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## **SPECIAL CLIMATE STATEMENT 24**

**An extremely wet end to 2010 leads to widespread flooding across eastern Australia.**

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*National Climate Centre  
Bureau of Meteorology*

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## **An extremely wet December leads to widespread flooding across eastern Australia**

Late November and December 2010 were extremely wet through much of eastern Australia. Four major rain events affected large parts of the eastern states during this period, resulting in widespread flooding on many rivers, especially in Queensland and New South Wales. The most severe flooding, which in terms of extent, impact and severity was the most significant in Australia since at least the 1970s, occurred in Queensland and far northern and central western New South Wales in the last week of December, with downstream impacts continuing into January. Earlier in the month, there was also substantial flooding in various parts of the eastern states, especially in the Murrumbidgee and Lachlan catchments of inland New South Wales.

It was the wettest December on record for Queensland and for eastern Australia as a whole, the second-wettest for the Murray-Darling Basin, the sixth-wettest for Victoria and the eighth-wettest for New South Wales. For Australia as a whole it was the third-wettest December on record. This followed an extremely wet spring, the wettest on record for Queensland, New South Wales, eastern Australia and the Murray-Darling Basin. The heavy late November and December rainfall followed a very wet July to October for Australia, meaning many catchments were already wet before the flooding rain. It was Australia's wettest July to October on record and also the wettest July to December on record.

The rains of late 2010 have taken place during a very strong La Niña event in the Pacific Ocean. The December Southern Oscillation Index (SOI) was +27.1, the highest December value on record and the highest monthly value since 1973, whilst other indicators of La Niña also indicate the strongest event since at least the mid-1970s. Previous strong La Niña events, such as those of 1974 and 1955, have also been associated with widespread and severe flooding in eastern Australia. Sea surface temperatures off the Queensland coast in recent months have also been at or near record levels.

### Major rain events of the period

There were four major rain events during late November and December, concentrated on the periods 28 November to 3 December, 7 to 13 December, 19 to 20 December and 23 to 28 December.

*28 November to 4 December.* A trough remained over eastern Australia through this period, with the southeast predominantly in a humid northerly airstream for the bulk of the period. Total rainfall for the period (Figure 1a) was widely in the 100-300 mm range on the ranges and western slopes of southern and central New South Wales, as well as in central Queensland in a band extending from Mackay southwards to the Emerald area. Falls exceeded 50 mm over most of the eastern two-thirds of New South Wales and the eastern half of Queensland (except the southeast corner), as well as large parts of central and northern Victoria. Notable daily falls during this period included 118.6 mm at Young on 29 November, 143.6 mm at Mackay and 100.8 mm at Mudgee on 1 December, and 228.0 mm at Mount Charlton (near Mackay) on 3 December.

*7 to 13 December.* A cold front crossed southeastern Australia at the start of the period, initially reaching South Australia late on the 7<sup>th</sup> and then continuing eastwards over the next two days. A trough developed associated with the front and moved slowly across northern New South Wales and the southern half of Queensland over the following days, eventually moving off the Queensland coast on the 13<sup>th</sup>. Falls for the period 8 to 13 December (Figure 1b) widely exceeded 50 mm in a number of areas, including eastern South Australia and western Victoria, the upland areas of northeast Victoria and southeast New South Wales, northwestern Tasmania, much of the Queensland coast and an inland area in Queensland's central west. Some falls were locally much

higher, especially as a result of severe thunderstorms in South Australia on the afternoon of the 7<sup>th</sup>, with all-time daily records at some sites and December records at many others (Table 1). Mannum received 130.0 mm and Birdwood 128.2 mm for the 24 hours to 9 a.m. on the 8<sup>th</sup>, while other notable daily falls during the period included 127.8 mm at Blackall (Queensland) on the 8<sup>th</sup>, 182.0 mm at Rocky Valley (Victoria) on the 9<sup>th</sup>, 106.1 mm at Cowra (NSW) on the 10<sup>th</sup> and 128.0 mm at Miriam Vale (Queensland) on the 12<sup>th</sup>.

*19 to 20 December.* A trough moved north over Queensland on 19 and 20 December, associated with an intense low east of Tasmania (which also brought snow to relatively low levels in Victoria and southern New South Wales). Whilst no exceptional daily totals occurred, much of southern and central Queensland received a further 50 to 100 mm for the period (Figure 1c).

*23 to 28 December.* A moist easterly flow covered much of Queensland for the period 23 to 28 December. Further moisture was brought into the region by the circulation associated with Tropical Cyclone *Tasha*, which made landfall south of Cairns on the morning of 25 December. A trough moved northeast across New South Wales and Queensland from the 26<sup>th</sup>, eventually clearing most of the rain seawards on the 28<sup>th</sup>. Rainfall totals for the period (Figure 1d) exceeded 200 mm over a large area of central eastern Queensland, roughly bounded by Rockhampton, Carnarvon Gorge and Hervey Bay, with falls exceeding 400 mm in places. Similar falls extended northwards along the Queensland coast as far north as Cairns, as well as near the Gold Coast and far northern New South Wales. Much of the eastern half of Queensland received at least 100 mm. The most widespread intense rainfall was on the 27<sup>th</sup>, where a number of stations in the Carnarvon Range area set all-time daily records with daily totals in excess of 200 mm, peaking at 273.6 mm at Carnarvon Station. Other very high totals (including 304 mm at Corsis and 294 mm at Babinda) occurred on the north tropical coast on the 25<sup>th</sup> near the landfall of *Tasha*, while other notable daily totals included 140.2 mm at Rockhampton on the 26<sup>th</sup>, 148.0 mm at Condamine on the 27<sup>th</sup> and 165.4 mm at Bundaberg on the 28<sup>th</sup>. Further south, falls of 50-100 mm in the NSW Central Tablelands on the 26<sup>th</sup> exacerbated flooding in that region.

#### Extreme daily rainfall totals during the period

Selected daily rainfall records set during December 2010 are listed in Table 1. The Queensland events were more notable for their extent, particularly the extent of heavy falls inland from the coast, and duration than for their intensity, and only a relatively modest number of daily records was set during the month.

The greatest concentration of daily records during the period was in South Australia and western Victoria on 8 December, mostly as a result of severe thunderstorms on the afternoon and evening of the 7<sup>th</sup>. December is normally a relatively dry month in this region and many stations exceeded their monthly average in one day.

Averaged over Queensland, the wettest day of the event was 27 December, with a statewide average of 22.0 mm. This was the second-highest on record for December (after 30.7 mm on 22 December 1956) but fell well short of the all-months record of 31.6 mm set on 2 March 2010 (see Special Climate Statement 20). Whilst no individual day approached record levels in the Murray-Darling Basin, the Basin-wide average daily total exceeded 10 mm on five days during the period (peaking at 13.7 mm on 28 November) and 5 mm on 14 days (this compares with the average daily total of about 1.5 mm).

#### Total rainfalls for the period

For the period from 28 November to 31 December (Figure 2), total rainfall exceeded 300 mm over most of the eastern half of Queensland, except for inland southern border areas. Totals in the 400 to 600 mm range were widespread along most of the Queensland east coast, extending inland to cover many areas in the Central Highlands and adjacent areas, as well as most of Cape York Peninsula. (The inland penetration of the heaviest falls can be compared with the 1918 event, which led to Rockhampton's record flood peak; that event, associated with a tropical cyclone, was concentrated quite close to the coast and was more short-lived than the current event). Some stations in the Mackay area exceeded 1000 mm, and totals between 600 and 800 mm occurred along several parts of the coast, especially around Mackay, between Cairns and Townsville, and in the Bundaberg-Wide Bay region.

Totals for the period were less extreme in the southeastern states, but were still between 200 and 400 mm over the ranges of northeast Victoria and southeast New South Wales, as well as in a broad band along the NSW western slopes from the Snowy Mountains into the state's far north. Most of the state's eastern half received at least 100 mm, as did most of Victoria, South Australia east and south from Adelaide, and northern and western Tasmania.

December 2010 was the wettest December on record over most of southeastern Queensland, as well as some areas further north (Figure 3). It was also the wettest December on record in a band through central New South Wales between Canberra and Dubbo, and in a broad region on both sides of the South Australia-Victoria border. All of these regions generally received between three and six times their average December rainfall (Figure 4). At some stations, particularly in Queensland (Table 2), it was the wettest month (i.e., compared against all calendar months) on record.

On an area-average basis, it was the wettest December on record for eastern Australia<sup>1</sup>, with the total of 167.2 mm (132% above normal) surpassing the 154.8 mm set in 1975. Queensland (209.5 mm, 154% above normal) also set a record (previously 200.1 mm in 1975), while the Murray-Darling Basin (107.0 mm, 119% above normal) ranked second behind 1992. Victoria (103.9 mm, 118% above normal) ranked fifth and New South Wales (98.9 mm, 83% above normal) eighth.

In some parts of the inland southeast the heaviest rain was split between the months of November and December and its extreme nature was thus not fully reflected in monthly totals. Young received 346.4 mm in the 13 days from 28 November to 10 December, more than half its annual mean (662 mm), and more than the 262.4 mm they received in all of 2006, and well in excess of their wettest calendar month on record (298.9 mm in March 1950). Whilst such statistics are not extraordinary in the more arid parts of Australia – where a number of stations in recent years have received their average annual rainfall in a single day – they are highly unusual for a location in southeastern Australia. Over the same 13-day period, Burrinjuck Dam received 332.0 mm and Canberra 225.0 mm.

### Floods resulting from the rainfall

The rains from 23 to 28 December resulted in exceptional flooding in many parts of central and southern Queensland with many rivers reaching record levels (Table 3). By 23 December, many rivers were already at or near flood level as a result of the rains in the preceding weeks (with some, notably the Dawson, experiencing major flooding). The rains during the following few days, on top of the pre-existing wet conditions, resulted in major flooding over a vast region. Except for the southeast coastal fringe south of Maryborough, almost every river in Queensland that is south of the Tropic of Capricorn and east of Charleville and Longreach reached major flood level at some stage during the period from 26 November to 7 January, mostly between 23 December and 4 January (Figure 5). Properties were inundated in at least 17 towns in Queensland and adjacent border areas

<sup>1</sup> In this context eastern Australia is defined as Queensland, NSW, Victoria, Tasmania and the ACT.

of New South Wales, with the largest impacts in the towns of Theodore, Dalby, Chinchilla, Emerald, Bundaberg and Rockhampton. Further flood peaks are expected downstream on the inland-flowing rivers in the coming weeks.

The most extreme flooding occurred in the Fitzroy and Condamine-Balonne catchments. Record flood levels occurred at a number of locations in these catchments (Table 3), including the Dawson River at Theodore, the Nogoia at Emerald, the Comet at Rolleston and Comet Weir, and in the Condamine-Balonne system at Tummaville, Millmerran, Condamine Township and Surat. In some cases these flood peaks broke records which had only just been set during the February-March 2010 event. The Fitzroy at Rockhampton reached its fifth highest level of the last 100 years, and the Burnett at Bundaberg its highest since 1942. The flooding was prolonged in many areas, with the Dawson at Theodore remaining above major flood level for more than two weeks (Figure 6).

Whilst not reaching the severity of Queensland, there was also widespread flooding in various parts of New South Wales, most significantly in the Murrumbidgee, Lachlan and Castlereagh catchments. Eugowra was flooded three times during the month on December 4, 10 and 27. Wagga Wagga experienced its worst flooding since 1974 when the Murrumbidgee peaked at 9.7 metres on 6 December, while major flooding (the highest since 1976) inundated properties in Queanbeyan on 9 December. This caused a secondary peak further down the Murrumbidgee, where floods extended downstream over the following weeks, reaching Hay at the end of the month. Total River Murray inflows for December were the highest on record, and in conjunction with floods earlier in the spring in southern inland New South Wales and northern Victoria, these are expected to produce the strongest flows<sup>2</sup> since at least 1992 in the South Australian portion of the Murray during January and February.

#### Further information

This statement is based on information available as of 6 January 2011. An update is expected to be issued later in January after downstream flood peaks have occurred.

The Gascoyne River flooding in Western Australia is not covered in this statement. A separate report on that event is available at <http://www.bom.gov.au/announcements/sevwx/>. Another separate report is expected to be issued in due course on flooding in the Murray River system.

Further information can be obtained from the following contacts:

#### *For general enquiries on this statement*

National – Blair Trewin (03-9669 4623), David Jones (03-9669 4085)

Queensland – Climate Services Centre (07-3239 8700)

NSW – Climate Services Centre (02-9296 1555)

SA – Climate Services Centre (08-8366 2600)

Victoria – Climate Services Centre (03-9669 4956)

#### *For enquiries specific to flooding in Queensland*

Peter Baddiley (07-3239 8768)

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<sup>2</sup> From the 31 December 2010 River Murray Flow Advice, SA Government Department for Water (<http://www.waterforgood.sa.gov.au/2010/12/river-murray-flow-advice-31-december/>).

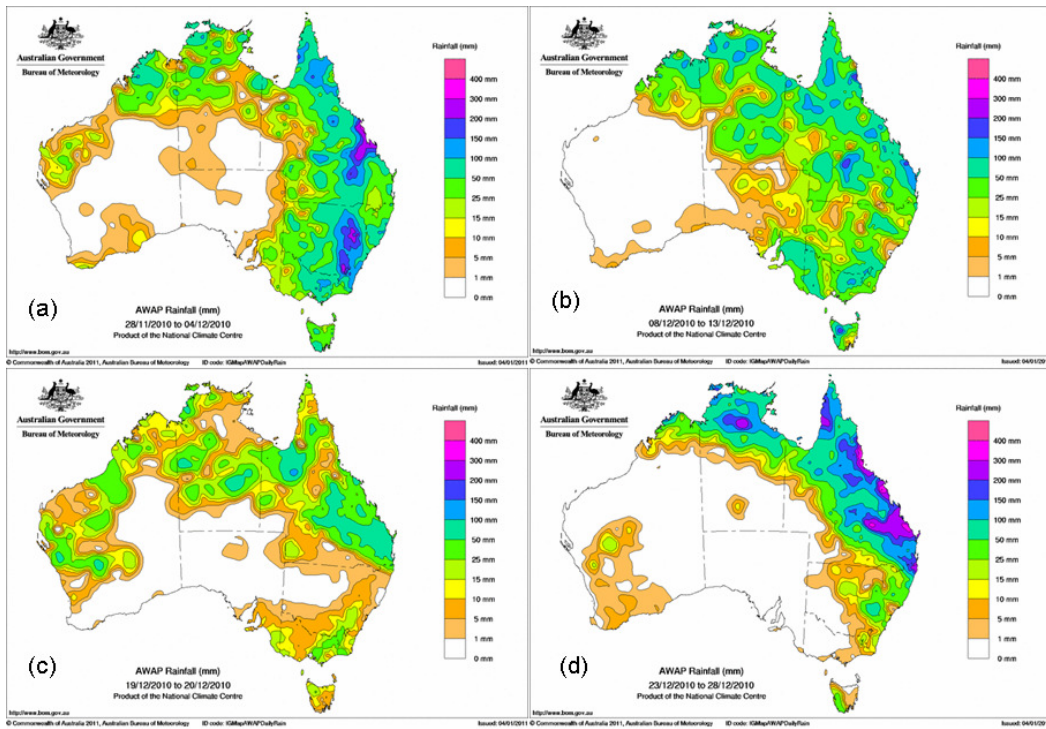


Figure 1. Australian rainfall totals for the periods (a) 28 November to 4 December, (b) 8 to 13 December, (c) 19 to 20 December and (d) 23 to 28 December.

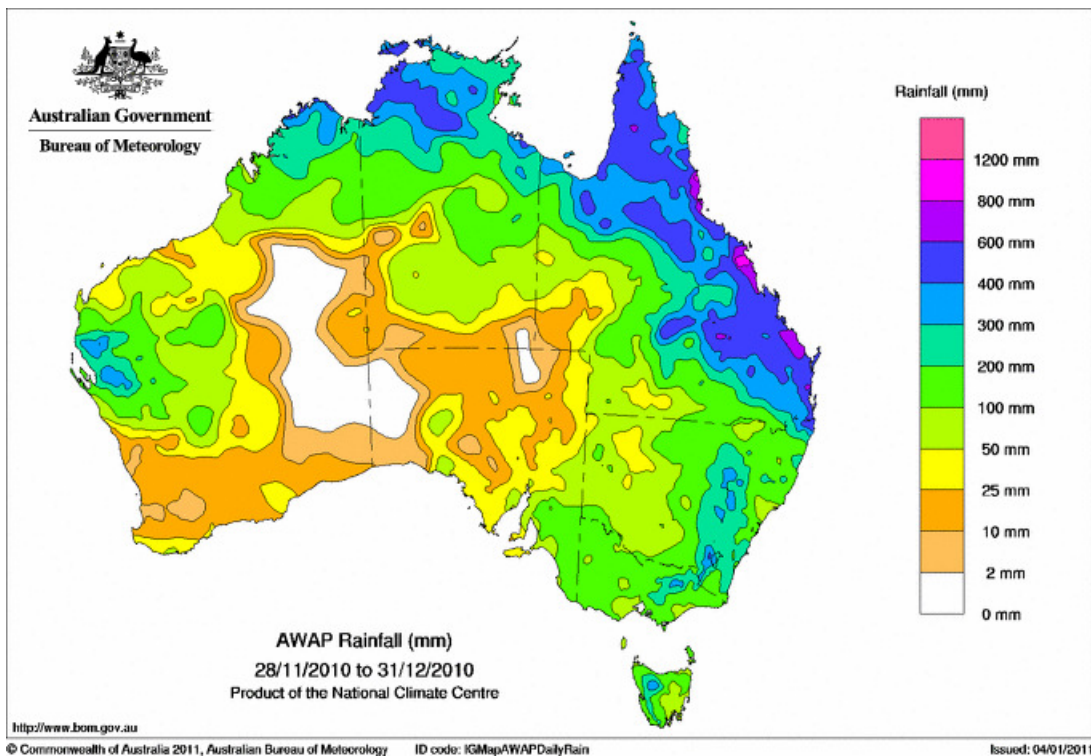


Figure 2. Total rainfall for the period 28 November – 31 December 2010.



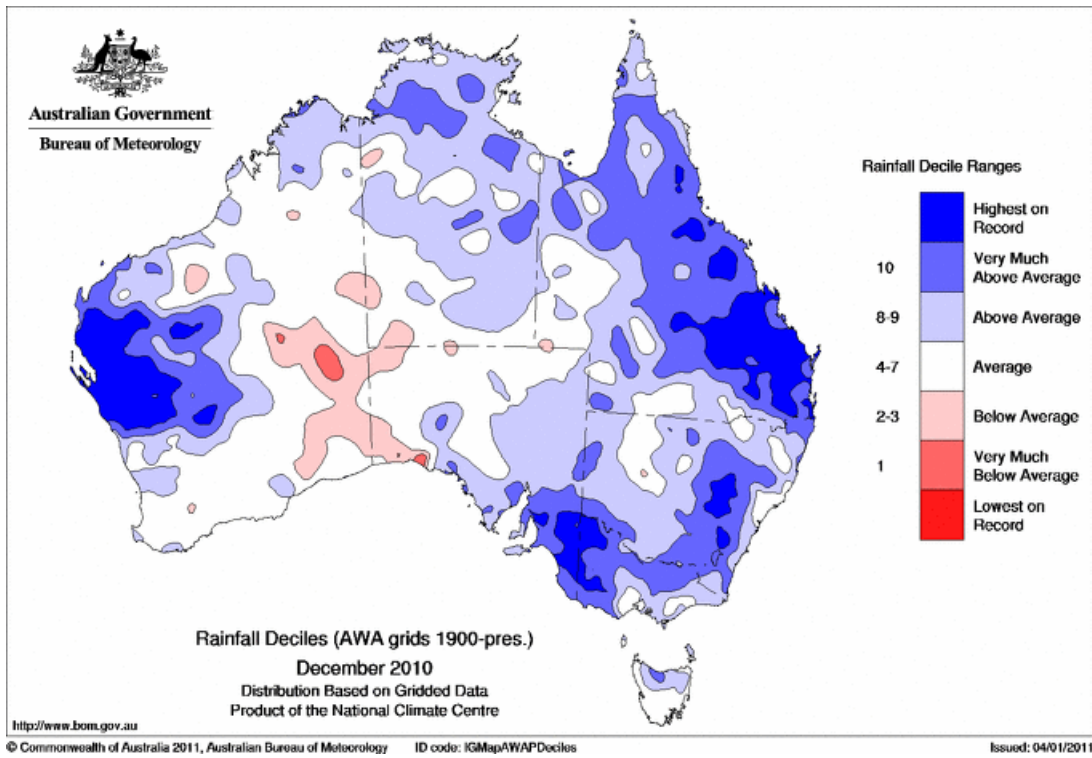


Figure 3. Australian rainfall deciles for December 2010.

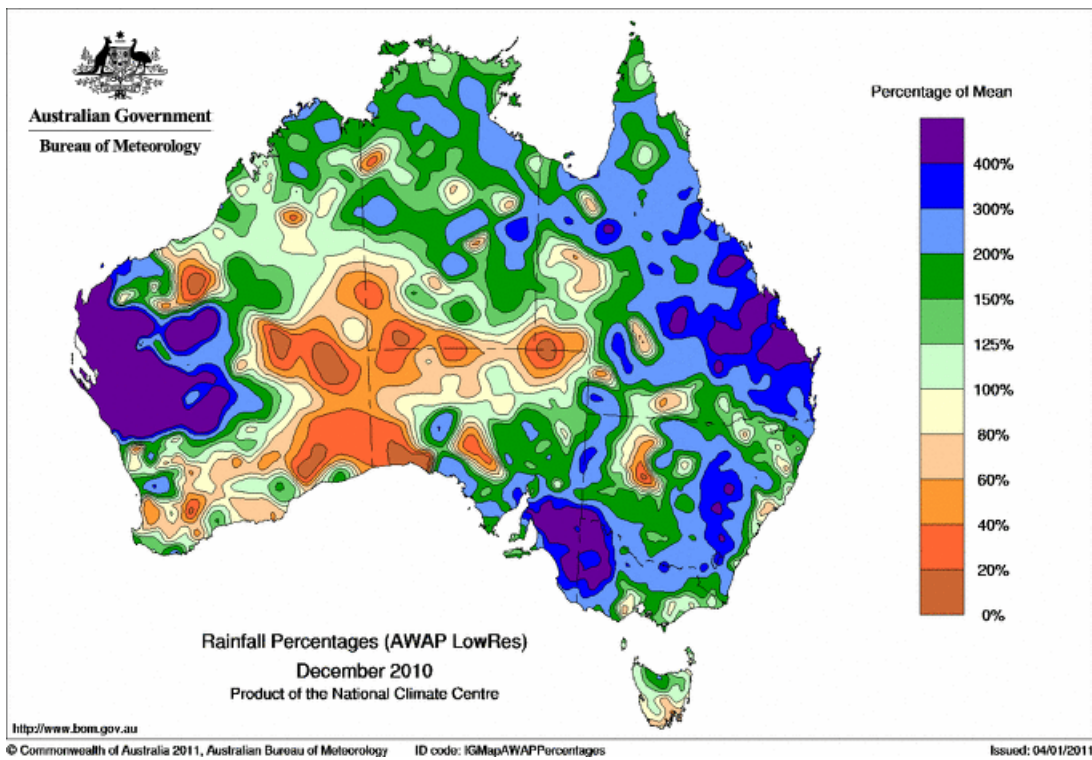


Figure 4. Australian rainfall percentages of normal for December 2010.

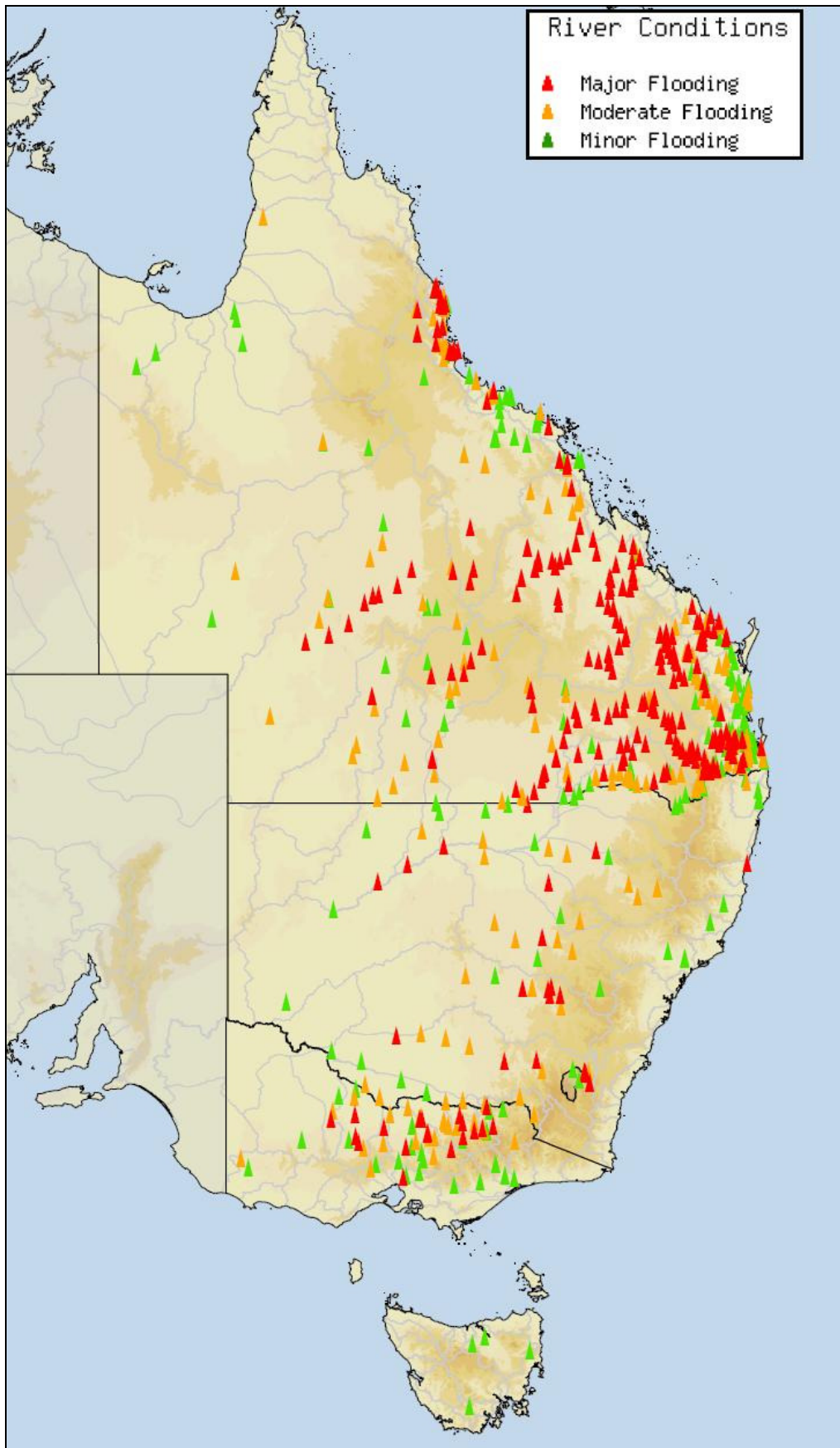


Figure 5. Flood peaks in eastern Australia over the period 26 November 2010 – 7 January 2011.



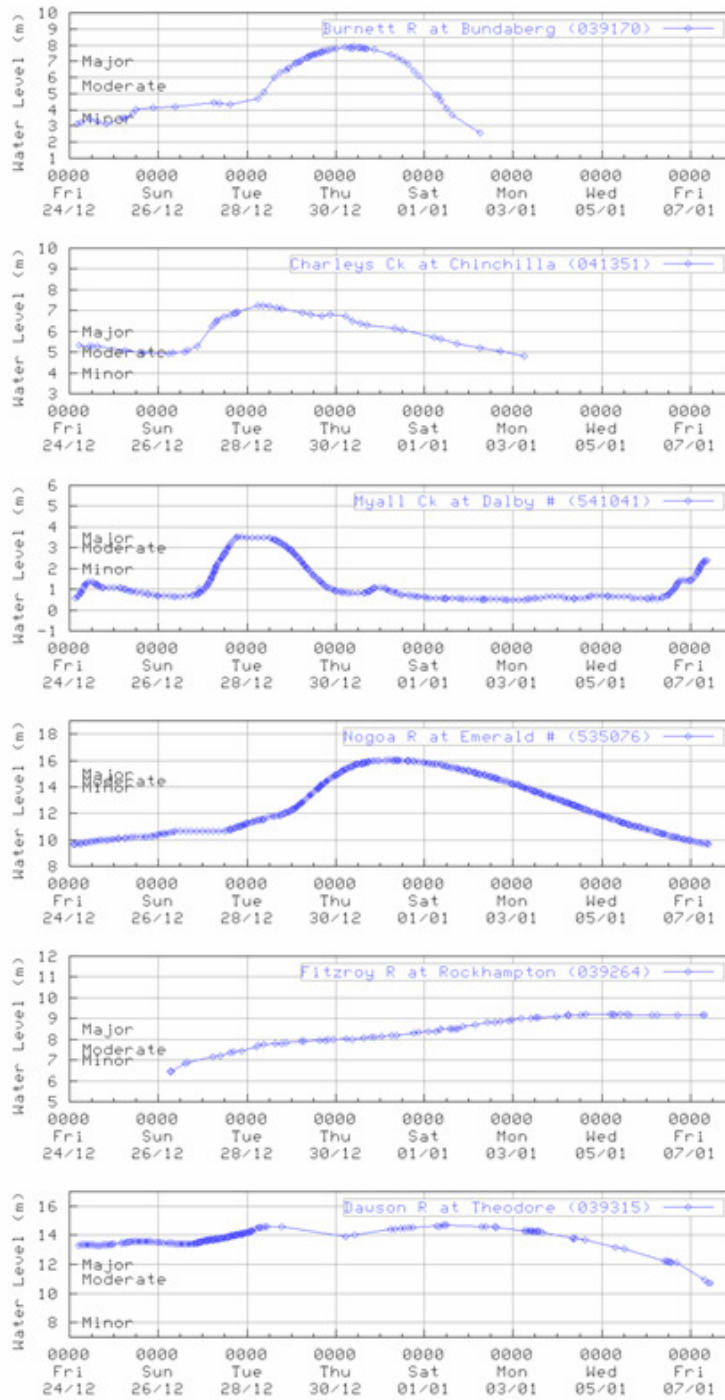


Figure 6. Flood peaks at selected Queensland towns: (from top) Bundaberg, Chinchilla, Dalby, Emerald, Rockhampton and Theodore.

Station number	Name	State	Rainfall (mm)	Date	Previous record (mm)	Date
18058	Whyalla (Mullaquana)	SA	44.8	8/12	39.2	12/12/2008
21001	Auburn	SA	65.8	8/12	50.3	12/12/1917
21002	Balaklava	SA	84.2	8/12	46.0	12/12/1917
21003	Blyth	SA	63.6	8/12	62.5	21/12/1921
21004	Booborowie	SA	71.4	8/12	49.0	1/12/1966
21012	Bute	SA	66.0	8/12	35.0	3/12/1989
21019	Farrell Flat	SA	89.6	8/12	69.3	27/12/1929
21022	Gulnare	SA	61.0	8/12	50.3	1/12/1966
21026	Hoyleton	SA	74.2	8/12	62.0	12/12/2008
21033	Mintaro	SA	66.8	8/12	54.6	12/12/1917
<b>21034</b>	<b>Mount Bryan</b>	<b>SA</b>	<b>76.6</b>	<b>8/12</b>	<b>57.9 (Dec)</b> <b>62.4 (all)</b>	<b>25/12/1946</b> <b>27/9/1979</b>
21047	Spalding	SA	53.0	8/12	52.3	1/12/1966
23005	Glen Osmond	SA	64.8	8/12	53.1	23/12/1913
23013	Parafield	SA	51.2	8/12	47.0	28/12/1929
23025	Smithfield	SA	68.8	8/12	45.7	27/12/1920
23078	Gawler	SA	72.8	8/12	35.6	19/12/1922
23090/23000	Adelaide	SA	70.0	8/12	61.5	23/12/1913
23305	Greenock	SA	98.8	8/12	50.5	28/12/1896
23307	Kapunda	SA	85.0	8/12	46.7	18/12/1923
23309	Lyndoch	SA	86.4	8/12	39.9	25/12/1946
23310	Manoora	SA	77.0	8/12	52.8	12/12/2008
23311	Marrabel	SA	70.0	8/12	50.8	12/12/1917
23314	Riverton	SA	90.0	8/12	63.0	12/12/2008
23315	Saddleworth	SA	74.8	8/12	60.5	17/12/1902
<b>23318</b>	<b>Tanunda</b>	<b>SA</b>	<b>94.0</b>	<b>8/12</b>	<b>48.5 (Dec)</b> <b>87.1 (all)</b>	<b>28/12/1896,</b> <b>5/12/1966</b> <b>17/4/1889</b>
23319	Tarlee	SA	109.8	8/12	64.8	24/12/1954
23343	Turretfield	SA	90.0	8/12	28.4	4/12/1911, 25/12/1964
23370	Stockport (Clifton)	SA	88.2	8/12	43.0	12/12/2008
<b>23705</b>	<b>Birdwood</b>	<b>SA</b>	<b>128.2</b>	<b>8/12</b>	<b>62.5 (Dec)</b> <b>125.5 (all)</b>	<b>25/12/1948</b> <b>9/2/1969</b>
23719	Gumeracha	SA	73.4	8/12	58.4	27/12/1920
23737	Mount Pleasant	SA	73.6	8/12	48.2	1/12/1987
23752	Williamstown	SA	94.6	8/12	45.7	27/12/1920
24517	Mannum	SA	130.0	8/12	62.2	25/12/1946
24525	Palmer	SA	86.2	8/12	81.0	18/12/1992
24534	Sutherlands	SA	87.0	8/12	83.1	26/12/1946
25000	Alawoona	SA	65.0	8/12	53.6	31/12/1983
25002	Purnong	SA	75.0	8/12	48.0	28/12/1929
25006	Karoonda	SA	73.6	8/12	57.2	28/12/1929
25010	Mindarie	SA	85.0	8/12	35.6 (Dec) 79.8 (all)	27/12/1920 18/12/1946
25013	Parilla	SA	79.0	8/12	74.0	26/12/1999

Table 1. Selected record daily rainfall totals which have occurred during December 2010 at locations with 50 or more years of data. Values shown in bold are records for any calendar month.

Station number	Name	State	Rainfall (mm)	Date	Previous record (mm)	Date
25014	Paruna	SA	64.6	8/12	40.6	22/12/2000
25015	Pinnaroo	SA	64.0	8/12	38.4	28/12/1962
25017	Sandalwood	SA	82.0	8/12	36.8	22/12/1964
25509	Lameroo	SA	73.0	8/12	60.0	26/12/1999
<b>35018</b>	<b>Carnarvon Station</b>	<b>QLD</b>	<b>273.6</b>	<b>27/12</b>	<b>124.5 (Dec)</b> <b>126.0 (all)</b>	<b>28/12/2008</b> <b>1/6/1981</b>
35021	Comet	QLD	148.4	3/12	136.4	30/12/1962
35051	Orion	QLD	153.4	3/12	139.8	28/12/2008
<b>35079</b>	<b>Wharton Creek</b>	<b>QLD</b>	<b>257.0</b>	<b>27/12</b>	<b>103.1 (Dec)</b> <b>184.2 (all)</b>	<b>22/12/1956</b> <b>24/11/1950</b>
35090	Rewan	QLD	190.6	27/12	144.8	11/12/1917
<b>35194</b>	<b>Wyseby</b>	<b>QLD</b>	<b>247.2</b>	<b>27/12</b>	<b>119.6 (Dec)</b> <b>213.8 (all)</b>	<b>22/12/1975</b> <b>3/3/1990</b>
36003	Birricannia	QLD	95.0	27/12	87.9	18/12/1944
36143	Blackall	QLD	123.6	8/12	96.4	31/12/2009
39204	Colodan	QLD	89.0	20/12	83.0	12/12/1988
40071	Lanark	QLD	102.0	23/12	100.1	15/12/1965
41069	Millmerran	QLD	97.0	27/12	94.0	5/12/2003
41082	Pittsworth	QLD	114.0	28/12	100.1	22/12/1956
42009	Drillham	QLD	81.0	27/12	66.5	26/12/1971
42016	Hannaford	QLD	102.0	27/12	90.2	12/12/1942
42048	Condamine	QLD	148.0	27/12	96.6	22/12/1988
47016	Lake Victoria	NSW	86.0	8/12	49.0	29/12/1957
50045	Yalgogrin North	NSW	68.2	9/12	66.5	17/12/1930
64009	Dunedoo	NSW	77.6	1/12	71.6	13/12/2008
65020	Manildra	NSW	63.8	10/12	63.2	14/12/1960
70016	Captains Flat	NSW	74.2	9/12	68.8	30/12/1948
70083	Tharwa	ACT	85.0	9/12	80.3	18/12/1961
70351/70014	Canberra	ACT	87.0	3/12	86.6	30/12/1948
72004	Batlow	NSW	99.6	9/12	94.0	28/12/1919
72150	Wagga Wagga	NSW	67.6	9/12	65.2	26/12/1988
73007	Burrinjuck Dam	NSW	111.0	3/12	87.6	18/12/1961
74064	Lockhart	NSW	53.2	9/12	45.7	3/12/1960
74110	Urana	NSW	69.0	9/12	60.0	9/12/2004
76038	Murrayville	VIC	70.0	8/12	41.1	25/12/1919
76064	Walpeup	VIC	78.0	8/12	41.0	21/12/1992
76067	Werrimull	VIC	71.0	8/12	58.8	31/12/2002
77033	Patchewollock	VIC	67.0	8/12	58.4	1/12/1987
79036	Natimuk	VIC	54.2	8/12	52.1	28/12/1929
79071	Apsley	VIC	48.4	8/12	38.6	10/12/1971
81051	Tungamah	VIC	83.4	9/12	57.7	15/12/1894
<b>83038</b>	<b>Tawonga</b>	<b>VIC</b>	<b>144.2</b>	<b>9/12</b>	<b>69.0 (Dec)</b> <b>95.4 (all)</b>	<b>22/12/2007</b> <b>26/3/1993</b>
83043	Rocky Valley	VIC	182.0	9/12	128.6	14/12/1993
89003	Balmoral	VIC	103.2	8/12	56.4	13/12/2008
<b>89009</b>	<b>Cavendish</b>	<b>VIC</b>	<b>106.8</b>	<b>8/12</b>	<b>65.0 (Dec)</b> <b>101.6 (all)</b>	<b>13/12/2008</b> <b>7/2/1957</b>
89011	Dunkeld	VIC	78.4	8/12	64.0	13/12/2008
<b>89034</b>	<b>Willaura</b>	<b>VIC</b>	<b>98.0</b>	<b>8/12</b>	<b>64.8 (Dec)</b> <b>91.4 (all)</b>	<b>13/12/1966</b> <b>6/2/1973</b>
90060	Nullawarre	VIC	70.2	8/12	61.6	3/12/1985

Table 1 (continued). Selected record daily rainfall totals which have occurred during December 2010 at locations with 50 or more years of data. Values shown in bold are records for any month.

Station number	Name	State	Rainfall (mm)	Previous record (mm)	Year
21001	Auburn	SA	140.0	120.8	1966
21002	Balaklava	SA	129.2	80.9	1894
21004	Booborowie	SA	122.2	99.6	1966
21012	Bute	SA	96.0	66.7	1922
21019	Farrell Flat	SA	141.6	122.4	1894
21026	Hoyleton	SA	109.6	104.2	2008
23025	Smithfield	SA	129.8	109.5	1966
23081	Gawler	SA	118.8	109.7	1861
23305	Greenock	SA	152.4	94.8	2008
23307	Kapunda	SA	132.2	103.1	1902
23309	Lyndoch	SA	160.0	107.2	1992
23310	Manoora	SA	135.4	104.4	1992
23311	Marrabel	SA	126.0	110.6	1992
23314	Riverton	SA	197.0	123.7	1902
23315	Saddleworth	SA	139.0	112.1	1902
23318	Tanunda	SA	177.4	120.4	1875
23319	Tarlee	SA	183.6	121.0	1992
23343	Turretfield	SA	153.7	91.8	1992
23705	Birdwood	SA	199.2	177.8	1992
23707	Bridgewater	SA	160.5	148.6	1992
23752	Williamstown	SA	167.0	115.4	1992
24517	Mannum	SA	173.0	138.6	2004
24526	Point Pass	SA	175.4	99.6	1946
25002	Purnong	SA	142.0	87.7	1929
<b>25006</b>	<b>Karoonda</b>	<b>SA</b>	<b>142.4</b>	<b>103.6 (Dec)</b>	<b>1992</b>
				<b>113.1 (all)</b>	<b>Feb 1969</b>
<b>25010</b>	<b>Mindarie</b>	<b>SA</b>	<b>132.4</b>	<b>84.0 (Dec)</b>	<b>1992</b>
				<b>127.3 (all)</b>	<b>Feb 1973</b>
25013	Parilla	SA	140.6	100.4	1937
25014	Paruna	SA	91.6	87.6	1992
25015	Pinnaroo	SA	86.0	71.6	1992
25017	Sandalwood	SA	113.5	92.8	1937
25507	Keith	SA	137.8	78.1	1937
25509	Lameroo	SA	107.8	88.1	1962
25513	Peake	SA	107.9	107.0	1929
25519	Wolseley	SA	129.6	106.0	1894
28000	Laura	QLD	410.4	406.6	1976
30082	Gregory Springs	QLD	350.2	315.4	2000
30137	Hillgrove	QLD	399.4	254.6	2000
31029	Herberton	QLD	446.2	416.0	1950
31046	Mount Garnet	QLD	337.4	327.0	1997
33008	Byfield	QLD	770.0	651.9	1962
33013	Collinsville	QLD	425.9	410.4	1956
34000	Balfes Creek	QLD	297.5	260.3	1906
35007	Bauhinia Downs	QLD	475.2	270.6	1988
<b>35014</b>	<b>Wandoan</b>	<b>QLD</b>	<b>413.0</b>	<b>357.8</b>	<b>1970</b>
<b>35018</b>	<b>Carnarvon Station</b>	<b>QLD</b>	<b>535.8</b>	<b>238.9 (Dec)</b>	<b>1927</b>
				<b>340.2 (all)</b>	<b>Feb 1997</b>
35021	Comet	QLD	383.0	273.5	1956
35049	Gillespie	QLD	268.6	213.1	1916
35051	Orion	QLD	380.1	350.0	1975
35065	Springsure	QLD	470.2	316.6	1975

Table 2. Selected record monthly rainfall totals which have occurred during December 2010 at locations with 50 or more years of data. Values shown in bold are records for any calendar month.

Station number	Name	State	Rainfall (mm)	Previous record (mm)	Year
<b>35079</b>	<b>Wharton Creek</b>	<b>QLD</b>	<b>452.0</b>	<b>307.0 (Dec)</b>	<b>1956</b>
				<b>414.3 (all)</b>	<b>Feb 1954</b>
<b>35194</b>	<b>Wyseby</b>	<b>QLD</b>	<b>603.2</b>	<b>339.0 (Dec)</b>	<b>1970</b>
				<b>511.6 (all)</b>	<b>Feb 2010</b>
36143	Blackall	QLD	254.0	246.8	1965
39004	Baralaba	QLD	461.2	353.9	1973
39040	Gin Gin	QLD	803.7	411.0	1970
39059	Lady Elliot Island	QLD	510.0	383.4	1962
39066/39039	Gayndah	QLD	380.8	321.2	1942
39070	Mount Perry	QLD	584.8	365.4	1956
<b>39073</b>	<b>Mundubbera</b>	<b>QLD</b>	<b>428.6</b>	<b>321.7 (Dec)</b>	<b>1959</b>
				<b>364.4 (all)</b>	<b>Feb 1956</b>
<b>39089</b>	<b>Thangool</b>	<b>QLD</b>	<b>374.4</b>	<b>344.4</b>	<b>1973</b>
<b>39104</b>	<b>Monto</b>	<b>QLD</b>	<b>499.0</b>	<b>248.5 (Dec)</b>	<b>1970</b>
				<b>434.2 (all)</b>	<b>Feb 1971</b>
39128/39015	Bundaberg	QLD	573.2	490.3	1962
40021	Biggenden	QLD	558.9	441.4	1942
40043	Cape Moreton	QLD	375.8	372.5	1965
40059	Cooroy	QLD	559.5	521.0	1926
<b>40071</b>	<b>Lanark</b>	<b>QLD</b>	<b>462.0</b>	<b>328.2</b>	<b>1947</b>
40078	Eumundi	QLD	615.8	516.7	1926
40082	UQ Gatton	QLD	317.0	278.7	1942
40098	Howard	QLD	631.4	543.0	1926
40099	Imbil	QLD	575.6	454.6	1926
40106	Kenilworth	QLD	547.1	481.1	1926
40135	Moogerah Dam	QLD	363.8	308.8	1921
40144	Mount Joseph	QLD	521.8	477.0	1926
40158	Nanango	QLD	365.9	333.1	1970
40160	Nerang	QLD	481.2	392.8	1897
40166	Oxenford	QLD	542.2	493.8	1897
40170	Pechey	QLD	326.0	307.2	1942
<b>40177</b>	<b>Proston</b>	<b>QLD</b>	<b>399.0</b>	<b>282.3 (Dec)</b>	<b>1970</b>
				<b>301.4 (all)</b>	<b>Feb 1971</b>
40198	Tarome	QLD	523.4	449.9	1965
40231	Manly	QLD	467.0	397.1	1970
41011	Cambooya	QLD	325.6	298.9	1895
<b>41018</b>	<b>Clifton</b>	<b>QLD</b>	<b>359.0</b>	<b>261.8 (Dec)</b>	<b>1928</b>
				<b>350.7 (all)</b>	<b>Feb 1893</b>
<b>41050</b>	<b>Jandowae</b>	<b>QLD</b>	<b>376.6</b>	<b>268.5 (Dec)</b>	<b>1921</b>
				<b>356.4 (all)</b>	<b>Mar 1941</b>
41069	Millmerran	QLD	312.0	264.0	1970
<b>41082</b>	<b>Pittsworth</b>	<b>QLD</b>	<b>433.6</b>	<b>297.5 (Dec)</b>	<b>1965</b>
				<b>359.7 (all)</b>	<b>Feb 1893</b>
<b>41120</b>	<b>Yangan</b>	<b>QLD</b>	<b>374.4</b>	<b>292.0</b>	<b>1975</b>
43015	Injune	QLD	349.9	280.4	1931
43020	Mitchell	QLD	319.4	253.9	1931
47016	Lake Victoria	NSW	140.1	98.7	1975
51049	Trangie Research	NSW	145.2	137.4	1992
55006	Blackville	NSW	244.4	208.9	1926
55023	Gunnedah Pool	NSW	232.4	185.8	2004
59040	Coffs Harbour	NSW	395.4	383.2	1991
62013	Gulgong	NSW	241.1	212.8	1958

Table 2 (continued). Selected record monthly rainfall totals which have occurred during December 2010 at locations with 50 or more years of data. Values shown in bold are records for any calendar month.



Station number	Name	State	Rainfall (mm)	Previous record (mm)	Year
63005	Bathurst Ag Station	NSW	219.4	194.5	1947
63035	Hill End	NSW	257.6	220.4	1926
64004	Binnaway	NSW	272.0	233.4	2007
64008	Coonabarabran	NSW	293.8	289.6	2007
64009	Dunedoo	NSW	279.4	194.8	1926
65011	Cumnock	NSW	283.0	200.2	1992
65018	Geurie	NSW	198.0	190.4	2007
65020	Manildra	NSW	252.6	204.5	1920
65023	Molong	NSW	241.4	214.8	1947
65026	Parkes	NSW	212.8	171.9	1947
65034	Wellington	NSW	184.6	173.2	2009
70025	Crookwell	NSW	270.8	212.4	1947
70083	Tharwa	ACT	220.4	159.6	1961
73007	Burrinjuck Dam	NSW	260.5	243.5	1947
76038	Murrayville	VIC	122.8	82.0	1966
<b>76064</b>	<b>Walpeup</b>	<b>VIC</b>	<b>141.6</b>	<b>121.6 (Dec)</b>	<b>1992</b>
				<b>139.0 (all)</b>	<b>Feb 2000</b>
76067	Werrimull	VIC	132.2	74.4	1983
77033	Patchewollock	VIC	97.2	96.8	2004
77052	Woomelang	VIC	119.6	101.7	1930
78010	Dimboola	VIC	141.0	111.8	1992
79010	Drung Drung	VIC	142.6	137.8	1930
79023	Horsham	VIC	150.2	145.8	1930
79036	Natimuk	VIC	130.6	116.5	1930
79075	Rupanyup	VIC	148.2	124.7	1930
83038	Tawonga	VIC	247.8	212.0	1988
<b>89003</b>	<b>Balmoral</b>	<b>VIC</b>	<b>222.2</b>	<b>122.7 (Dec)</b>	<b>1902</b>
				<b>197.4 (all)</b>	<b>Jul 1947</b>
89034	Willaura	VIC	169.4	162.3	1966
90057	Merino	VIC	176.0	149.4	1986

Table 2 (continued). Selected record monthly rainfall totals which have occurred during December 2010 at locations with 50 or more years of data. Values shown in bold are records for any calendar month.

River	Location	Peak height (m)	Date	Previous record (m)	First year of data
Dawson	Utopia Downs	14.25	28 December	12.82 (27/4/1989)	1970
Dawson	Tanara Crossing	12.50	28 December	12.09 (26/5/1983)	1983
Dawson	Windamere	10.52	27 December	10.28 (3/5/1983)	1975
Dawson	Chilgerrie Hill	10.85	27 December	10.60 (28/8/1998)	1983
Dawson	La Palma	7.70	28 December	7.39 (23/2/1971)	1956
Dawson	Glebe Weir TW	18.81	31 December	15.19 (6/5/1983)	1983
Dawson	Glebe Weir HW	9.62	31 December	6.15 (6/5/1983)	1983
Dawson	Gyandra Weir	4.80	27 December	3.94 (7/3/2010)	1988
Dawson	Theodore	14.70	1 January	14.07 (14/2/1956)	1924
Dawson	Woodleigh	18.45	2 January	13.97 (17/1/1996)	1986
Dawson	Redcliff	9.01	28 December	7.36 (22/2/1971)	1958
Dawson	Beckers	19.47	30 December	15.75 (4/5/1983)	1965
Nogoa	Raymond	12+	28 December	11.41 (25/11/1950)	1947
Nogoa	Craigmore	18.16	29 December	16.25 (20/1/2008)	1972
Nogoa	Emerald	16.05	31 December	15.70 (27/11/1950)	1950
Comet	Rewan	11.3+	27 December	10.97 (19/4/1990)	1987
Comet	Rolleston	8.2 (approx.)	28 December	5.87 (19/2/2010)	1958
Comet	Comet Weir	13.94	29 December	13.19 (11/2/1954)	1922
Mackenzie	Bingegang	17.45	2 January	17.23 (6/2/1978)	1974
Barker	Glenmore	4.45	28 December	4.11 (10/2/1999)	1988
Boyne	Boondooma Dam	3.46	28 December	1.30 (28/7/1984)	1983
Auburn	Glenwood	14.70	29 December	13.11 (5/2/1971)	1971
Burnett	Monto	6.49	28 December	5.96 (9/1/1996)	1990
Burnett	Lands End	6.81	27 December	6.45 (7/2/2003)	1987
Burnett	Wuruma Dam	3.38	28 December	0.59 (10/2/1971)	1971
Burnett	Eidsvold	14.28	28 December	12.36 (8/2/2003)	1963
Burnett	Gayndah Flume	16.34	28 December	14.20 (5/2/1971)	1971
Burnett	Coringa	10.09	27 December	8.47 (16/3/1992)	1986
Burnett	Walla	20.10	29 December	18.07 (5/2/1971)	1968
Condamine	Clydesdale	4.78	27 December	4.65 (3/5/1996)	1971
Condamine	Centenary Bridge (Millmerran)	8.30	28 December	8.20 (February 1976)	1976
Condamine	Loudoun Bridge	11.20	29 December	10.89 (13/2/1976)	1956
Condamine	Warra-Kogan Road Bridge	15.00	30 December	14.00 (1956)	1956
Condamine	Brigalow Bridge	14.84	30 December	13.99 (14/2/1976)	1972
Condamine	Beruna	7.95	28 December	7.20 (8/2/1981)	1962
Condamine	Chinchilla Weir	15.38	31 December	13.97 (8/4/1988)	1956
Condamine	Condamine	15.25	1 January	14.25 (13/2/1942)	1924
Condamine	Cotswold	17.82	2 January	16.13 (8/5/1983)	1967
Balonne	Warkon	12.03	3 January	11.88 (13/1/1996)	1941
Balonne	Surat	12.75	4 January	12.40 (3/3/2010)	1910
Moonie	The Deep Crossing	5.65	27 December	4.45 (10/1/1996)	1970
Moonie Weir	Tartha	7.00	28 December	6.75 (1956)	1956
Boyne	O'Connor	14.58	28 December	14.57 (January 1956)	1956
Boyne	Awoonga Dam	4.16	28 December	1.74 (7/1/1991)	1987
Kolan	Fred Haigh Dam	3.85	29 December	1.73 (12/3/1977)	1977

Table 3. A selection of record flood peak heights reached during the event at sites with 20 or more years of observations. (HW – headwater/lake level; TW – tailwater/outflow level).