	115	1962	2nd-highest
Paraparaumu	2237	110	1953	4th-highest
Lake Tekapo	2463	115	1928	4th-highest
Balclutha	2019	124	1964	3rd-highest
Wallaceville	1638	88	1939	4th-lowest
Stratford	1836	94	1963	3rd-lowest
Blenheim	2358	97	1947	3rd-lowest

Section 9: 2011climate in the six main centres

Of the six main centres, for 2011 as a whole, Tauranga was the sunniest but also the wettest, Christchurch was the driest, and Auckland the warmest.

Mean annual temperatures were above average in Auckland, Tauranga, and Hamilton, but were close to average in Wellington, Christchurch and Dunedin. Annual rainfall at Tauranga was above normal, while for the other main centres it was in the near normal range (between 80 and 119 percent of annual normal). Annual sunshine totals in 2011 were in the near normal range for all of the main centres except for Wellington, where annual sunshine totals were below normal.

Table 6: 2011 Climate in the six main centres

Location	Mean temp. (°C)	Departure from normal (°C)		Rainfall (mm)	% of normal		Sunshine (hours)	% of normal	
Auckland[a]	15.9	+0.8*	Above average	1540	131%	Above normal	2009	100%	Near normal
Tauranga[b]	15.7	+1.1	Above average	1698	140%	Above normal	2271	102%	Near normal
Hamilton[c]	14.1	+0.6	Above average	1538	127%	Above normal	1941[d]	97%	Near normal
Wellington[e]	13.1	+0.3	Near average	1380	110%	Near normal	1954	95%	Near normal
Christchurch[f]	11.6	+0.0	Near average	621	99%	Near normal	2030	97%	Near normal
Dunedin[g]	11.4	+0.3	Near average	660	82%	Near normal	1804	113%	Abovenormal

[a]Mangere [b]Tauranga Airport [c]Hamilton Airport [d]Ruakura [e]Kelburn [f]Christchurch Airport [g]Musselburgh
**Mangere normal based on 1961-2000, all other normal 1971-2000*

Section 10: Significant extremes

Floods

In 2011, there were five very extreme rainfall events. A low of tropical origin (which formed near New Caledonia) moved towards New Zealand on 22/23 January, producing significant heavy rainfall, flooding, slips and road closures over much of the North Island, north of about Wanganui. Tropical Cyclone Wilma moved rapidly across the northeastern North Island on 28 January, causing widespread deluge rainfalls, severe flooding and slips, in northeastern regions of the North Island. Otago and Southland experienced very heavy rainfall on 6 February during severe northwesterly conditions and an associated frontal passage. On 25 and 26 April, heavy rain and winds caused flooding and slips across central North Island regions. Hawkes Bay was particularly hard hit, as deluge rainfall hit the coastal settlements around Aramoana on the 26th, causing severe land slips. Residents were evacuated from Te Awanga, east of Hastings, after the heavy rain, and Aramoana was completely cut off. Extraordinary rainfall totals were observed during a humid, northerly airstream which affected the Nelson region on 14 December, resulting in a State of Emergency being declared, as major flooding and land slips cut off coastal communities in Cable Bay and around Golden Bay.

Snow

Two extremely significant and widespread snowfall events occurred during 2011. A polar blast during 24-26 July delivered a bitterly cold air mass over the country. Snowfall was heavy and to very low levels over Canterbury, the Kaikoura Ranges (both Inland and Seaward), the Richmond Ranges, Tararua and Rimutaka Ranges, the Central Plateau, and around Mt Egmont. During the event, snow closed the Desert Road, the Rimutaka Hill Road, the Napier-Taupo and Napier-Taihape Roads. In the South Island, major road closures occurred, including SH1 from Cheviot to Waipara, Oamaru to Dunedin and Dunedin to Gore. Both Lincoln and Canterbury Universities, and Otago and Canterbury Polytechnics were closed. In Dunedin, many banks and retail businesses did not open, and meals-on-wheels deliveries were cancelled by the District Health Board. The Christchurch, Dunedin, Queenstown and Invercargill airports were all closed. Snow on power lines cut power across Canterbury. Elective surgery was cancelled at both Christchurch and Southland Hospitals. Snow was down to sea level at New Brighton and Spencerville beaches. City bus services in Christchurch, Waimakariri and Selwyn districts were cancelled, as were many long distance bus services. Courier and rural post deliveries were cancelled, and in Balclutha and Queenstown, the day's court proceedings were postponed. Snow was also reported from the Kaimai Ranges, Taupo, Hawera, Stratford, Wanganui, Palmerston North, the Kapiti Coast, Wellington, Masterton, Greytown, Martinborough, Greymouth, Hokitika, Nelson, Mapua, Motueka, Takaka Hill, Rai Saddle and Kaikoura. Brief dustings of snow were also reported in the ranges of Motueka and Northland on the 25th.

An unusually long-lived southerly airstream brought blast after blast of sub-Antarctic air onto New Zealand, between 14-17 August. On 14 August, snow fell to very low levels across much of the South Island, as well to central Wellington and the hill suburbs. On 15 August, the southerly winds continued to deliver extremely cold air and snowfalls to the country, and airports and schools remained closed in Christchurch, Queenstown, Invercargill and Dunedin. On the West Coast, snow fell in Rotomanu, Inchbonnie, Reefton, Greymouth, Blackball and Ikamatua. Snow fell again to sea level in Wellington, closing schools and the airport. Both Rotorua and New Plymouth reported snow falling in the central city. Snow reached the Kaimai Ranges and Mount Fitzroy (Great Barrier Island), and Te Mata Peak was covered in snow. Snow fell briefly in Auckland city but did not settle, and was also reported from the Waitakere Ranges, Drury, Waiuku, Clevedon and the Bombay Hills. The snow reached Northland, with hillside properties around Dargaville reporting snow falling. Taupo Airport was also closed as heavy snow fell around the lake. In the Waikato, snow was seen in central Hamilton, Te Kuiti, and briefly in Raglan. Snow settled in Wanganui, reputedly for the first time since 1974. Between 15 and 17 August, many eastern and alpine South Island roads, as well as lower North Island roads, remained affected by snow or ice, and airports, hospitals, mail deliveries, and power lines remained affected in these regions.

Wind

It was a windy year overall, with seven very windy months (January, February, March, April, May, July and October). Of particular note was the month of July, in which westerly winds from Christchurch southwards were the second-strongest for July, since the “westerly wind” index began in 1941.

Drought

Soil moisture deficits in 2011 were generally short-lived. At the beginning of the year, significant soil moisture deficits (more than 110 mm of deficit) affected parts of western Northland, Waikato, Bay of Plenty, Gisborne, Manawatu and Wairarapa, as well as parts of Canterbury and Central Otago. However, the extremely wet January in all North Island regions fully recharged soil moisture levels by the end of the month right across the North Island. In contrast, February was very dry for parts of Northland and Auckland, the Central Plateau, parts of southern Hawkes Bay and the Wairarapa, and parts of Marlborough, so that significant soil moisture deficit had redeveloped by the end of February in southern Taranaki, Manawatu, Kapiti coast, Wellington, Wairarapa, Nelson, and Marlborough, and had continued in north Canterbury. March was generally wet in many regions, so that significant soil moisture deficit remained only in the Tasman District, Marlborough and parts of Canterbury. Rainfall in April replenished all remaining dry soils. August and September were relatively dry, and the combination of low rainfall and enhanced southwesterly winds over the country meant that soil moisture levels are already below normal by the middle of spring in north Canterbury, Mackenzie country and central Otago, as well as parts of the North Island. By the end of November, significant soil moisture deficits were observed in regions north of Taupo, also Hawkes Bay, Gisborne, Marlborough, and central Otago. Above normal rainfall totals in December throughout the North Island improved soil moisture levels there, but deficits had become extreme (deficit of more than 130 mm) in Central Otago and parts of Southland by the end of the year.

Further detailed information about significant climate and weather events for 2011is attached. For media comment, please contact:

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Note for editors:

Climate measurements have been made in New Zealand for about 150 years, with reasonable coverage of reliable data from at least 1900. NIWA makes its raw climate data publicly available for free on-line. Journalists are advised, however, to take extreme care when interpreting trends from raw data to ensure they have not been compromised by changes in site location, urbanisation, exposure, or instrumentation over time. If in any doubt, please call us.

Significant weather and climate events – 2011

Section 11: High temperatures

2011 was notable for six warm months (January, February, May, June, October and December). Winter arrived extremely late – May was the warmest on record, and June was the 3rd-warmest ever experienced, using NIWA's seven-station temperature series which begins in 1909.

Warm, humid, tropical air was delivered onto the North Island via the ex-tropical cyclones Vania and Zelia on 17/18 January, resulting in record-breaking daytime temperatures (see Table below) and very muggy and uncomfortable sleeping conditions at night.

Scorching heat was experienced at numerous locations covering the entire length of the country between 2 and 7 February. Timaru recorded 41.3°C on 6 February, a new February and also all-time record in the area, since records began in 1885. Many, many sites recorded temperatures in excess of 30.0°C during 5-6 February.

Unusual warmth was also observed in Buller and Nelson during the last week of April, with 28.4 °C observed at Westport on 26 April, during an easterly air stream (this was the highest April temperature measured at Westport since records began in the area in 1937). And many locations set new all-time May temperature records during the first two weeks of May. A record-breaking May heat wave event occurred on the West Coast of the South Island and in Nelson, on May 1st, caused by foehn warming in strong easterly winds. Hokitika experienced 26.7 °C on 1 May – a new May record for the area, in observations that begin in 1963. Auckland also broke a long-standing May temperature record on 13 May, hitting 24.6°C, as did Wanganui (with 22.7°C) on 3 May.

Many locations in the North Island and the northern South Island experienced record-high or near-record-high June temperatures on 5 June, associated with an extremely mild, northerly airstream brought down from the sub-tropics. And temperatures were unusually high across the North Island and northern South Island during the last week of August.

December was particularly warm in Southland, Otago and the West Coast, with record high December-average maximum temperatures recorded at Milford Sound, Manapouri and Lumsden.

Table 7: Extremes of high daily maximum temperature in 2011were recorded at:

Location	Maximum temperature (°C)	Date of occurrence	Records began	Comments
January				
Paeroa	31.9	17th	1947	Highest
Dannevirke	31.5	18th	1951	Highest
Mahia	31.5	19th	1990	Equal highest
Levin	31.4	18th	1895	Highest
Wellington	29.4	18th	1962	Highest
Hawera	30.7	18th	1977	Highest
Paeroa	31.9	17th	1947	Highest
February				
Leigh	29.5	5th	1966	Highest
Te Puke	31.2	5th	1973	Highest
Takaka	33.0	6th	1978	Highest
Kaikoura	34.3	2nd	1963	Highest
Timaru (Aero)	40.3	6th	1990	Highest
Timaru (Gardens)	41.3	6th	1885	Highest

April				
Kaikohe	26.6	23rd	1973	Highest
Takaka	25.5	30th	1978	Highest
Westport	28.4	26th	1937	Highest
May				
Kaikohe	23.1	5th	1973	Equal highest
Auckland	24.6	13th	1959	Highest
Whatawhata	23.0	12th	1952	Highest
Ngawi	23.4	11th	1972	Highest
Levin	24.3	3rd	1895	Highest
Ohakune	22.0	11th	1962	Highest
Wanganui	22.7	3rd	1987	Highest
Westport	25.0	1st	1937	Highest
Hokitika	26.7	1st	1963	Highest
Greymouth	23.2	1st	1947	Highest
Haast	21.5	1st	1949	Highest
Nelson	22.8	1st	1943	Highest
June				
Leigh	22.2	5th	1966	Highest
Whangaparaoa	21.4	5th	1982	Highest
Whitianga	22.4	5th	1962	Highest
Port Taharoa	20.2	5th	1973	Highest
Palmerston North	20.9	5th	1918	Equal highest
Lake Rotoiti	16.4	5th	1965	Highest
August				
Kerikeri	21.8	30th	1981	Highest
Kaikohe	20.5	30th	1973	Highest
Whangarei	22.1	30th	1967	Highest
Leigh	20.2	30th	1966	Highest
Lake Rotoiti	17.5	23rd	1965	Highest
October				
Kerikeri	24.0	21st	1981	Highest
Kaikohe	22.4	21st	1973	Highest
Leigh	23.8	21st	1966	Highest
Milford Sound	23.8	19th	1934	Highest

Section 12: Low temperatures and severe frost

2011 was notable for three cold months (April, August, and September). Two exceptional snow fall events during 2011 were also record-breaking with regards temperatures. The polar blast during 24-26 July delivered a bitterly cold air mass over the country, breaking several all-time low temperature records. And the unusually long-lived southerly airstream that brought blast after blast of sub-Antarctic air onto New Zealand between 14-17 August, broke many, many, August low minimum temperature records from one end of the country to the other (see Table below). The August event was notable in that afternoon (maximum) temperatures were also exceptionally low. At Auckland Airport, and in Upper Hutt, the Wairarapa, Rotorua, Port Taharoa, the Takapau Plains, as well as the Kaikoura Coast, maximum temperatures on 15 August were the lowest ever observed (for any month, not shown here) based on climate records of approximately 30-50 years' duration. This is consistent with climate histories, which show this snow fall event to be comparable, in terms of North Island snow fall and temperatures, to the 21 June 1976 snowfall occurrence.

Table 8: Extremes of low daily minimum temperature in 2011were recorded at:

Location	Minimum temperature (°C)	Date of occurrence	Records began	Comments (* indicates all-time lowest ranking)
April				
Hanmer Forest	-5.2	29th	1906	Lowest
Queenstown	-4.5	28th	1871	Lowest
July				
Kerikeri	0.4	26th	1981	Equal lowest
Leigh	2.7	26th	1966	Lowest
Whangaparaoa	3.4	26th	1982	Lowest
New Plymouth	-2.6	26th	1944	Lowest (*)
Westport	-1.5	26th	1937	Lowest
Le Bons Bay	-1.2	25th	1984	Lowest
Manapouri	-10.2	26th	1963	Lowest (*)
Milford Sound	-6.1	11th	1934	Lowest (*)
August				
Leigh	2.6	16th	1966	Lowest (*)
Whangaparaoa	2.3	16th	1982	Lowest
Rotorua	-5.2	16th	1964	Lowest (*)
Port Taharoa	0.1	16th	1973	Lowest (*)
Te Kuiti	-3.4	16th	1959	Lowest
New Plymouth	-2.3	16th	1944	Lowest
Castlepoint	0.0	15th	1972	Lowest
Ngawi	0.6	15th	1972	Lowest
Hicks Bay	1.0	16th	1969	Lowest
Mahia	1.2	16th	1990	Lowest
Stratford	-4.6	16th	1960	Lowest
Westport	-2.5	15th	1937	Lowest
Lake Rotoiti	-10.1	16th	1965	Lowest
Blenheim	-6.2	16th	1932	Lowest
Kaikoura	-1.0	15th	1963	Lowest (*)
Le Bons Bay	-2.3	15th	1984	Lowest
Lumsden	-7.1	19th	1982	Lowest
Haast	-3.5	15th	1949	Lowest (*)
November				
Haast	-0.4	5th	1949	Lowest
Milford Sound	0.0	5th	1934	Lowest

Section 13: Floods and high rainfall

Heavy rainfall was observed on 18 and 19 January, associated with ex-tropical cyclones Vania and Zelia, which produced flooding on the West Coast and caused the Fox River to burst its banks, forcing some township residents to leave their property. SH6 was flooded north of Punakaiki, as well as between Greymouth and Runanga, and was closed by a mud slide near Reefton. Roads in the Grey Valley near Ngahere were also flooded.

A low of tropical origin (which formed near New Caledonia) moved towards New Zealand on January 22/23, producing extremely heavy rainfall, flooding, slips and road closures over much of the North Island, north of about Wanganui. Many daily rainfall records were broken during this event between Taranaki and Wanganui. In Auckland, flooding and a King Tide resulted in the Northern and Northwestern motorways being partially closed, and homes and businesses in the central city and coastal suburbs being flooded. Several yachts were beached. A Taupo camping ground was evacuated, and the Desert Road was closed by a slip. On 24 January, the Waitomo Caves were closed to visitors because of rising river levels after heavy rain. Surface flooding covered the farm paddocks in the area.

Tropical Cyclone Wilma moved rapidly towards the northeastern North Island during 28 January, causing widespread deluge rainfalls and severe flooding in northeastern regions of the North Island. On 28 January, SH10 in Kerikeri was closed by surface flooding after heavy rainfall associated with the cyclone. The waterfront at Paihia was flooded, and Paihia's water treatment plant was damaged. Residents were asked to conserve water, while power was lost in other areas of the Far North, and in Whangarei.

On 29 January, Wilma continued to affect the upper half of the North Island bringing torrential rain, although it was downgrading to an extra-tropical cyclone. SH25, the Thames coast road, was closed by a huge slip at Ruamahanga, with several other smaller slips also along the road. More than 500 visitors were stranded in Coromandel township, and Tapu camping ground also housed hundreds of campers. Flooding closed SH2 at Waimana Gorge, and also between Tauranga and Whakatane, with the access road to Tawharanui Beach near Matakana also cut off. Slips caused delays on SH25 near Whitianga, Kuaotunu and Whangamata, and on SH2 at Waioeka Gorge and Waiotahi Beach. Also in Whangamata, the heavy rain forced raw sewage to flow over properties and into the harbour after the treatment station at Awarua Point failed. On Waiheke Island, an 80 year-old house plunged down a cliff after a retaining wall was washed away. People from Kaeo to Kawakawa were evacuated from their homes because of rising floodwaters. In Whangarei, the Kamo bypass and parts of SH1 were closed, with detours in place. SH1 was also closed at Springs Flat, Kaeo, and Puketona Junction, with more than a kilometre of road under water at Kaeo. SH11 was closed by floodwaters between Kawakawa and Paihia. At Waihi Beach, motel units had to be evacuated because of flooding. Nine patients were evacuated from Waipuna Hospice at Te Puna until flood waters surrounding the hospital receded. All tracks on and around Mount Maunganui were closed by slips and mud slides. Sections of SH2 in Tauranga were affected by surface flooding, but remained open.

During 6 - 7 February, heavy rain caused flooding in West and South Otago, with some roads impassable, and surface flooding over large areas of farmland, especially around Kelso and low-lying parts of Balclutha. SH90 was closed near Tapanui, and two slips on the Haast Pass Highway, one southwest of Makarora, and another west of the summit, closed the road during the morning. In Timaru, the heavy rain brought down a tree which hit the 11kV power line, cutting power to homes southwest of the city. On 8 February, the Land Transport Authority closed the twin bridges over the Waitaki River at Kurow, after high river flows damaged a bridge pier.

On 21-22 March, heavy rain in the Coromandel caused flooding and slips, closing many roads, including Hot Water Beach Road and Hikuai Settlement Road, south of Tairua. SH25 was closed between Thames and Coromandel, and also at Opoutere where forestry logs were washed on to the road. In Eastland, SH35 was closed by flooding about 1 km north of Te Puia Springs, and East Cape Road was closed at Te Araroa by flooding, a slip and fallen trees. In Gisborne, arcing power lines led to a fire on a wooden pole, and other power lines were brought down. In rural areas, the persistent rain put a stop to harvesting, with maize, sweetcorn, tomatoes and grapes affected.

On 27 March, a sudden downpour from Wellington to Kapiti flooded properties, ripped up roads, and caused cars to float down streets. People had to be helped from their cars after they became trapped in the flooding. In Tauranga, a deluge popped stormwater manhole covers and flooded streets. The area between Wanganui, Feilding and Mangaweka was lashed with localised heavy rain and thunderstorms.

On 4 April, heavy rain caused a serious land-slip depositing tonnes of debris on the railtracks at Awatuna, north of Hokitika. In New Plymouth, heavy rain delayed the setting of the newly laid cement road surface in Devon Street, causing a sludgy mess for businesses, people and vehicles in the area.

Heavy rain on 5 April caused minor flooding and slips in Wellington and Taumarunui. In Christchurch the rain caused problems with the sewerage system broken in the earthquake.

On 25 and 26 April, heavy rain and winds caused flooding and slips and brought down trees across central North Island regions. SH5 between Rotorua and Taupo was blocked by downed trees and powerlines. Residents were evacuated from Te Awanga, east of Hastings, after the heavy rain. Many roads in Waikato, Taranaki, Manawatu, Bay of Plenty, the Taupo area, Hawkes Bay and Gisborne were closed by slips and flooding.

On 27 April, more people were evacuated from coastal Hawkes Bay settlements, and more roads were closed by slips, following persistent heavy rain. Problems created by the heavy rain meant all water for drinking and cooking had to be boiled and residents were asked to conserve water and not take showers or baths, do the laundry or flush the toilet. SH2 was closed from Bayview to Nuhaka. At Morere Hot Springs heavy rain caused severe damage. In Mt Maunganui, slips closed more of the tracks on Mauao, with some tracks still closed after the January storms.

On 28 April, a large slip in Napier, between Bluff Hill and the port, blocked the railway line as well as the road in both directions, and 18 homes above the slip were evacuated. Mahia was completely cut off by a slip. A group of eight trampers was evacuated by helicopter from Whirinaki Forest Park where they had been trapped for three days by the bad weather. On 29 April, Aramoana (Hawkes Bay) was still completely cut off, and food parcels were dropped by air. The historic building, Aramoana Woolshed, was reported to have been damaged by a very large slip, which lifted it from its foundations.

On 2 May, heavy rain caused flooding in Kaeo, and reduced SH10 to one lane north of Kaeo after a section of the road slumped by 60 cm. In Houhora Harbour the storm sank a launch at its mooring. Whangarei Harbour was closed for shellfish gathering after the heavy rain caused overflows from the city's sewerage system. In the Western Bay of Plenty, the heavy rain caused surface flooding in many areas, and slips on SH33 near Paengaroa, and on No3 Rd, Te Puke.

Heavy rain caused flooding in Sumner on 7 May, and many homes with roofs damaged by the earthquake suffered more water damage. Record rainfall amounts were also observed on 7 May in Otago. On 8 May, heavy rain over a 12 hour period caused slips and surface flooding, and blocked drains in Alexandra and Dunedin. On the Otago Peninsula, multiple small slips closed Portobello Road between Dunedin and Macandrew Bay, as well as Highcliff Road. More slips and fallen trees blocked roads across the harbour at Carey’s Bay, and at least one house suffered significant damage. Parts of SH1 near Waimate were covered in surface water, with flooding at the intersection of SH1 and SH82, and many buildings in the town were flooded. Local roads were disrupted by slips and flooding, and at least five areas through the Waimate Gorge were washed out.

On 11 May, a "boil-water" notice was issued for Patearoa, Ranfurly, Omakau, Naseby and Lake Roxburgh residents after the heavy rain on 8 May discoloured water supply sources. At Omokoroa, neat Tauranga, a huge slip came down leaving a house near the edge of a cliff.

Heavy rain in Eastland on 13 May caused slips and flooding, closing SH2 at Waimana, and causing several slips on SH35, the coast road north of Opotiki.

On 15 May, heavy rain caused flooding in Wellington, with SH2 closed by a slip in Hutt Valley, and a slip near Johnsonville blocking train tracks and stopping services for several hours.

Flooding closed some rural roads in Southland on 19 May. Heavy rain also flooded farmland north of Invercargill, and closed several roads, on May 20.

On 25 May, heavy rain caused flooding in Ferntown, Golden Bay and around Sharlands Creek in Nelson. On the 26th, further heavy rain flooded SH6 at Brightwater and between Havelock and Rai Valley, and SH60 at Takaka, with flood warnings issued for SH63 between Renwick and St Arnaud. Houses were evacuated at Hope and Brightwater. A house was evacuated in Nelson after a massive slip undermined its foundations. Slips closed the Takaka Hill Road, Matai Valley Road, and SH6 at Havelock. Further north, there was severe surface flooding in the northbound lanes of the Waikato Expressway at Rangiriri. Surface flooding up to 600 mm deep was reported in Tokoroa. In the Far North, SH1 was closed at the Rangiahua Bridge which was under water. SH1 was also closed by flooding between Pakaraka and Kaitaia. Surface flooding also covered SH10 at Kaeo.

On 8 June, heavy rain caused flooding on SH3 south of Waitara, and surface flooding in New Plymouth. The Waitara River undercut its banks near Tarata, causing part of Motukawa Road to slip into the river. On 9 June, a large slip closed SH3, south of Mokau, for several hours.

On 18 June, after heavy rain, a slip came down on a house at Ohope Beach, killing a young man. The rain also caused significant flooding in Whakatane town centre. Further north, there was significant surface flooding on SH1 at Mercer.

On 5 July, heavy rain in Gisborne caused surface flooding, and overloaded the stormwater and sewerage systems. Gisborne Girls High School was closed because the toilet drains were blocked. A large slip blocked Waingake Road, about 16 km up the valley, and many other roads were closed by flooding, including Kaiti Beach Road where cars could not get in or out of the settlement.

On 11 July, heavy rain closed SH53 at Waihenga Bridge, between Featherston and Martinborough. In Wellington the heavy rain and strong winds caused power outages and interrupted TelstraClear internet services. In Ruapehu District, Okahukura Saddle Road was blocked by a slip, and Oio Road, was closed as it had been undermined by a large sinkhole.

On 13 July, many roads in the Golden Bay and Motueka areas were closed by slips and fallen trees, after persistent heavy rain.

On 14 July, many slips and washouts were reported in Wanganui and the wider Wanganui District, with power outages at Kaiwhaiki, Makirikiri, Parihauhau, Parikino, River Road and Upokongaro. A slip blocked one lane of SH3 south of Ratana, and several slips came down on SH3 at Whenuakura Bridge partially blocking the road. SH56 was closed by flooding at Opiki. In the Nelson and Tasman districts all sports grounds were closed because they were waterlogged.

On 22 July, heavy rain caused a sewage spill in Whangarei, flooded several roads in the city, and flooded pasture to a depth of about a metre at Hikurangi, Otaika, and Maungatapere. In Napier, home-owners were evacuated after two more slips came down on Napier Hill.

On 26 July, a massive slip, about 500 m upstream from the Bridge to Nowhere, closed the Mangapurua section of the Ruapehu to Whanganui cycle trail.

On 11 August, heavy rain caused surface flooding in the western Bay of Plenty.

Heavy rainfall caused flooding on 14 August in the Wellington suburb of Kilbirnie.

On 18 August, a massive slip closed both lanes of SH3 through the Manawatu Gorge.

On 6 September, another slip came down on SH3 through the Manawatu Gorge, extending the closed period.

On 3 October, heavy rain caused the cancellation of planned outdoor performances in the Nelson Arts Festival. Some roads in Matai Valley were closed by flooding. Nelson Council closed Waimea Inlet and Nelson Haven to shellfish collection and swimming, partly because of the high storm-water run-off. Farmers in Bay of Plenty were warned to shift stock to high ground after very heavy rain in the region.

On 18 October, heavy rain caused surface flooding and slips in and around Dunedin, Oamaru and Temuka. Further north, heavy rain caused another massive slip on SH3 in the Manawatu Gorge.

On 19 October, the Heathcote River breached its banks in several areas, with many Christchurch roads closed by flooding. SH1 north of Oamaru, was closed by flooding at Hilderthorpe, and also flooded to the south near Moeraki, where one lane was closed. In the Waitaki District, flooding closed many rural roads. In Southland, heavy rain caused rivers and streams to swell, closing roads in eastern and northern Southland, and isolating the township of Waikaia.

On 25 October, flooding affected SH6 between Harihari and Franz Josef.

Heavy rain on 20 and 21 November caused flooding and road closures on the West Coast. The Grey River burst its banks, and there was extensive flooding of farmland. Widespread stock losses were reported, including one of cattle being electrocuted after floodwaters brought down power lines. In Greymouth, the racecourse, golf course, speedway, and sports grounds were covered in water and silt, with damage to infrastructure. Surface flooding and strong winds also affected SH73 at Arthurs Pass.

On 22 November, the Mataura River burst its banks, and nearby roads were closed by flooding.

On 14 December, record-breaking heavy rain caused major slips and flooding in Nelson and Golden Bay. A State of Emergency was declared in Nelson on 14 December, following record-breaking rainfall, widespread flooding and land slips. In Nelson city, more than 100 homes near rising rivers were evacuated. The Matai river walkway was closed, as were many urban and rural roads, isolating communities. The Coastal Highway, SH60, was closed at both Appleby Bridge and at Takaka Hill. Collingwood was cut off after the road was washed away at Birds Hill, and roads to Pakawau and Puponga were closed. A dam collapsed above Pohara Gully in Golden Bay.

On 15 December, schools in Golden Bay were closed after the extreme rainfall closed roads and damaged property. Many slips threatened properties in the Nelson region, and more homes were evacuated. Food was taken to Collingwood on an alternative four-wheel vehicle track. About 500 Tahunanui homes lost landlines after slips washed away power lines. Campers were trapped at the Totaranui Campground after mudslides closed the only access road. Pohara Beach Holiday Park was closed after its water and sewerage supplies were cut. In Ligar Bay, a slip containing mud, trees, and even eels, damaged several homes. Aniseed Valley residents were isolated by massive slips and washouts. In Northland, SH1 and SH10 were closed by flooding, and many other roads were affected by surface flooding.

On 16 December, many roads in Nelson, Waimea and Golden Bay remained closed, including SH60 from Takaka to Collingwood. In Christchurch, heavy rain caused flooding, with sewage overflowing into the Avon River.

On 17 December, heavy rain caused a landslide which dislodged three cabins at the Oakura Bay Holiday Park. Several homeowners who lived above the slip were evacuated. In Rotorua, heavy rain caused surface flooding in several areas, including Te Ngae Road and Fairy Springs Road.

On 22 December, a thunderstorm with associated very heavy rain, caused flash floods in south Auckland, flooding houses and causing traffic chaos, especially in the Dominion Road area.

On 30 December, a band of very heavy rain crossed most of the country. In Wellington, low lying suburbs were flooded and the Moa Point sewage treatment plant was overwhelmed by the storm water, overflowing into Lyall Bay, resulting in the beach being closed to swimmers. In Nelson, a new slip again closed Rocks Road, and in Golden Bay, the Wainui River carved a new course, isolating a commune and flooding farmland.

On 31 December, continuing heavy rain caused the cancellation of many planned New Year's Eve celebrations, including those at Mt Maunganui, Palmerston North, and Wellington. Slips closed SH29 over the Kaimai Ranges, and SH2 between Whakatane and Opotiki. Many roads in the Nelson region remained closed. Near Whangamata, a car attempting to cross a ford was swept down river, but both occupants escaped unharmed.

Table 9: Record high extreme 1-day rainfall totals were recorded at:

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year Records Began	Comments
January				
Cape Reinga	130	28th	1919	Highest
Kaitaia	124	28th	1967	Highest
Kaikohe	210	28th	1956	Highest
Kerikeri	252	28th	1981	Highest
Dargaville	100	28th	1943	Highest
Whangarei	211	28th	1943	Highest
Leigh	194	28th	1967	Highest
Warkworth	161	28th	1967	Highest
Whangaparaoa	150	28th	1946	Highest
Kumeu	64	28th	1978	Highest
Whitianga	220	28th	1961	Highest
Matamata	86	28th	1951	Highest
Tauranga	174	28th	1910	Highest
Te Puke	175	28th	1973	Highest
Taupo	114	23rd	1949	Highest
Whatawhata	80	22nd	1952	Highest
Te Kuiti	97	23rd	1957	Highest
Taumarunui	120	23rd	1913	Highest
Turangi	124	23rd	1968	Highest
Stratford	164	23rd	1960	Highest
Hawera	118	23rd	1977	Highest
Ohakune	125	23rd	1961	Highest
Waiouru	86	23rd	1950	Highest
Wanganui	125	23rd	1937	Highest
February				
Ranfurly	53	6th	1943	Highest
Lumsden	57	6th	1982	Highest
Cromwell	52	6th	1949	Highest
Alexandra	68	6th	1983	Highest
Gore	64	6th	1967	Highest
Nugget Point	63	6th	1930	Highest
March				
Wanganui	39	4th	1987	Highest
May				
Wanganui	37	15th	1987	Highest
Ranfurly	52	7th	1943	Highest
Cromwell	47	7th	1949	Highest
Alexandra	67	7th	1983	Highest
Nugget Point	62	7th	1930	Highest
October				

New Plymouth	102	3rd	1944	Highest
Stratford	137	3rd	1960	Highest
Winchmore	59	18th	1927	Highest
Timaru	66	18th	1881	Highest
Oamaru	70	18th	1898	Highest
Tara Hills	43	25th	1949	Highest
Dunedin (Musselburgh)	55	18th	1918	Highest
Lumsden	53	17th	1982	Highest
December				
Kaitaia	69	14th	1985	Highest
Kerikeri	103	4th	1981	Highest
Hamilton	88	17th	1907	Highest
Takaka	392	14th	1976	Highest
Nelson	168	14th	1941	Highest

Table 10: Record high monthly rainfalls were recorded at:

Location	Rainfall (mm)	Percentage of normal for the month	Year Records began	Comments
January				
Dargaville	212	307	1943	Highest
Leigh	383	517	1966	Highest
Whitianga	418	427	1961	Highest
Matamata	268	349	1951	Highest
Te Puke	425	423	1973	Highest
Whakatane	337	423	1952	Highest
Rotorua	424	471	1963	Highest
Taupo	279	331	1949	Highest
Whatawhata	279	281	1952	Highest
Hamilton	225	281	1935	Highest
February				
Alexandra	99	328	1983	Highest
April				
Wairoa	333	230	1964	Highest
May				
Takaka	430	254	1976	Highest
Lake Rotoiti	333	241	1933	Highest
Reefton	360	187	1960	Highest
Nelson	271	353	1941	Highest
Alexandra (Pioneer)	93	289	1983	Highest
July				
Invercargill	183	232	1939	Highest
Tiwai Point	243	273	1970	Highest
December				
Kerikeri	411	397	1981	Highest
Te Puke	413	313	1973	Highest
Rotorua	351	307	1963	Highest
Hamilton	226	237	1905	Highest
Stratford	344	229	1960	Highest
Hawera	234	294	1977	Highest
Wanganui	212	302	1890	Highest
Takaka	1103	814	1976	Highest

Motueka	292	294	1943	Highest
Nelson	446	601	1941	Highest

Section 14: Low soil moisture levels and record low monthly rainfall

In 2011, six months were very wet overall (January, March, April, May, July, and October) and two were generally dry (August and September). Four months showed mixed rainfall totals by region (February, June, November and December). Significant soil moisture deficits were generally short-lived in all regions of the country in 2011.

At the beginning of 2011, significant soil moisture deficits (more than 110 mm of deficit) affected parts of western Northland, Waikato, Bay of Plenty, Gisborne, Manawatu and Wairarapa, as well as parts of Canterbury and Central Otago. However, the extremely wet January in all North Island regions fully recharged soil moisture levels by the end of the month right across the North Island. In contrast, February was very dry for parts of Northland and Auckland, the Central Plateau, parts of southern Hawkes Bay and the Wairarapa, and parts of Marlborough, with rainfalls less than 20 percent of February normal in these regions. It was the driest February in Dannevirke since records began there in 1951 (see Table below). By the end of February, significant soil moisture deficit had redeveloped in southern Taranaki, Manawatu, Kapiti coast, Wellington, Wairarapa, Nelson, and Marlborough, and had continued in north Canterbury. March was generally wet in many regions, so that significant soil moisture deficit remained only in the Tasman District, Marlborough and parts of Canterbury. Rainfall in April replenished all remaining dry soils.

August precipitation was mostly well below average (less than 50 percent of August normal) for western, northern and alpine areas of the South Island, as well as for Taupo northwards. It was the driest August on record in the Waikato, and in and around Nelson (see Table below). And September was very dry for most regions. Less than half of normal September rainfall was recorded in Bay of Plenty, Gisborne, on the West Coast, and in the Mackenzie country. It was the driest September on record for Whakatane (see Table below). The combination of two dry months and windy southwesterly winds over the country meant that soil moisture levels are already below normal by the middle of spring in north Canterbury, Mackenzie country and central Otago, as well as parts of the North Island. November was an extremely dry month in Northland, Firth of Thames, eastern Waikato, Coromandel, Western Bay of Plenty, and Taupo, with less than half of normal November rainfall observed. Whangarei received only 10 mm of rainfall during the month (it was the second-driest November there, in records which begin in 1937) and Tauranga reported only 13 mm (also the second-driest November there, in records which begin in 1898). Elsewhere in the North Island, rainfall totals in November were generally below normal, with the notable exception of around Palmerston and Wellington. At the end of November, significant soil moisture deficits were observed in regions north of Taupo, also Hawkes Bay, Gisborne, Marlborough, and central Otago. Above normal rainfall totals in December throughout the North Island improved soil moisture levels there, but deficits had become extreme (deficit of more than 130 mm) in Central Otago and parts of Southland by the end of the year.

Table 11: Record low monthly rainfalls were recorded at:

Location	Rainfall (mm)	Percentage of normal	Year records began	Comments
February				
Dannevirke	6	9	1951	Lowest
August				
Hamilton (Ruakura)	28	24	1905	Lowest
Te Kuiti	48	30	1950	Lowest
Takaka	29	14	1976	Lowest
Motueka	22	13	1943	Lowest
Nelson	15	16	1941	Lowest
September				

Whakatane	31	34	1952	Lowest
December				
Milford Sound	83	13	1929	Lowest
Puysegur Point	54	28	1879	Lowest
Dunedin, Airport	11	15	1962	Lowest
Dunedin, Musselburgh	9	11	1918	Lowest
Manapouri	8	8	1961	Lowest
Queenstown	9	15	1871	Lowest
Lumsden	21	23	1982	Lowest
Gore	8	8	1950	Lowest
Tiwai Point	13	15	1970	Lowest
Balclutha, Telford	6	9	1964	Lowest

Section 15: Sunshine extremes

In 2011, four months were generally sunny over much of New Zealand (March, August, September and November), and three months were generally cloudy across the country (May, June and October). The other five months showed mixed sunshine totals across different regions. Several sites experienced record high sunshine hours in August or September 2011. And in the case of Takaka, sunshine totals were record high in both months. In contrast, it was the cloudiest May on record at several stations (see Tables below).

Table 12: High monthly sunshine extremes were recorded at:

Location	Sunshine (hours)	Percentage of normal	Year Records began	Comments
March				
Greymouth	234	154	1947	Highest
July				
Cheviot	170	160	1983	Highest
August				
Te Kuiti	151	134	1962	Highest
Takaka	217	131	1985	Highest
Nelson	247	146	1948	Highest
Blenheim	235	130	1947	Highest
Lake Tekapo	218	152	1928	Highest
September				
Dargaville	198	129	1943	Highest
New Plymouth	202	127	1972	Highest
Tauranga	231	140	1933	Highest
Dannevirke	202	157	1963	Highest
Gisborne	242	140	1905	Highest
Waipawa	247	168	1945	Highest
Takaka	234	135	1985	Highest
Cheviot	223	152	1983	Highest
December				
Balclutha, Telford	276	156	1964	Highest

Table 13: Low monthly sunshine extremes were recorded at:

Location	Sunshine (hours)	Percentage of normal	Year Records began	Comments

May				
Stratford	89	71	1963	Lowest
Hokitika	68	59	1964	Lowest
Cromwell	59	50	1979	Lowest
October				
Wallaceville	97	57	1939	Lowest
Christchurch	141	71	1930	Lowest
December				
Hamilton	136	64	1936	Lowest

Section 16: Snow and ice

On 20 May, snow was well below Stratford Mountain House on Mt Taranaki, with at least 8 cm in the upper car park.

A lack of snow caused the cancellation of some of the events planned for the first week of the Queenstown Winter Festival, in late June.

On 7 July, snow closed both SH8, Omarama to Tarras, the Lindis Pass, and SH94, Te Anau to Milford Sound. Some vehicles had to be towed off the Lindis Pass. Chains were required on the Crown Range between Queenstown and Wanaka.

On 9 July, snow closed the Crown Range until it was cleared by snow ploughs at 1 pm on the 10th. The snow and ice-covered Haast and Lindis Passes were also closed overnight. Heavy snow prevented both Wanaka skifields, and the Remarkables, from opening on 10 July. Several flights in and out of Queenstown Airport were cancelled. Snow also closed SH94, the Milford Road, between Knobs Flat and Milford Sound, with other parts of the road closed to towing vehicles.

SH94 remained closed from Knobs Flat to Milford Sound on July 11th, with chains essential on SH73 at Porters Pass and at Arthurs Pass to Otira, SH8 at Lindis Pass, and SH6 at Haast Pass. Ice warnings were in force for SH6 from Kingston to Five Rivers. Ironically, ski fields were also closed because of too much snow, the danger of avalanche, and the difficult driving conditions. Many schools in Central Otago were closed for the day. A Saudi Arabian family was freed early afternoon after they spent the night trapped in their campervan on the snow-bound Crown Range pass.

On 12 July, the snow caused havoc in Queenstown with schools closed, vehicles trapped, and the road from Queenstown to Frankton closed. Two flights were cancelled, one diverted, and others delayed. Trucks were stuck in snow on SH8 between Roxburgh and Shingle Creek. The Crown Range and Lindis Pass were closed, as was SH82 between Te Anau and Milford Sound. SH94 remained closed. Snow-loading on power lines was also responsible for power trips, or brief cuts, in the Gore area.

On 13 July, heavy snow brought down trees and power lines in Tasman District, closing roads, and cutting power to about 500 homes. Chains were essential on SH63 from Wairau to Kawatiri, while snow closed SH6 at the Hope Saddle and Spooner Range, stranding trucks and campervans. Lake Rotoiti School at St Arnaud was closed for a second day. Rainbow Skifield, the Mt Robert Road, Tophouse Road to St Arnaud, and all local or back roads south of Wakefield were also closed. Heavy snow loading on lines and trees brought down power lines and disrupted supply to about 500 customers in St Arnaud, the Howard Valley, the Buller River Valley, the Gowan Valley, and parts of Rainy River. Further south, snow closed the Crown Range Road again, SH93 from Clinton to Mataura, and SH94 between Milford Sound and Te Anau remained closed. Black ice warnings were issued for SH6, between Winton and Centre Bush, and for SH8, the Lindis Pass, from Tarras to Omarama. Chains were essential for SH6 at the Haast Pass.

SH94 remained closed by snow on 14 July, with severe gales hampering efforts to clear it. SH93 from Clinton to Mataura was also closed. Clinton Primary School closed at lunchtime. Chains were essential on

SH73 between Arthur's Pass and Otira, and SH8 between Omarama and Tarras, the Lindis Pass, with both roads closed to towing vehicles. The Crown Range was re-opened but chains were essential. Snow was reported in Invercargill, Tokanui School in The Catlins was closed, and doctors from Balclutha were not able to get through to Tokanui for a planned clinic. On 15 July, ice closed SH87 between Outram and Middlemarch, with cautions in place for black ice on SH8 from Lawrence to Raes Junction, SH94 from Mossburn to Te Anau, SH1 from Clinton to Gore, and from Balclutha to Gore.

On 24 July, a major snowfall event closed SH1 on the Desert Road section, SH2 at the Rimutaka Hill Road, and SH5 between Napier and Taupo in the North Island. In the South Island, roads between Lawrence to Milton were closed by snow, and chains were required from Ranfurly to Naseby. Queenstown Airport was closed.

On 25 July, snow closed SH1 from Cheviot to Waipara, Oamaru to Dunedin and Dunedin to Gore, SH6 from Queenstown to Kingston, SH5 at Rangitaiki, roads between Outram and Middlemarch; Palmerston and Kyeburn, Raes Junction and Clarkesville, Clinton and Mataura, and Te Anau to Milford Sound. The Rimutaka Hill Road, the Desert Road, and the Napier-Taupo Road remained closed, and SH2 at both Nuhaka and Mt Bruce between Masterton and Eketahuna, and the Napier-Taihape Road were added to the list. Both Lincoln and Canterbury Universities, and Canterbury Polytechnic Institute of Technology were closed for the day. In Dunedin, Otago Polytechnic closed at 10.30am, many banks and retail businesses did not open, and meals-on-wheels deliveries were cancelled by the District Health Board. Christchurch, Dunedin, Queenstown and Invercargill airports were closed. Snow on the power lines caused power cuts across Canterbury. Elective surgery was cancelled at both Christchurch and Southland Hospitals. Snow was down to sea level at New Brighton and Spencerville beaches. City bus services in Christchurch, Waimakariri and Selwyn districts were cancelled, as were many long distance bus services, and many businesses, including banks, were closed for the day as staff were unable to get into the city. Courier and rural post deliveries were cancelled, and in Balclutha and Queenstown, the day's court proceedings were postponed. More than 200 stranded motorists sheltered in the Waitati Hall overnight. Severe ice on SH6 from south of Lumsden to Kingston caused several accidents. Snow was also reported from the Kaimai Ranges, Taupo, Hawera, Stratford, Wanganui, Palmerston North, the Kapiti Coast, Wellington, Masterton, Greytown, Martinborough, Greymouth, Hokitika, Nelson, Mapua, Motueka, Takaka Hill, Rai Saddle and Kaikoura. In Taranaki, newborn calves had to be rescued from the storm and put indoors, and power was cut to about 1800 properties around Kaponga and Cardiff.

On 26 July, roads between Palmerston and Kyeburn, Outram to Middlemarch, SH2 at the Rimutaka Hill Road, SH1, the Desert Road south to Taihape, and SH4 remained closed by snow and ice. Early morning flights out of Christchurch were cancelled. About 250 skiers were stranded on Mt Lyford overnight after avalanches blocked the road with snow 2-3 m deep.

On 27 July, SH94 from Te Anau to Milford Sound remained closed to towing vehicles, with chains required for all other vehicles. Chains were also needed on Arthurs Pass, and the road closures caused Wanaka to run out of petrol. Removal of rubble from the Christchurch CBD restarted, after snowfalls had stopped work.

On 6 August, SH94, Te Anau to Milford Sound, was affected by snow with chains required. On 7 August, the Napier-Taupo highway was closed by snow and black ice, trapping at least two trucks.

On 14 August, another major southerly storm brought snow to much of the country, including central Wellington and the hill suburbs. SH2 over the Rimutaka Hills was closed, trapping about 100 people who were rescued using 4-wheel drive vehicles. Queenstown and Dunedin Airports were closed, and flights to Wanaka were also cancelled. Snow-laden trees toppled on to power lines, cutting power to about 3500 customers in the lower North Island.

On 15 August, following the snow of the 14th, major North Island roads remained closed, including SH1 Desert Road to Rangipo to Waiouru to Taihape, SH2 Rimutaka Hill, near Mount Bruce, Dannevirke to Norsewood to Waipukurau, and Gisborne to Nuhaka, SH3 from Inglewood to Stratford, SH5 Napier to Taupo, and Napier to Taihape. South Island roads closed by snow or ice included the Lyttelton Tunnel Road, Raes Junction to McNab, Raes Junction to Milton, Alexandra to Roxburgh, and at the Lindis Pass Omarama to Tarras, Queenstown to Kingston to Five Rivers, Clinton to Mataura, Kaikoura to Waipara, Palmerston to

Dunedin, and Dunedin to Gore, Kyeburn to Palmerston, and Ranfurly to Omakau, Clinton to Mataura, and Outram to Kyeburn. Many inner-city roads in Dunedin and hill roads around Wellington were also closed. Southern District Health Board postponed all outpatient clinics and elective surgery. Airports and schools were closed in Christchurch, Queenstown and Dunedin, and Invercargill Airport was also closed. The University of Canterbury and Christchurch Polytechnic Institute of Technology were closed, as was the Christchurch campus of the University of Otago. Contractors were forced to stop working in Christchurch's Red Zone because of snow and ice. Bus services in Dunedin were cancelled. Power cuts affected about 6000 households in South Taranaki, Manawatu and Whanganui. Wainuiomata Primary School in Lower Hutt was closed because it had no power, heating or phone lines. Many other schools in the Wellington region closed early. Snow again fell down to sea level in Wellington, and as far north as the Kaimai Ranges. Both Rotorua and New Plymouth reported snow falling in the central city, and Te Mata Peak was covered in snow. Road closures meant Fonterra milk tankers were unable to reach about 1700 dairy farms in snow-bound areas of the South Island. All flights in and out of Wellington airport were cancelled in the evening, some buses which service the hill suburbs were cancelled during the afternoon, and all bus services stopped at 7 pm. Some commuter train services from Wellington to Waikanae and Upper Hutt were cancelled or replaced with buses. Snow fell briefly in Auckland city but did not settle, and was also reported from the Waitakere Ranges, Drury, Waiuku, Clevedon and the Bombay Hills. Taupo Airport was also closed as heavy snow fell around the lake, particularly on the western side. In the Waikato, snow was seen in central Hamilton, Te Kuiti, and briefly in Raglan. Snow settled in Wanganui, reputedly for the first time since 1974. On the West Coast, snow fell in Rotomanu, Inchbonnie, Reefton, Greymouth. Blackball and Ikamatua. Awahono School at Ahaura closed at lunchtime because of the snow. Eight adults and 16 school pupils spent an extra night on Mt Ruapehu as the road down was too icy to safely navigate and major highways were closed.

On 16 August, all Dunedin kindergarten, primary, intermediate and secondary schools remained closed for a second day, and in Wellington icy roads forced the closure of several schools. Many Wellington hill suburb roads remained closed, bus services were cancelled, and the Cable Car was also out of action. Many schools in Canterbury, both universities, and most schools in Southland were also closed. Canterbury District Health Board cancelled all outpatient clinics, elective and non-urgent surgery. Some customers in Wanganui, Manawatu and Taranaki were without electricity overnight after snow and falling trees damaged power lines. Snow falling into the uplink dish at TVNZ's Avalon studios in Lower Hutt caused the loss of Freeview channel reception. There were no mail deliveries in the lower North Island. The snow reached Northland with hillside properties around Dargaville reporting snow falling. The Tranz Alpine passenger train was stopped by snow at Springfield. All South Island passes were closed, and other major road closures included SH1 Kaikoura to Waipara and Waikouaiti to Dunedin, SH6 Queenstown to Kingston and to Five Rivers, SH8 from Fairlie to Lake Tekapo, Geraldine to Fairlie, Kyeburn to Palmerston, Kyburn to Outram, Clinton to Mataura, Mataura to Te Tipua, Te Anau to Milford Sound, and from Springs Junction to Reefton. North Island closures included SH1 between Waiouru and Vinegar Hill, and from Rangipo to Waiouru, the Napier-Taupo road, SH4 from Wanganui to National Park, Ohakune to Waiouru, Tongariro to Rangipo, National Park to Turangi, and SH2 from Brown Owl to Te Marua, over the Rimutaka Hills between Wairarapa and Wellington, from Ekatahuna to Mt Bruce, and between Morere and Bartletts. Black ice affected SH1 between Levin and Manakau, Ngauranga Gorge and the northern motorway of Wellington.

On 17 August, the snow storm battering Wellington caused the closure of many kindergartens, primary, intermediate and secondary schools and roads throughout the region, and the cancellation of all Cook Strait passenger ferries. The snow, together with high winds, caused more damage to power lines cutting electricity supply across South Taranaki, rural Wanganui, Manawatu and Wairarapa. Some roads remained closed, including SH1 at the Desert Road, Taihape to Waiouru, and at Hunterville, SH2 at the Rimutaka Hill Road, Te Marua to Pakuratahi, and Muriwai to Morere, SH5 the Napier to Taupo Highway, and from Cheltenham to Vinegar Hill, SH7 from Springs Junction to Reefton, SH7 from Springs Junction to Hanmer Springs, and Porters Pass. Severe ice caused the closure of roads from Rotorua to Tauranga. There were no mail deliveries to Ohakune, Raetihi, Waioru, Taihape and Hunterville, and limited deliveries in Christchurch, Queenstown and Dunedin. In Rotorua black ice was reported on the roads to Tokoroa and Tirau, as well as SH5 south of the city. South Canterbury roads re-opened to vehicles with chains, but remained closed to towing vehicles. SH2 over the Rimutaka Ranges was re-opened late afternoon. Queenstown Airport re-opened, and a start was made on clearing the backlog of stranded passengers, but most schools in the area remained closed.

On 18 August snow was finally cleared from SH87, the last of the Otago highways to be cleared, liberating locals at Clarks Junction and Middlemarch who had been cut off for four days. On 19 August, ice warnings were still in place for SH8 from Milton to Raes Junction.

Snow affected SH94 from Te Anau to Milford Sound on 15 September, with all vehicles required to carry chains. Heavy snow closed Danseys Pass, with extreme care required on roads around Poolburn, Oturehua, St Bathans and Naseby.

On 18 October, SH8 at the Lindis Pass was closed by heavy snow. Snowfall on Burkes Pass caught out several cyclists who had to be rescued and taken to Lake Tekapo. On 19 October, heavy snow fell down to about 700 m, with 80 cm settling around Lake Tekapo township.

On 5 November, snow fell over much of Southland, Otago and Banks Peninsula.

Section 17: Severe or damaging hail, electrical storms and tornadoes

On 31 January, at Waitapu Gardens, a mini-tornado tore a 48 m plastic tunnel house off the pepper crop, flattened the corn crop, destroyed the beans, and ripped the tomato tunnel house in half.

On 2 February, a mini-tornado in Te Anau ripped corrugated iron off classroom roofs at Fiordland College, flinging one sheet up to 150 m over trees and across a sports field.

A huge lightning storm lit up northeastern and coastal Wairarapa with massive flashes every two or three minutes for about half an hour on 4 April. An even bigger thunder storm affected White Island, accompanied by a massive downpour.

On 5 April, a mini tornado in South Auckland blew the roof off a storage unit, trapping a man in a nearby vehicle.

On 26 April, at Waikawa near Picton, a twister tore the roof off at least one house and left iron lying metres up a nearby hillside.

On 28 April, the 110kV Transpower line, feeding power to the Far North, was hit by lightning between Maungatapere and Kaikohe, cutting power to more than 30,000 customers for a short time.

On 3 May, a tornado crossed the Auckland region, killing a man in Albany and injuring many others.

A Qantas passenger plane was struck by lightning soon after take-off from Auckland Airport on11 May. It re-landed safely.

On 15 May, MetService reported nearly 6000 lightning strikes throughout New Zealand, with a garage set on fire in Paraparaumu, and radio transmitters hit, interrupting broadcasts in Wellington. Power was also cut to properties in the Riwaka Valley after lightning struck transformers on the Takaka Hill. On the same day, a mini-tornado in Atawhai, Nelson battered homes and swept away two trampolines, one of which flew 60 m over a house and caught on the top of a power pole. Power was cut for about an hour and a half. Mini-tornadoes also struck Wellington and the Kapiti Coast, felling 30 m trees.

On 18 June, lightning struck a restaurant in Rotorua, cutting power and phone lines for a short time.

On 19 June, New Plymouth central business district and nearby residential areas were struck by two tornadoes, which smashed windows, lifted roofs, sucked furniture out of buildings, pulled up trees by their roots, and tore up streets in their path. At New Plymouth racecourse, winds sucked out barn doors to four stable blocks, destroyed a long section of near-new racetrack running rail, sheared off steel uprights at ground level, and tossed a horse transporter on to its side. Bell Block and Omata were also affected by a swarm of tornadoes, with New Plymouth Clay Target Club clubrooms at Omata reduced to matchsticks. About 300 properties in central New Plymouth lost power for several hours as a result of the tornadoes, with damage to both high-voltage and low-voltage parts of the network.

Lightning struck homes in Whakatane on 23 June, damaging electrical and telecommunication-linked appliances, and causing smoke damage. Power and telephone connections were cut to several homes.

On 8 July, an RNZAF Boeing 757 was hit by lightning a few minutes after take-off from Whenuapai. It circled the airbase for about 1.5 hours waiting for a break in the weather before landing back at Whenuapai. On the same day in New Plymouth, a ferocious thunderclap, centred above the city, woke many people at about 2 am.

A severe thunderstorm on 9 July crossed the Auckland region, with lightning striking the Sky Tower. In Bulls, hail the size of marbles was reported, causing bullet-sized holes in windows. The Tui Nature Reserve in outer Pelorus Sound had 2 cm hail-stones which damaged corrugated plastic roof panels. On the same day, a tornado tore through Peka Peka beach, just north of Waikanae. Trees were brought down, crushing cars and a caravan, injuring the occupants. Sheds were demolished, roofs blown off, and cars blown over. One vehicle on SH1 was tossed 30 m into a paddock, with the driver suffering only minor injuries. A woman walking near the coast also suffered minor injuries when she was blown over. Power lines were damaged cutting power to some areas.

On 10 July, it was the turn of Wanganui, Rangitikei, and Palmerston North, for roaring thunderstorms and lightning. A lightning strike on the Bastia Hill Water Tower in Wanganui took down the wireless network, and blew the pole fuses.

In the early hours of 11 July, a severe lightning storm struck Northland. A lightning strike caused an outage, cutting electricity supplies to customers in the Tophouse area and in the Howard Valley. Telecommunications were also affected when lightning struck the Mt Murchison transmitter.

On 12 July, an Air New Zealand plane was struck by lightning just after taking off from Auckland. The plane returned to Auckland for safety checks. Parts of New Plymouth were without power for about an hour after lightning caused a tree branch to fall on to an overhead line. Lightning is also thought to have started a large bush fire in the Hinewai Reserve on the eastern side of Banks Peninsula. Further south, a lightning strike in Invercargill caused street light outages across parts of the city.

Two cyclists were struck by lightning on 13 July on the Little River Rail Trail near Birdlings Flat in Canterbury. The two boys were thrown from their bicycles and were shaken but uninjured. In Ngahere (near Greymouth) a bull was killed by lightning, and several cows were knocked off their feet, but survived. The same storm brought hail about 2 cm deep to Franz Josef township. At Gladstone, birds were reported falling out of the sky after being hit by hail and lying dead on the road.

On 22 July, a tornado was recorded in Waipu, destroying caravans and sheds in its path.

On 7 August, hail was reported over Wellington, associated with the sudden arrival of a southerly front. In Invercargill, many residents were woken by an early morning thunderstorm.

A twister was reported on 11 August at Waiharara, north of Kaitaia.

Two Air New Zealand planes were struck by lightning at Wellington Airport on 14 August. They were grounded for engineering checks. Hail fell over most of Christchurch.

On 15 August, heavy hail and lightning affected Taranaki with power cuts to parts of South Taranaki. A loud thunder and lightning storm struck Wellington, with frequent brief power outages. Lightning hit the wireless internet antennas on the roof of a Wellington apartment block, burning out the wiring down to the computer box, and tripping the fire alarms, forcing tenants to evacuate the building and stand outside for about 20 minutes in freezing conditions until the fire service gave the all clear.

On 11 September, lightning hit property and power lines in the Auckland suburbs of Te Atatu South and Avondale, cutting power to some properties. A tornado swept through the Auckland suburbs of Avondale and Te Atatu South, damaging homes, felling trees and downing power lines. The NIWA electronic climate

station at Albany was also damaged. In the Hauraki Gulf, savage wind gusts caused problems for yachts in the Simrad 100 race, snapping masts and causing one yacht to run aground.

A lightning storm swept across Wellington city on 13 September, with the accompanying marble-sized hail blanketing the ground, making some roads impassable. Several flights into Wellington were cancelled or delayed. About 900 homes in Eastbourne, Days Bay, and Evans Bay lost power for a few hours. In the Wairarapa, sleet and snow fell briefly. A separate storm brought hail to Gisborne on the same day.

On 14 September, a tornado in Pehiri Valley, inland from Gisborne, damaged property and uprooted trees.

On 19 September, a very-localised, intense hailstorm was reported in Renwick, with small hail covering the ground, looking like snow. Lightning disrupted some telephone and television services.

On 25 September, a hail storm coated some steep Dunedin streets, creating havoc for motorists.

On both 18 and 19 October, Hawke's Bay was affected by forked lightning, affecting power supplies to the regional prison, and putting a hole into the front lawn of a property in Hastings.

A lightning strike hit transmission lines between Clyde and Twizel on 25 October, cutting power across the Central Otago region.

On 5 November, a 20-minute hail storm in Otautau hammered cyclists on the Tour of Southland.

A thunderstorm struck Rotorua on 14 November, accompanied by heavy rain and hail. Flooding closed some roads, including SH5 at Whakarewarewa. Properties were flooded, power cut to some areas, and one building had its roof blown off during the storm. Hailstones up to 2 cm in diameter were also reported in Taupo.

Funnel clouds were reported in Hamilton on 5 December, and Bulls and Sanson on 7 December.

Section 18: High winds

On 15 January, a wind gust flipped one small plane on top of another at Queenstown Airport, causing extensive damage to both aircraft. Another plane had its tie-downs broken, but was not badly damaged.

On 31 January, wind gusts of more than 100 km/hr lifted roofing iron, uprooted trees, demolished farm sheds, tore apart tunnel houses and felled power lines between Collingwood and Puramahoi. The back wall of Golden Bay Air's nearly-completed hangar at Puramahoi Aerodrome was blown out, and Farewell Spit Tours cancelled trips to the spit.

On 2 February, strong northwest winds knocked down trees, damaging a 33 KV power line, cutting power to about 2500 homes near Leeston. In Fairlie, 15 power poles were snapped, cutting power to the town. SH80 between Lake Pukaki and Mt Cook, and SH8 between Fairlie and Twizel were closed to towing vehicles. Cautions were also in place for SH1 between Blenheim and Cheviot, and SH73 between Springfield and Arthurs Pass.

High winds on 2 March affected Nelson, Southland and Central Otago, as well as Wellington. In the capital, strong winds knocked over street signs and blew out office block windows in central Wellington, closing Brandon Street; and near the Basin Reserve, a shop sign was blown into the path of oncoming traffic.

On 22 March, strong winds brought down a tree near Mangawhai, blocking the road. In the Auckland suburb of Parnell, firefighters had to cut through an oak tree, blown on to a house and car, to provide access to the occupants and in Otara a fallen tree brought down phone lines.

On 18 April, high winds brought down power lines in Gisborne.

On 26 April, strong wings in Te Awamutu brought down power lines and trees, including an avenue of about 20 trees up to 6 m high, cut power to Cambridge and Te Awamutu, and damaged buildings. One business had

a 6 m square window blown out and lost part of its roof. Downed trees and power lines completely blocked SH5 north of Taupo, and the Napier-Taupo section of SH5 was also blocked by fallen trees. The whole of Taupo and some surrounding areas lost power mid-afternoon after power lines were brought down. In Taranaki, the drill ship, Noble Discoverer, which had been drilling on the Maui gas field, was disconnected from its well-head as a precautionary measure before forecast heavy winds hit the area. Only two flights were able to leave New Plymouth Airport because of the conditions. High winds around Shannon caused a vehicle towing a boat to jack-knife, with the wind lifting the boat clear of the trailer, throwing it into a nearby paddock. At Paraparaumu, a rail barrier was blown into the live overhead train wires and lodged there. In Wellington, the Bluebridge ferry collided with a fishing boat while trying to berth the ship in strong winds. The ferry was damaged and out of service for repairs.

On 27 April, a Jetstar plane was damaged at Wellington Airport when a wind gust blew a container into the tail of the plane. In Tauranga, McLaren Falls Park was closed for a few hours because of high winds and tree damage. All flights in and out of New Plymouth Airport were cancelled because of the high winds. At Rotorua Airport an incoming trans-Tasman flight was diverted to Auckland. In Okato storm-force winds severed the town's power supply, and a huge kowhai tree was blown over on to a house. The lack of power meant the water treatment plant was out of action, and residents were asked to conserve water. Day one of the Subaru Proworld surfing tour event off the coast of Taranaki was abandoned. In Napier, a large gum tree was completely uprooted in the slushy ground and crashed, roots and all, on to a neighbouring property. The corner of the house was compressed, sections of the roof were badly damaged, and a decking area smashed. Telecommunication was lost to coastal Hawke’s Bay areas like Waimarama.

Significant damage was done to property and vehicles in Auckland on 3 May, and many trees were blown over. One tree, with a 1 m thick trunk, was picked up and thrown into a nearby house, crushing the roof. Road were closed, causing serious traffic problems.

On 11 May, storm damage resulted in a power outage lasting about an hour in western Auckland. At least two large trees were blown over, including one in the courtyard of St Matthew-in-the-City church in downtown Auckland, which toppled onto Wellesley Street, striking a man and causing minor injuries. Three ferry trips between Auckland and Waiheke Island were cancelled because of the high winds. In the Bay of Islands, yachts broke free of their moorings.

On 12 May, wind warnings were issued early morning for SH1 between Kaikoura and Waipara, SH80 between Pukaki and Mt Cook, SH8 at both Burke’s Pass and Lindis Pass, and SH87 between Kyburn and Outram. During the day, serious damage was observed, with several people injured, 12,000 consumers losing power, roofs blown off buildings, cars damaged, and many roads closed between Mosgiel and Waikouaiti. One man was seriously injured when his car was badly damaged by a falling tree on SH1 near the Karitane turnoff. In Dunedin, people were blown over, and large trees were uprooted blocking Portobello Road, SH1 and SH88. Trucks were backed up on the northern motorway until fallen trees had been cleared. At Dunedin International Airport, six inbound and outbound flights were delayed, with one inbound flight cancelled, and two flights diverted, one to Invercargill and one to Queenstown. There was significant damage at Woodhaugh Gardens and in the Dunedin Botanic Gardens.

On 17 May, high winds again caused damage, pulling off half the roof of an operations building at Napier Port, and a section of roof from a Hastings farm house, and in the harbour, a yacht broke from its mooring. In Wairarapa, gales cut power, brought down branches, and blew a four-tonne truck off SH2 near Mt Bruce. In the Nelson region, gales brought down trees and closed roads, including the Motueka Valley Highway where several hundred pine trees snapped off, and about 40 of the trees fell across the road trapping two trucks between them. Other local roads, including SH60 over Takaka Hill, were closed for short periods. At Ngatimoti, also in the Motueka Valley, five large macrocarpa trees were blown over, crushing two caravans and a truck. In Invercargill, trampolines were lifted and trees blown over, and in Waimate, a hay bale was blown off a truck.

On 26 May, high winds in Wellington brought down a tree on to overhead lines on the Johnsonville railway line between Ngaio and Wadestown, halting trains. At Cooks Beach on the Coromandel Peninsula, two people were injured when a tree fell on their car in strong winds. In Waimate, the track to the White Horse

monument was closed after high winds left more than four hectares of pine trees blown down along the mountain bike track and footpath.

Gale force winds closed Northcote wharf on Auckland's North Shore on 8 July, with ferry services disrupted. In Wellington early morning trains were cancelled on the Johnsonville line between Johnsonville and Ngaio for about an hour.

On 11 July, a trampoline was blown onto railway tracks in Upper Hutt, and power lines were blown down in Johnsonville. Several homes in Greymouth, and one in Kaiwaka, had their roofs blown off. In Ohope, garden furniture was blown all over the town. Powerlines were blown down in Matamata, while Wellington City Council asked residents to not put out their recycling, after rubbish was strewn around some suburbs. In Masterton, falling branches crushed cemetery headstones. Power was cut to customers in Taranaki after a tree was blown down over 11,000 volt lines, lightning strikes damaged transformers, and severe winds damaged network equipment.

Wanganui's Cooks Gardens were closed on 12 July after strong winds undermined the floodlight towers. Homes in Omaui, Southland were left without electricity overnight after strong winds tore down power lines, with telephone lines also brought down. In Hawke's Bay a caravan being towed on SH2 near Waipawa was toppled on to its side by the strong gusts across the Takapau Plains. At Whangara near Gisborne, a hayshed was blown down, and trees were blown into power lines causing power outages in Tauwhareparae and Wairoa. In New Plymouth, a gust lifted a plastic giant ice-cream scoop off the top of a shop and sent it hurtling down St Aubyn Street, and in coastal Kaupokonui, power lines snapped in high winds.

On 13 July, strong winds battered the Kapiti Coast, uprooting trees, lifting roofs, and bringing down powerlines in Paraparaumu. All along the west coast from Kapiti to Taranaki, sea birds, mainly prions and petrels, were blown inland by the strong westerly winds, and many birds were killed. Wind warnings were issued for SH6, Whataroa to Haast. In Greymouth, the roof the West Coast Regional Council in Paroa had to be secured after it began to lift in the wind, and the nearby pony club roof was blown across SH6, stopping traffic. Many trees were felled in the Hokitika, Greymouth and Blackball area, roofs and fences damaged, and some windows blown out.

On 14 August a truck was blown off Old Coach Rd between Clinton and Mataura, but the driver was not injured. On 15 August, high winds made driving on the Auckland Harbour Bridge difficult, and in Pakuranga Heights a tree was blown over on to a house. In Christchurch, strong winds snapped power poles, cutting electricity in some areas.

Wind warnings were issued on 14 September for roads in Taranaki, Waikato, Auckland, Coromandel Peninsula, and western Bay of Plenty.

Severe winds on 24 October brought down power poles and trees, smashed windows and lifted roofing iron in Central Otago, Maniototo and Southland. Power was cut to many areas, and many roads were closed, including the Ranfurly to Naseby Road, and SH6. A 15 m-long catamaran was blown from its moorings at Kelvin Grove out to the centre of Queenstown Arms, and a jet-ski was torn from a car port and dumped upside down on a veranda below. Many fires were caused by downed power lines. Further north, tourists had to be evacuated from a backpackers' hostel in Mt Cook Village, after it suffered structural damage, including the destruction of a large picture window which framed the view of Mt Cook. The mast of the NIWA climate station at Mt Cook was also destroyed, after gusts to 180km/hr were recorded.

On 16 November, gale-force winds blew down trees in Wanganui, downing power lines and cutting power to several areas. On 17 November, wind warnings were issued for SH1 between Milton and Gore.

Gales struck the lower North Island on 21 November. In Greytown, a tree branch was blown off, injuring two pedestrians who were admitted to Masterton Hospital. Some flights were delayed at Wellington Airport, with one flight from Auckland making two attempts to land, before giving up and returning to Auckland. Several harbour commuter ferries were cancelled, and a large, high-sided carrier, unable to berth at Aotea Quay, was forced to leave the harbour and circle at the heads where conditions were calmer. In Wainuiomata, a large

tree was blown on to a house. Near Palmerston North, a truck and trailer unit was blown off the road. Westport Airport was closed by the storm.

On 23 November, strong winds in Wellington blew a window out of the 10th floor of a central city office building, and deposited it in a car park 100 m away. A cruise ship needed the help of a tug to berth, and several flights in and out of Wellington airport were delayed.

Gales battered Southland and Otago on 25 November, downing trees and power lines. Fallen trees caused temporary closures of SH1 north of Waitati, and later in north Dunedin. Wind warnings were issued for SH8 from Milton to Raes Junction, SH90 from Raes Junction to Gore, and SH87 from Kyeburn to Middlemarch. The motorcycle beach racing event at Oreti Beach, part of Invercargill's big Burt Munro Challenge events, was cancelled. A truck blew over in Wyndham bringing down power lines, and in Invercargill, a car door was found blowing down the road.

On 26 November, strong winds made life difficult for the cyclists in the annual Lake Taupo Cycling Challenge, with scattered branches and debris strewn across SH32. The 80 km mountain bike race was cancelled after two hours. In Stratford, marquees were blown over at the annual A & P show.

On 28 November, strong winds in Picton caused the Aratere to swing away from its berth, wrenching out a bollard, damaging both the wharf and the ship.

Section 19: Fog

On 3 May, thick fog obscured vision in the shipping lanes of Wellington Harbour. The fog also caused the cancellation of a flight from Blenheim.

Heavy fog on 5 May delayed 15 domestic flights in and out of Auckland but did not affect international flights.

On 24 May, fog caused cancellations and delays of both incoming and outgoing domestic flights from Auckland International Airport. Heavy fog in Christchurch also caused the diversion and cancellation of flights, including two international flights which were diverted to Wellington.

On 9 June, heavy fog in Auckland cancelled or delayed about 20 flights, and slowed motorway traffic.

On 18 July, Christchurch Airport was affected by fog, causing delays, and affecting the start that day of the Pike River Mine Disaster enquiry.

On 12 August, fog caused the cancellation of five early morning flights from Dunedin Airport to Christchurch, Wellington and Auckland. Flights resumed about 11 am.

Thick fog at Auckland Airport on 13 August caused cancellations and delays for many domestic flights, and delays for international flights.

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