



**Australian Government**  
**Bureau of Meteorology**

**Water Information**  
DATA > INFORMATION > INSIGHT

# Tully and Murray River Floods

January and February 2009



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2	3

1. Flood waters over a road at Euramo – Photo by Liam Fox, ABC News
2. Tully River – Photo from Cairns Post
3. Flood waters at Hotel Euramo – Photo by Sue London

**Note:**

1. Data in this report has been operationally quality controlled but errors may still exist.
2. This product includes data made available to the Bureau by other agencies. Separate approval may be required to use the data for other purposes. See Appendix 1 for DNRW Usage Agreement.
3. This report is not a complete set of all data that is available. It is a representation of some of the key information.

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# Tully and Murray River Floods

## January and February 2009

### 1. Introduction

The Tully River catchment covers an area of 1475 square kilometres at Euramo. The Tully River is a relatively short stream, rising in high rainfall areas of the coastal ranges and flowing across the coastal plain. Floods in the Tully and the adjacent Murray River inundate cane lands and the larger floods isolate farm houses. An important impact of Tully River floods is the cutting of the Bruce Highway at Euramo and at Murray Flats.

The three most significant periods of rainfall in the Tully and Murray River catchments occurred on the 30<sup>th</sup> January, 1<sup>st</sup>-2<sup>nd</sup> February and 6<sup>th</sup>-7<sup>th</sup> February. This caused riverine flooding in the Tully and Murray Rivers. A major flood level was reached in the Tully River at Euramo and in the Murray River at Upper Murray and Murray Flats.

River levels exceeded the level of the Bruce Highway at Murray Flats and Euramo during Saturday 7<sup>th</sup> February. River heights fell below the highway level by Sunday morning (8<sup>th</sup>) and Monday morning (9<sup>th</sup>) respectively. The river heights were above the level of the highway at Murray Flats for 13 hours and at Euramo for 40 hours. Overnight on the 7<sup>th</sup> February six people in Tully were relocated due to rising floodwaters.

This report provides a summary and analysis of the meteorology and hydrology of the Tully and Murray River Floods of January and February 2009. A [map of the Tully and Murray River catchments](#) shows the location of flood warning stations referred to in this report.

### 2. Meteorological Summary

A low pressure system developed on the monsoon trough off the north tropical coast of Queensland, to the north-east of Cairns, on Thursday 29<sup>th</sup> January. This monsoon low moved southwards during Friday 30<sup>th</sup> January before moving northwards and hovering to the east north-east of Cairns during Saturday 31<sup>st</sup> January. It further developed into Category 1 Tropical Cyclone Ellie very early on Sunday 1<sup>st</sup> February.

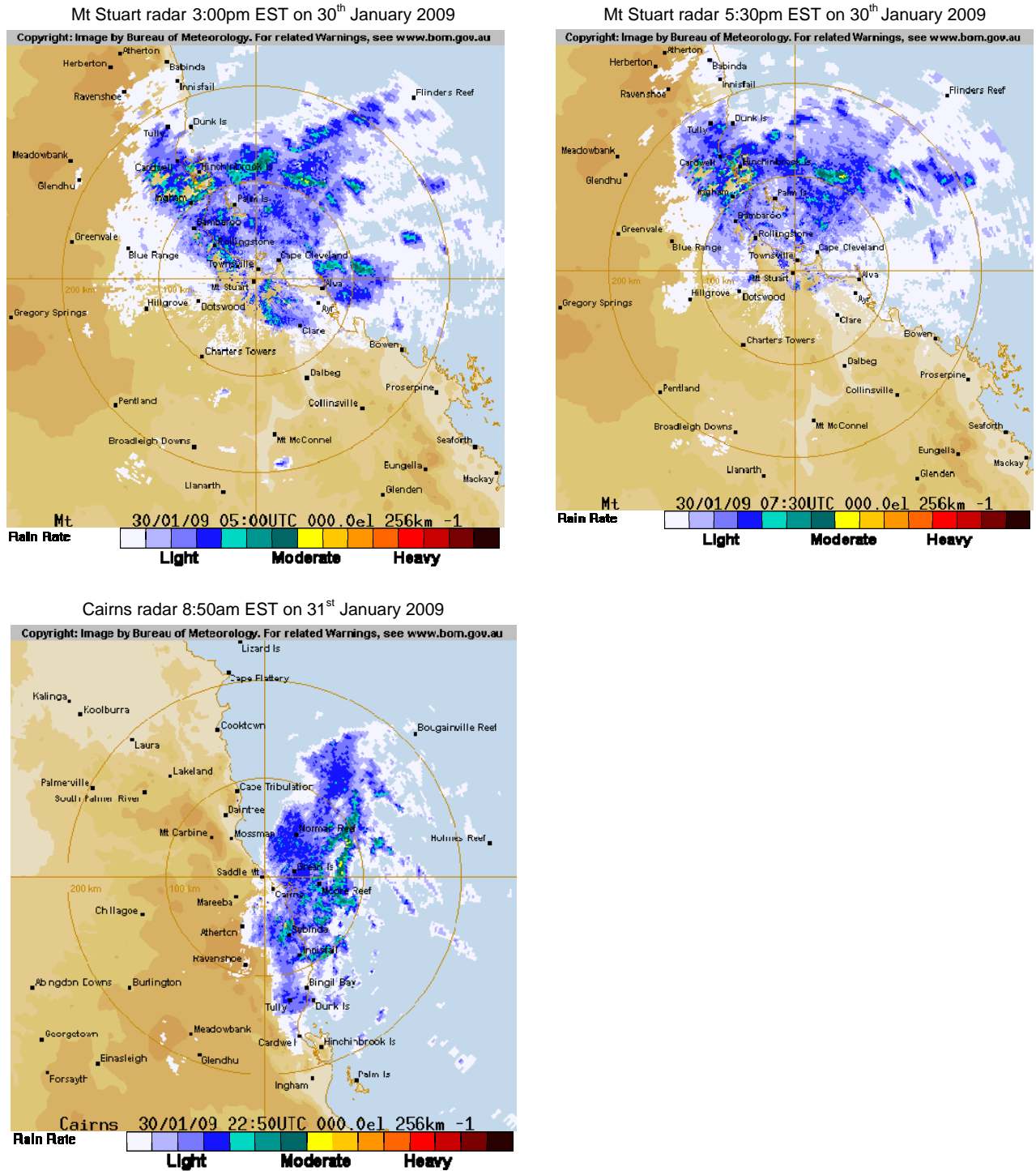
Large rainfall totals were recorded during Friday 30<sup>th</sup> January 2009 to Monday 2<sup>nd</sup> February across the Tully and Murray catchments. This rainfall was due to the approaching Tropical Cyclone Ellie which crossed the coastline near Mission Beach at 11:55pm on 1<sup>st</sup> February 2009. The cyclone rapidly weakened into a rain depression. The rain depression then continued in a general west to south-west direction over the following few days, producing heavy rainfall particularly in the Tully River catchment.

A weak low developed on the monsoon trough to the east of Cairns on the 4<sup>th</sup> February, then drifted northwards with the monsoon trough. This produced further heavy rainfall on the Friday 6<sup>th</sup> and Saturday 7<sup>th</sup> February in both catchments.

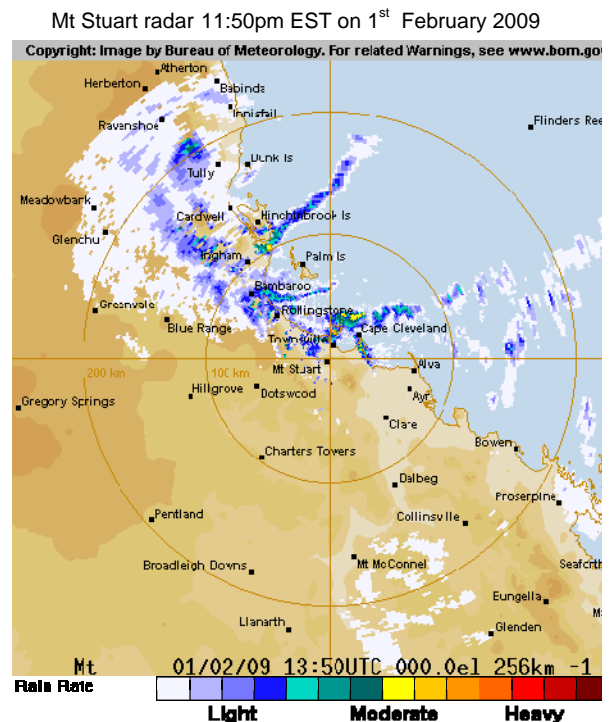
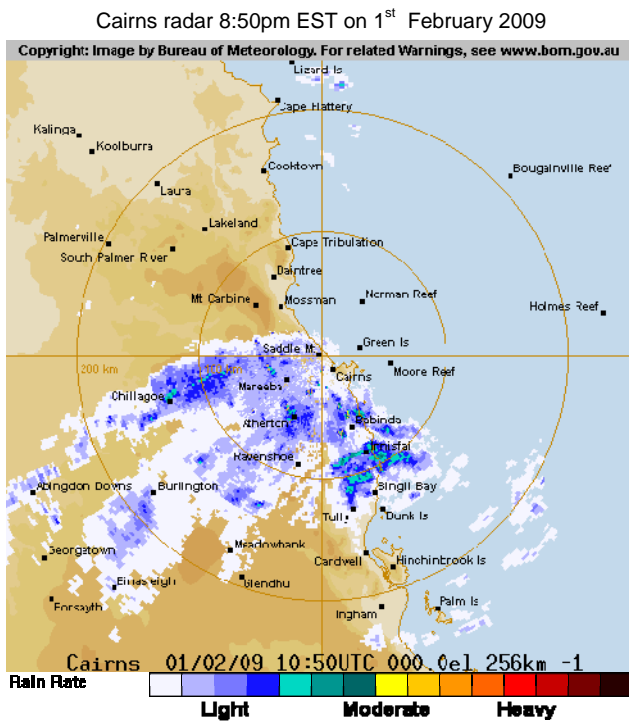
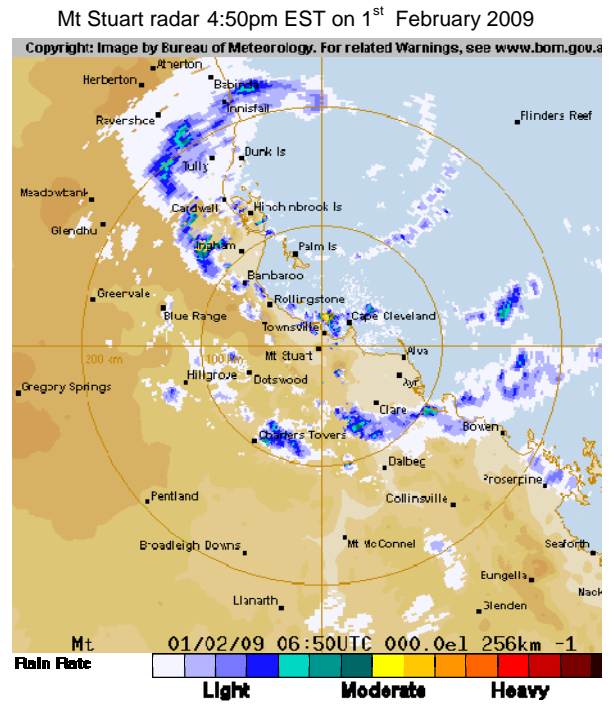
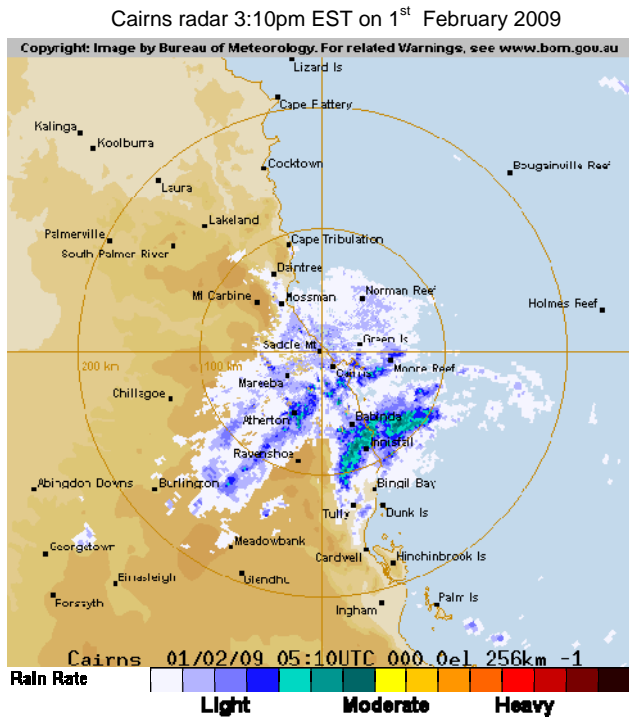
The radar imagery for these periods is shown in Figures 2.1-2.3.

For a more detailed discussion of the meteorology of the event and a summary of flooding in Queensland throughout January and February 2009, refer to the report [Queensland Floods January and February 2009](#).

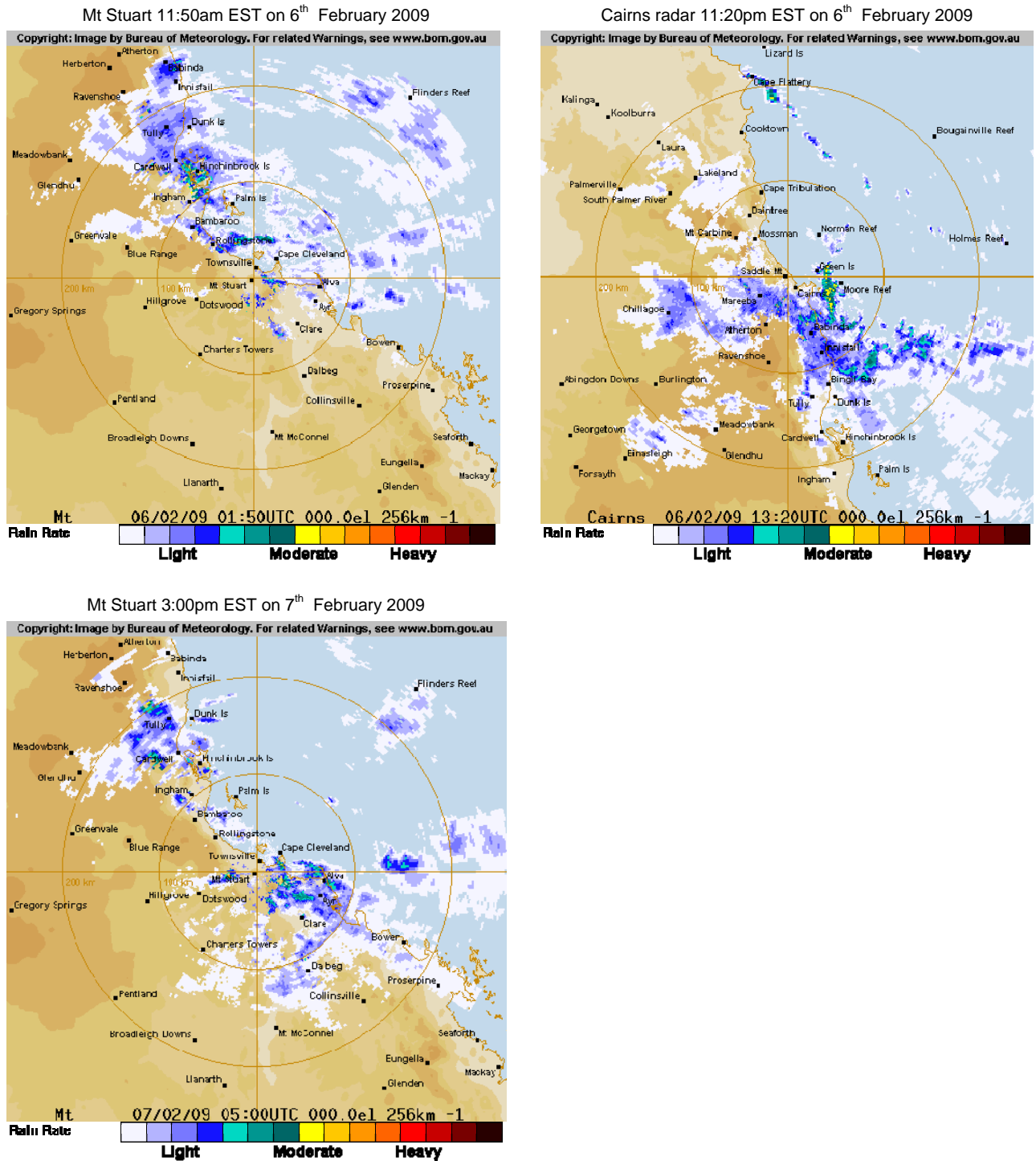
**Figure 2.1 Radar imagery for 3:00pm and 5:30pm on 30/01/09 and for 8:50am on 31/01/09.**



**Figure 2.2 Radar imagery for 3:10pm, 4:50pm, 8:50pm and 11:50pm on 01/02/09.**



**Figure 2.3 Radar imagery for 11:50am and 11:20pm on 06/02/09 and 3pm on 07/02/09.**



### 3. Hydrology

Large rainfall totals were recorded during the early morning of Friday 30<sup>th</sup> January 2009 across the Tully and Murray catchments, this resulted in riverine flooding in the Tully and Murray Rivers on Friday 30<sup>th</sup> and 31<sup>st</sup> January. A moderate flood level was reached in the Tully River at Euramo and in the Murray River at Murray Flats.

On Sunday 1<sup>st</sup> and Monday 2<sup>nd</sup> February further heavy rainfall was received in the Tully and Murray catchments. This rainfall was due to the approaching Tropical Cyclone Ellie and caused renewed river level rises in the Tully and Murray Rivers. River levels in the Tully River at Bolinda Estate and Euramo rose to a moderate flood peak on the 2<sup>nd</sup> and 3<sup>rd</sup> February respectively. Prolonged moderate flooding resulted in the Murray River at Murray Flats reaching a moderate flood peak on 3<sup>rd</sup> February.

Rainfall totals for the period 2<sup>nd</sup> to 5<sup>th</sup> February reduced significantly. This allowed river levels in the Tully and Murray Rivers to fall to minor flood level or below. Further heavy rainfall occurred on the Friday 6<sup>th</sup> and Saturday 7<sup>th</sup> February due to a weak low which had developed on the monsoon trough to the east of Cairns on the 4<sup>th</sup> February. As a result of the previous large rainfall events, the catchment was saturated leading to reduced losses, very rapid runoff and faster river rises. The Tully River at Bolinda Estate rose to a moderate flood peak on the 6<sup>th</sup> February, while a major flood peak was reached at Euramo on the 7<sup>th</sup>. The Murray River at both Murray Flats and Upper Murray River rose quickly to major flood levels on the 7<sup>th</sup>.

#### 3.1 Peak River Heights

The flooding in the Tully and Murray Rivers was the most significant flooding in some parts of the region since 1967. As can be seen from Table 3.1.1, all the gauging stations had their first or second highest flood on record. The peak river heights for the period 28<sup>th</sup> January – 11<sup>th</sup> February 2009 are shown in Figure 3.1.1.

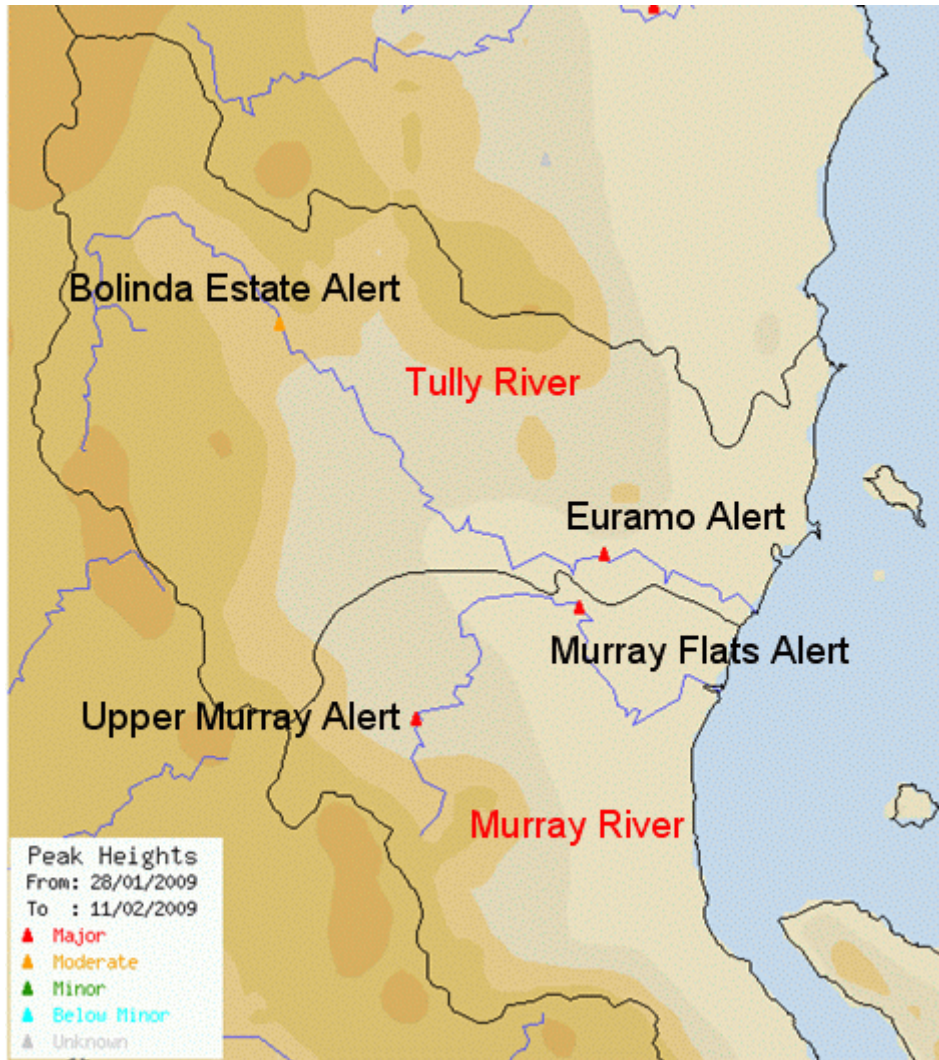
In the Tully River, major flooding at Euramo was the highest since 1999 and the 2<sup>nd</sup> highest on record, with records going back to 1967. At Bolinda Estate moderate flooding was the highest on record and the highest since 2<sup>nd</sup> February 2009, from a record starting in 1994.

Major flooding at Murray Flats on the Murray River was the highest on record, however the records for this site only started in 2001. Major flood levels reached in the Murray River at Upper Murray were the highest since 1997 and the 2<sup>nd</sup> highest on record, with records going back to 1971.

**Table 3.1.1 Peak height comparison to records**

Gauging station	Feb 2009 peak (metres)	Start of record	Ranking	Highest since	Highest on record
Tully River at Euramo	9.14m	1967	2nd	Feb 1999	9.37m 1967
Tully River at Bolinda Estate	6.10m	1994	1st	2 Feb 2009	New Record
Murray River at Murray Flats Alert	8.71m	2001	1st	Feb 2007	New Record
Murray River at Upper Murray	9.57m	1971	2nd	Mar 1997	10.00m Jan 1998

**Figure 3.1.1 Peak height map for 28<sup>th</sup> January - 11<sup>th</sup> February 2009**

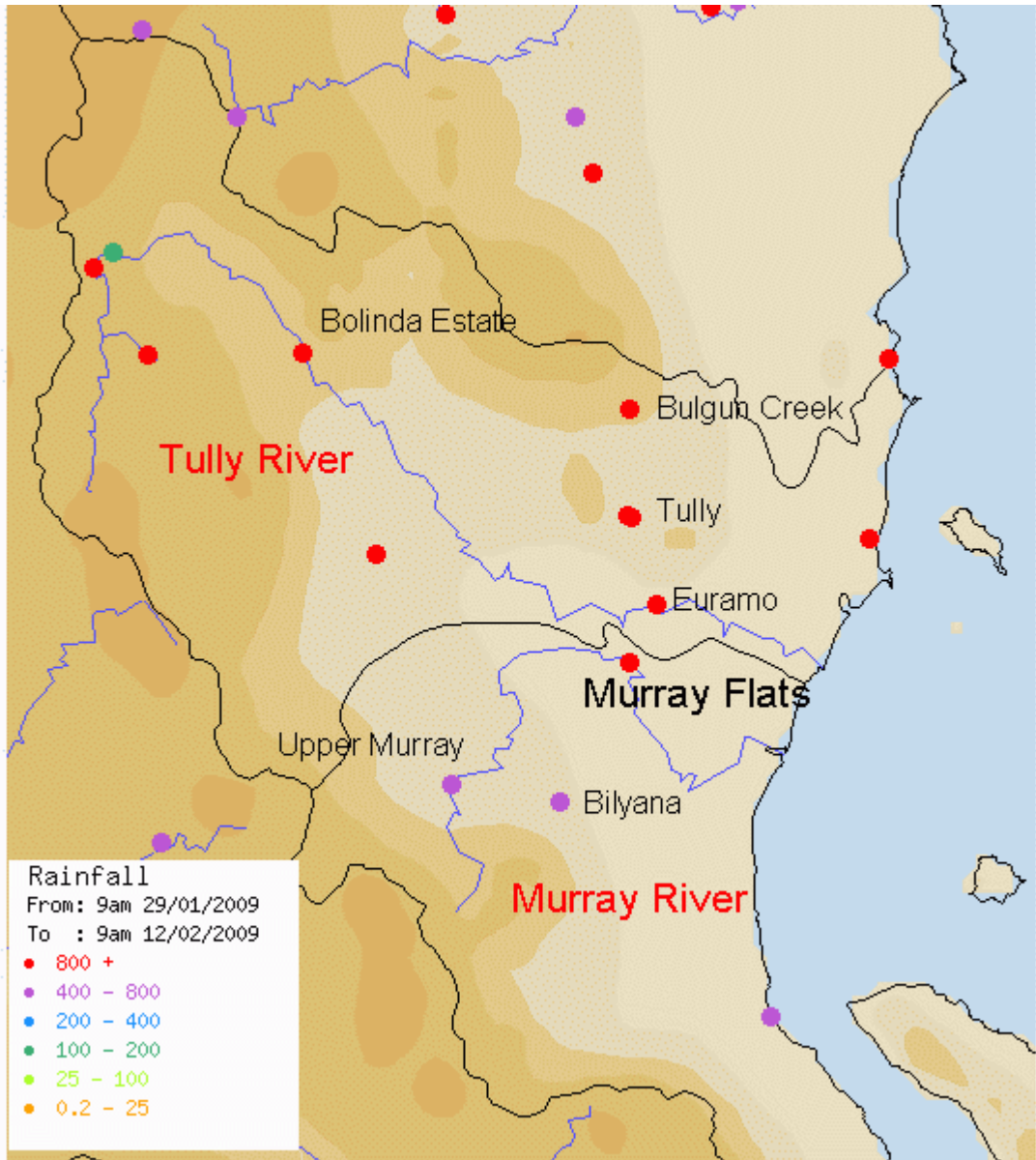


### 3.2 Rainfall Maps

The highest daily rainfall total in the period 30<sup>th</sup> January - 8<sup>th</sup> February of 374mm was recorded at Bulgun Creek Alert in the 24 hours to 9am on 7<sup>th</sup> February. Bulgun Creek Alert during the period 30<sup>th</sup> January - 8<sup>th</sup> February received 1840mm. (Table 3.4.1)

The rainfall amounts in Figures 3.2.1 to 3.2.4 are all given in millimetres. Refer to the [Flood Warning Network Map for the Tully and Murray Rivers](#) for locations used in Figures 3.2.1-3.2.4.

**Figure 3.2.1 Rainfall map from the 29<sup>th</sup> January 2009 to 12<sup>th</sup> February 2009**



During this period most of the Tully River catchment received over 800mm. The Murray River catchment upstream of Murray Flats recorded just under 800 mm.

**Figure 3.2.2 Rainfall map for the 24 hours to 9am on the 30<sup>th</sup> January 2009**



The highest rainfall totals in this period were recorded in the Tully catchment and also at Murray Flats station.

**Figure 3.2.3 Rainfall map for the 48 hours to 9am on the 30<sup>th</sup> January 2009**



The highest rainfall totals in this period were recorded in the Tully catchment and also at Murray Flats station.

**Figure 3.2.4 Rainfall map for the 24 hours to 9am on the 7<sup>th</sup> February 2009**



The highest rainfall totals in this period were widespread across both the Tully and Murray River catchments.

### 3.3 Rainfall Intensity

The most intense rainfall in the Tully and Murray River catchment occurred on the 30<sup>th</sup> January, 1<sup>st</sup>-2<sup>nd</sup> and 6<sup>th</sup>-7<sup>th</sup> February 2009. For some of the key stations from these catchments Hourly Hyetographs (Figures 3.3.1 and 3.3.2) and Intensity Frequency Duration (IFD) analyses (Figures 3.3.3 and 3.3.4) have been produced.

The Tully and Murray Rivers during January and February 2009 recorded large rainfall totals. These large totals did not however result from statistically significant intense rainfall, but rather from rainfall falling over a longer duration.

The most statistically significant short duration rainfall occurred at Bulgun Creek where for the 2 hour duration to 5:00pm on 7<sup>th</sup> February 2009 the observed total of 162 mm is assessed as being greater than 2-5% AEP (20-50 year Average Recurrence Interval (ARI)) intensity. (Figure 3.3.3)

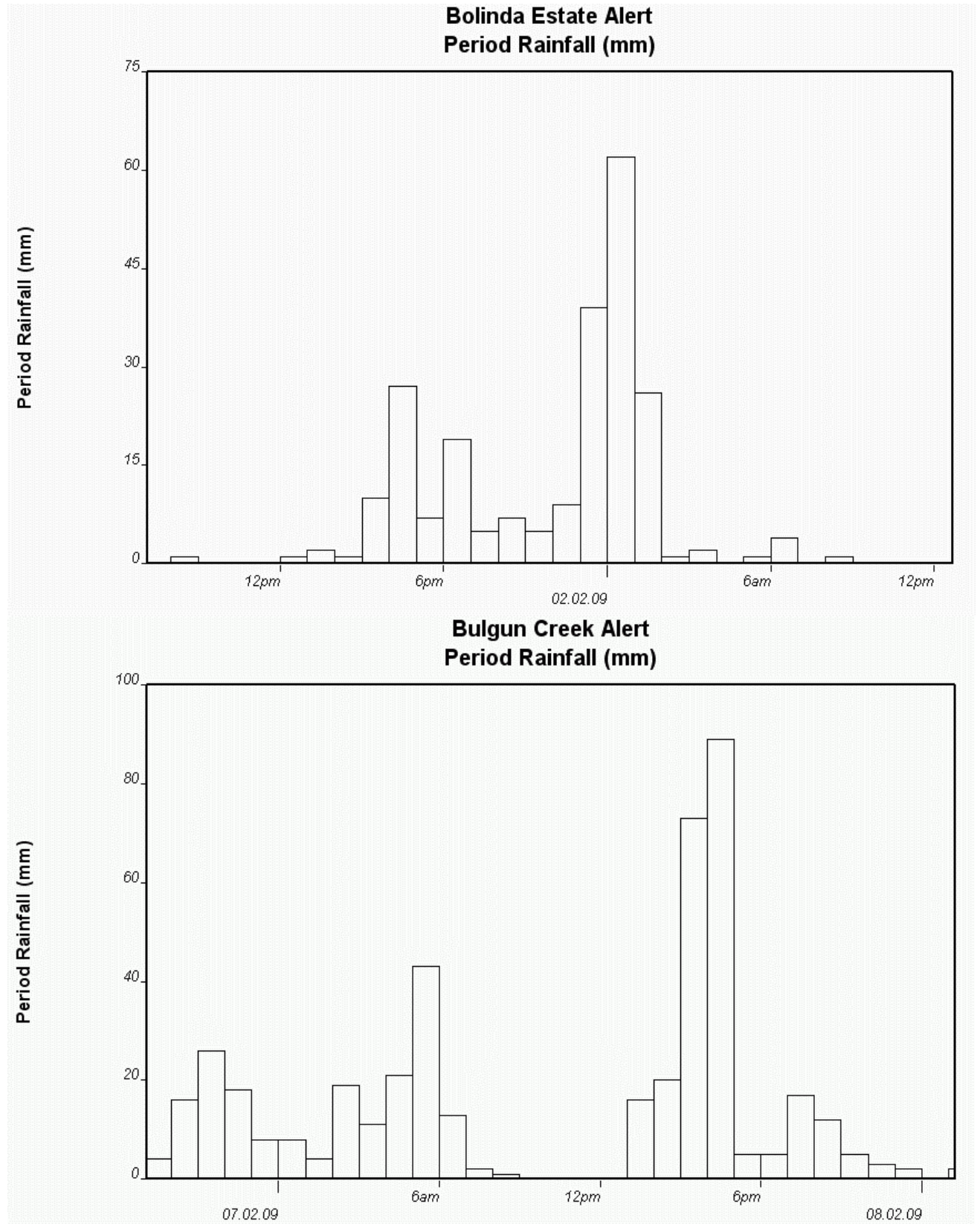
In the Tully River a comparison of observed intensities to IFD intensities at Euramo Alert, the observed rainfall in the 48 and 72 hour periods on the 7<sup>th</sup>-8<sup>th</sup> February are assessed as being greater than 20-50% AEP (2-5 year ARI) intensity. (Figure 3.3.4) At Bolinda Estate the observed total of 111 mm in the 2 hours to 01:20pm 2<sup>nd</sup> February is assessed as being greater than 5-10% AEP (10-20 year ARI). (Figure 3.3.3)

The Hourly Hyetographs for the Bolinda Estate, Bulgun Creek and Euramo Alert stations are shown in Figures 3.3.1 and 3.3.2. For each of these stations the time period when the most intense rainfall was recorded is shown.

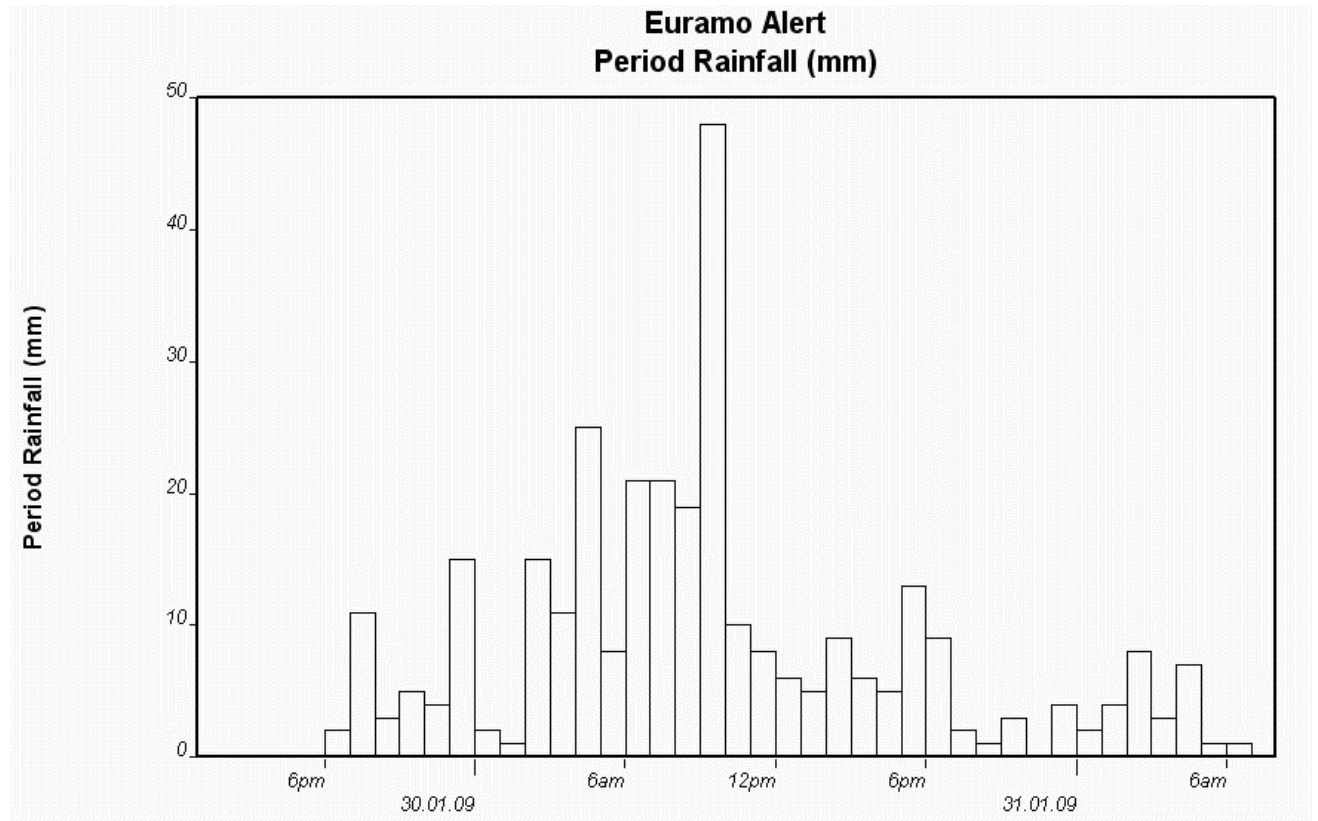
In the Murray River observed rainfall intensities were not as statistically significant. A comparison of observed intensities to IFD intensities for the rainfall at Bilyana Alert, Murray Flats and Upper Murray Alert stations were at most equal to 20-50% AEP (2-5 year ARI).

**Note: A flood frequency analysis would be required to assess the probability of flood levels reached at each location. The frequency analysis in this report is for rainfall only.**

**Figure 3.3.1 Hourly hyetographs for Bolinda Estate Alert and Bulgun Creek Alert**



**Figure 3.3.2 Hourly hyetographs for Euramo Alert**

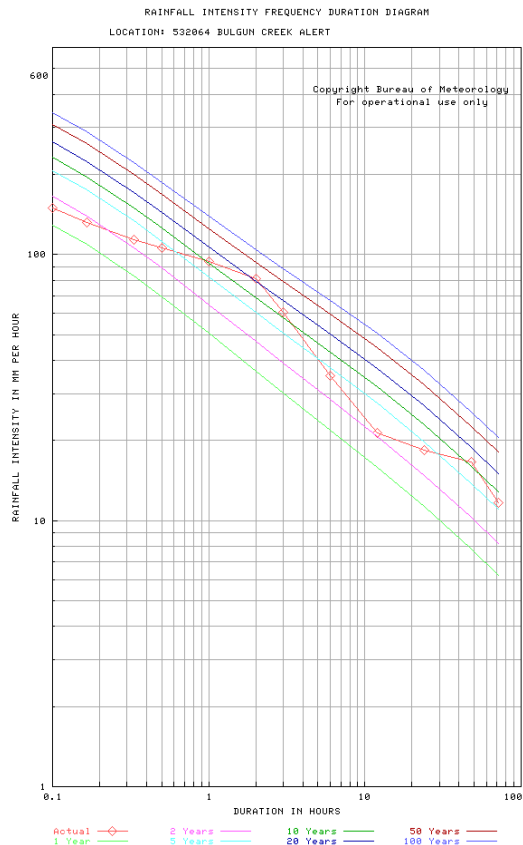
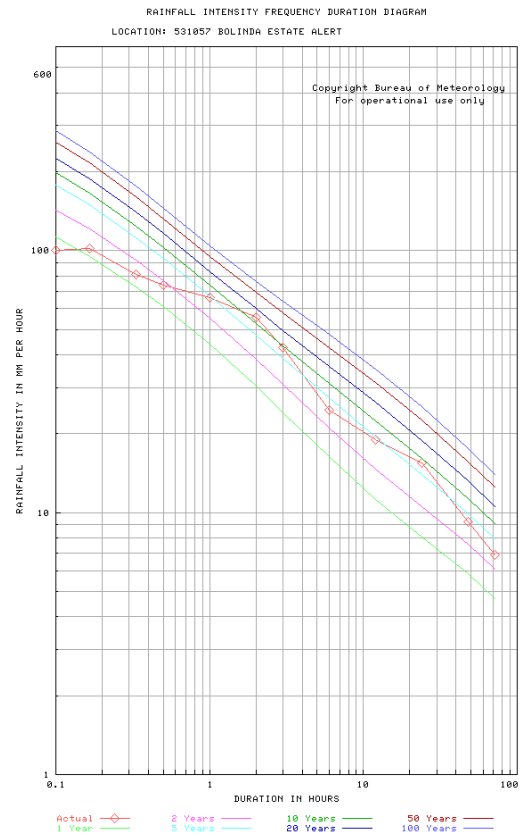


**Figure 3.3.3 IFD rainfall analysis for Bolinda Estate Alert and Bulgun Creek Alert**

RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS		
LOCATION: 531057 BOLINDA ESTATE ALERT		
Analysis of the rainfall for the 374 hours to Thu Feb 12 14:00:00 2009		
Rain (mm)	Period Ending	ARI (years)
9	5 mins ending at 21:10:00 06/02/2009	1
10	6 mins ending at 21:11:00 06/02/2009	< 1
17	10 mins ending at 21:10:00 06/02/2009	1-2
27	20 mins ending at 21:10:00 06/02/2009	1-2
37	30 mins ending at 21:10:00 06/02/2009	1-2
66	60 mins ending at 01:10:00 02/02/2009	2-5
111	2 hours ending at 01:20:00 02/02/2009	10-20
128	3 hours ending at 01:55:00 02/02/2009	5-10
148	6 hours ending at 02:00:00 02/02/2009	2-5
227	12 hours ending at 21:30:00 06/02/2009	2-5
371	24 hours ending at 23:40:00 06/02/2009	5-10
442	48 hours ending at 18:05:00 07/02/2009	2-5
495	72 hours ending at 03:15:00 02/02/2009	2-5

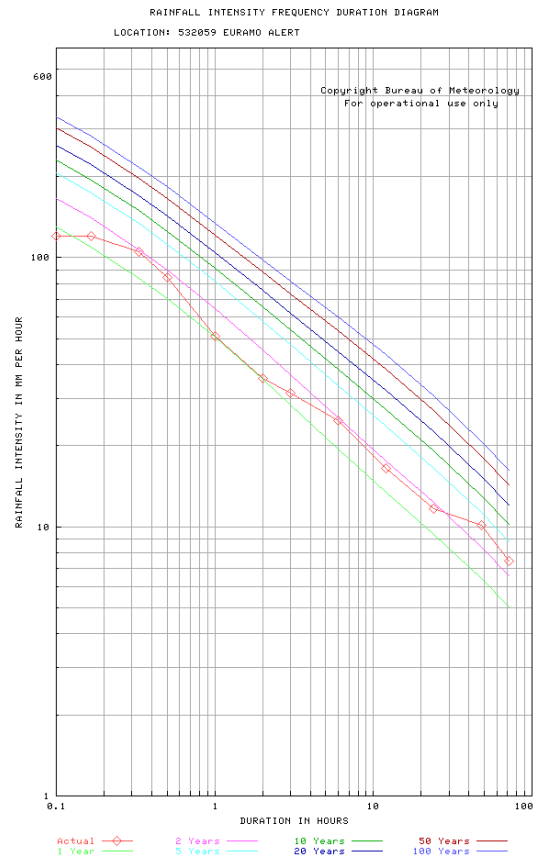
  

RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS		
LOCATION: 532064 BULGUN CREEK ALERT		
Analysis of the rainfall for the 374 hours to Thu Feb 12 14:00:00 2009		
Rain (mm)	Period Ending	ARI (years)
13	5 mins ending at 15:40:00 07/02/2009	1-2
15	6 mins ending at 15:41:00 07/02/2009	1-2
22	10 mins ending at 15:40:00 07/02/2009	1-2
38	20 mins ending at 15:45:00 07/02/2009	2-5
53	30 mins ending at 16:45:00 07/02/2009	2-5
94	60 mins ending at 16:35:00 07/02/2009	10-20
162	2 hours ending at 17:00:00 07/02/2009	20-50
182	3 hours ending at 17:05:00 07/02/2009	10-20
210	6 hours ending at 19:30:00 07/02/2009	2-5
256	12 hours ending at 16:55:00 07/02/2009	2-5
441	24 hours ending at 06:10:00 07/02/2009	2-5
798	48 hours ending at 21:20:00 07/02/2009	10-20
841	72 hours ending at 21:05:00 07/02/2009	5-10



**Figure 3.3.4 IFD rainfall analysis for Euramo Alert**

RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS		
LOCATION: 532059 EURAMO ALERT		
Analysis of the rainfall for the 374 hours to Thu Feb 12 14:00:00 2009		
Rain (mm)	Period Ending	ARI (years)
10	5 mins ending at 09:45:00 30/01/2009	< 1
12	6 mins ending at 09:46:00 30/01/2009	< 1
20	10 mins ending at 09:50:00 30/01/2009	1-2
35	20 mins ending at 09:55:00 30/01/2009	2
42	30 mins ending at 10:05:00 30/01/2009	1-2
51	60 mins ending at 10:15:00 30/01/2009	1-2
71	2 hours ending at 10:15:00 30/01/2009	1-2
94	3 hours ending at 10:15:00 30/01/2009	1-2
149	6 hours ending at 10:15:00 30/01/2009	1-2
198	12 hours ending at 10:50:00 30/01/2009	1-2
281	24 hours ending at 18:55:00 30/01/2009	1-2
488	48 hours ending at 22:10:00 07/02/2009	2-5
538	72 hours ending at 17:00:00 08/02/2009	2-5



### 3.4 Rainfall Totals

The abbreviations used in the following tables include:

AL - ALERT Radio Telemetry, TM - Telephone Telemetry, AWS - Automatic Weather Station, SYN - Bureau Synoptic Station

Note: \* signifies automatic station, N/A signifies missing data

Refer to the [Flood Warning Network Map for the Tully and Murray Rivers](#) for the location of the stations used in Table 3.4.1.

**Table 3.4.1 Rainfall totals for the Tully and Murray River catchment.**

Station name	24 hour rainfall to 9am on															Total (mm)
	January						February									
	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	
Maalan Road AL *	2	5	5	17	37	75	57	99	8	58	59	111	172	62	30	<b>803</b>
Tully Weir AL *	12	4	4	35	50	69	42	219	10	42	65	64	187	37	23	<b>885</b>
Koombooloomba AL *	22	4	4	45	74	72	40	245	9	33	55	82	185	41	22	<b>953</b>
Kareeya TM *	13	4	2.2	17	38	61	36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>174.4</b>
Bolinda Estate AL *	68	8	27	91	198	106	50	229	7	83	57	131	279	39	33	<b>1423</b>
Davidson Creek AL *	52	4	11	49	155	103	33	167	7	48	45	64	343	22	19	<b>1194</b>
Tully AL *	59	10	31	128	199	208	50	83	6	29	39	158	271	174	62	<b>1523</b>
Tully Sugar Mill	59	10	29	125	190	209	49	77	5.8	28	38	165	271	165	58	<b>1493</b>
Bulgun Creek AL *	50	3	33	105	212	212	45	142	10	65	98	199	374	252	16	<b>1840</b>
Bingil Bay	18	13	111	60	66	232	64	95	0.2	34	71	115	132	56	4.2	<b>1090</b>
South Mission Beach AL *	146	43	74	70	97	211	32	43	0	38	56	120	144	59	8	<b>1143</b>
Euramo AL *	83	35	30	90	164	162	45	52	0	29	21	108	265	131	35	<b>1252</b>
Upper Murray AL *	81	4	7	58	63	81	17	78	16	38	8	25	268	73	30	<b>905</b>
Upper Murray TM *	55	24	7	51	61	76	15	74	15	37	7	24	254	70	29	<b>855</b>
Bilyana AL *	99	2	15	82	94	98	22	63	12	22	10	44	288	105	15	<b>984</b>
Murray Flats AL *	82	5	22	93	194	130	31	51	1	25	26	69	259	84	46	<b>1134</b>
Cardwell SYN	76	3	37	100	83	126	15	41	21	114	8.6	41	185	128	11	<b>992.8</b>
<b>Numerical Average</b>	<b>59</b>	<b>12</b>	<b>27</b>	<b>72</b>	<b>120</b>	<b>126</b>	<b>36</b>	<b>98</b>	<b>8</b>	<b>43</b>	<b>39</b>	<b>96</b>	<b>243</b>	<b>96</b>	<b>28</b>	<b>1091</b>
<b>Maximum</b>	<b>146</b>	<b>43</b>	<b>111</b>	<b>128</b>	<b>212</b>	<b>232</b>	<b>64</b>	<b>245</b>	<b>21</b>	<b>114</b>	<b>98</b>	<b>199</b>	<b>374</b>	<b>252</b>	<b>62</b>	<b>1840</b>

### 3.5 Peak Heights

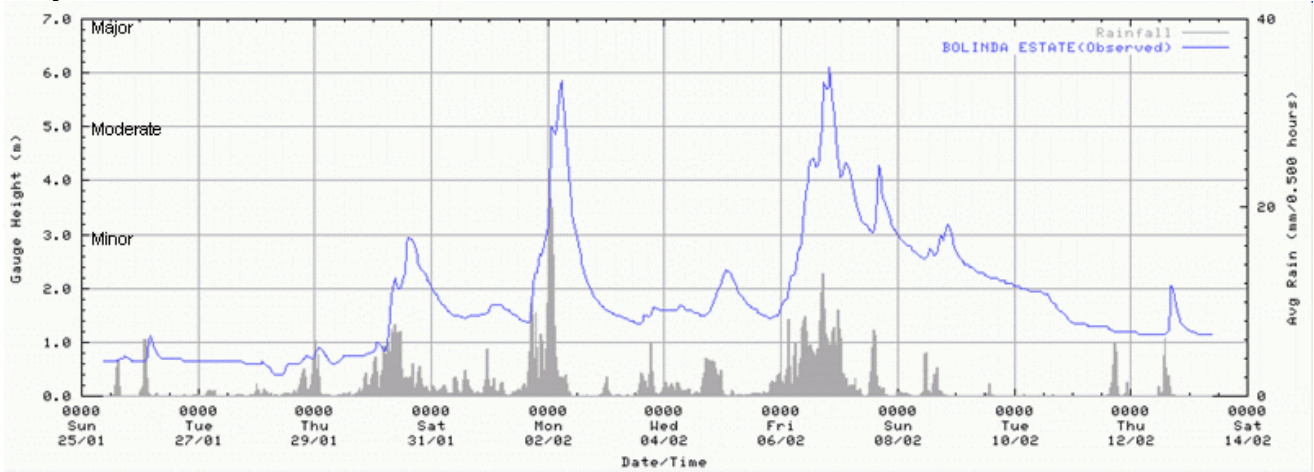
Table 3.5.1 Peak flood heights between 28/01/2009 and 13/02/2009.

Station no.	Station name	Date	Height (metres)	Flood class
531057	BOLINDA ESTATE ALERT	02/02/2009 05:00	5.85	Moderate
531057	BOLINDA ESTATE ALERT	06/02/2009 19:55	6.10	Moderate
532059	EURAMO ALERT	31/01/2009 09:00	8.59	Moderate
532059	EURAMO ALERT	03/02/2009 01:00	8.59	Moderate
<b>532059</b>	<b>EURAMO ALERT</b>	<b>07/02/2009 22:20</b>	<b>9.04</b>	<b>Major</b>
532061	UPPER MURRAY ALERT	30/01/2009 19:20	6.92	Minor
532061	UPPER MURRAY ALERT	02/02/2009 05:00	7.04	Minor
532061	UPPER MURRAY ALERT	03/02/2009 00:40	6.37	Minor
532061	UPPER MURRAY ALERT	03/02/2009 21:10	6.88	Minor
<b>532061</b>	<b>UPPER MURRAY ALERT</b>	<b>07/02/2009 04:50</b>	<b>9.57</b>	<b>Major</b>
532061	UPPER MURRAY ALERT	07/02/2009 19:45	8.72	Moderate
532060	MURRAY FLATS ALERT	31/01/2009 16:50	7.76	Moderate
532060	MURRAY FLATS ALERT	03/02/2009 11:50	7.91	Moderate
<b>532060</b>	<b>MURRAY FLATS ALERT</b>	<b>07/02/2009 17:00</b>	<b>8.71</b>	<b>Major</b>

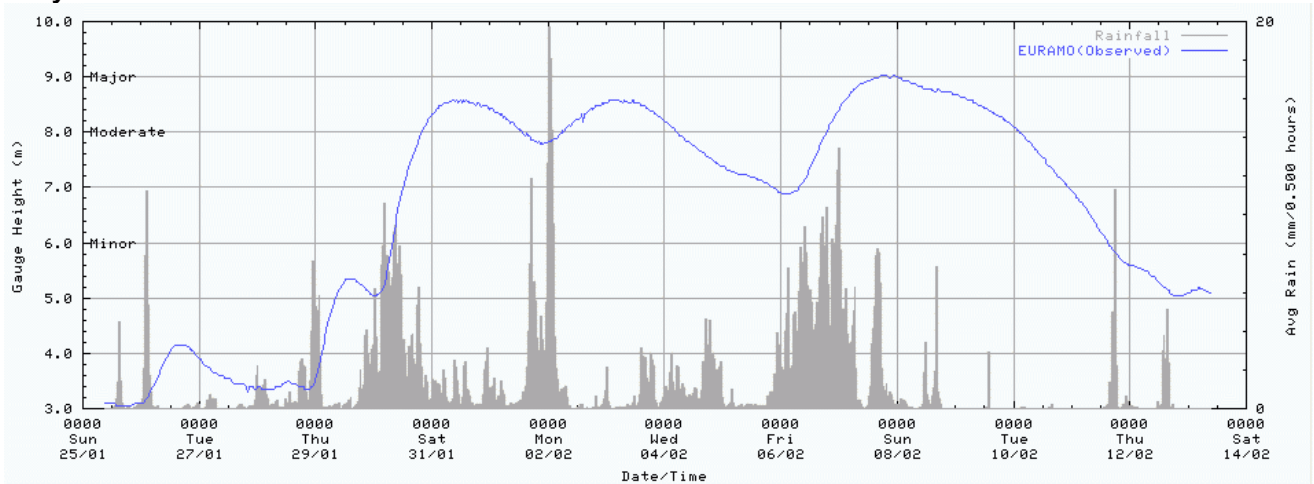
### 3.6 Flood Hydrographs for the Tully and Murray River

Figure 3.6.1 Flood hydrographs for the Tully River

#### Tully River at Bolinda Estate

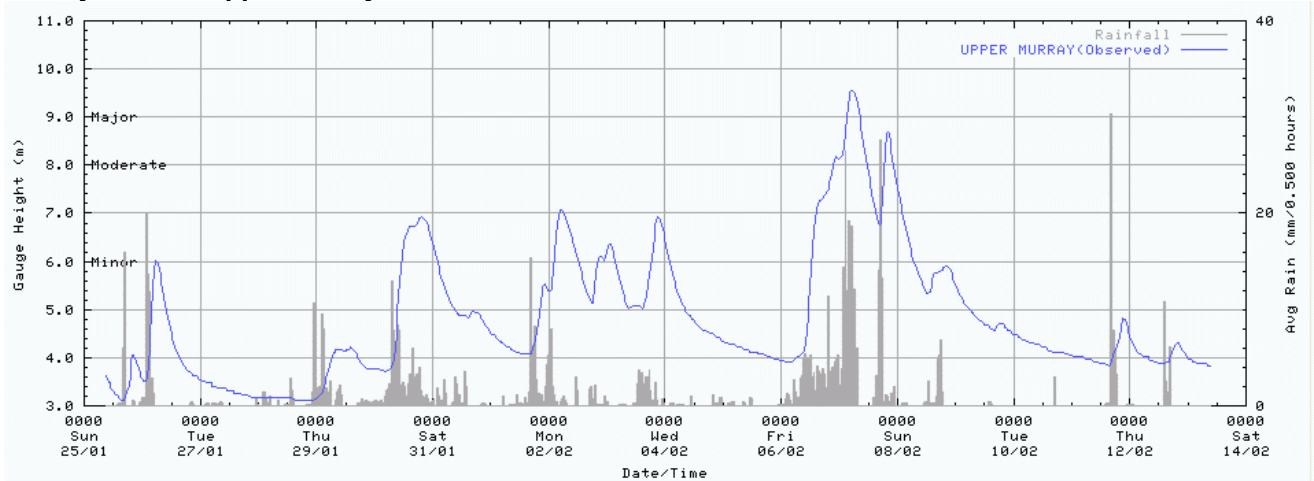


#### Tully River at Euramo

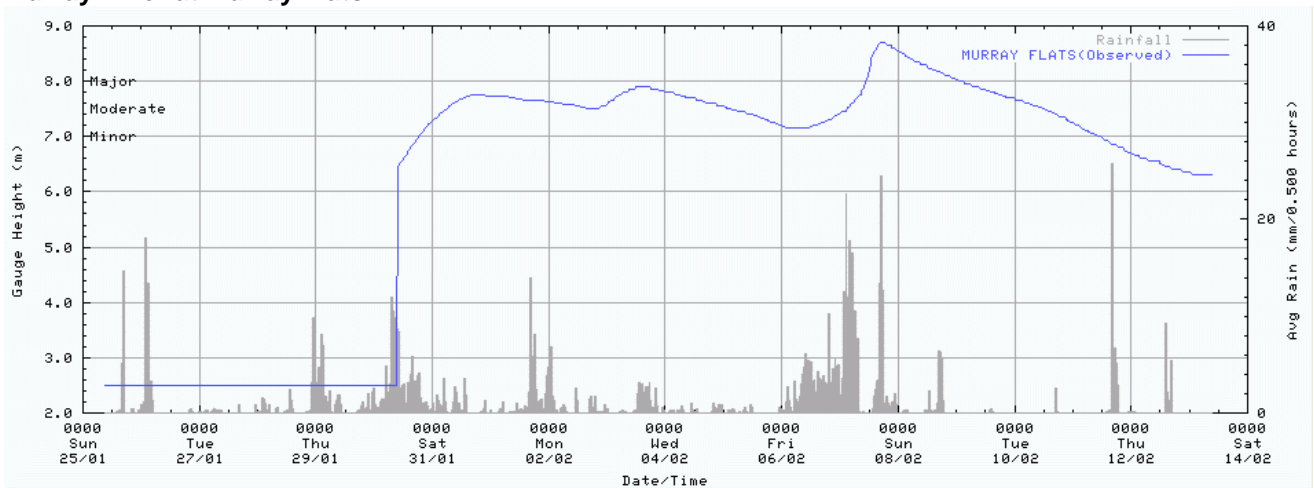


**Figure 3.6.2 Flood hydrographs for the Murray River**

**Murray River at Upper Murray**



**Murray River at Murray Flats**



### 3.7 Warning Services for the Tully and Murray River

**Table 3.7.1 Flood warnings and predictions issued between 30/01/2009 and 11/02/2009.**

Number of Warnings	Number of Major Warnings	Number of Predictions	Number of Locations	First Warning	Last Warning
41	8	20 (13 Euramo, 7 Murray Flats)	2	6:38am Fri 30/01/2009	7:18am Wed 11/02/2009

**Table 3.7.2 River height predictions issued.**

Location	Warning issue time	Prediction		Actual	
		Height	Time	Height (m)	Time
Euramo	10:58am 30/01/09	reach 8m	afternoon 30/01/09	7.44	3pm 30/01/09
	8:08pm 30/01/09	exceed 8.5m	3am 31/01/09	8.49	3:30am 31/01/09
	6:04am 31/01/09	peak 8.6m	midday 31/01/09	8.59 (Peak)	9am 31/01/09
	10:37am 02/02/09	reach 8.7m	9pm 02/02/09	8.49	9:30pm 02/02/09
	5:18pm 02/02/09	peak 8.5m	9pm 02/02/09	8.59 (Peak)	2am 03/02/09
	11:17am 06/02/09	exceed 8.0m	late 06/02/09	8.04	7pm 06/02/09
	3:43pm 06/02/09	reach 8.7m	midday 07/02/09	8.94	12:30pm 07/02/09
	11:47pm 06/02/09	exceed 8.7m	morning 07/02/09	8.74	5:30am 07/02/09
	5:43am 07/02/09	reach 9m	midnight 07/02/09	8.99	midnight 07/02/09
Murray Flats	10:50am 07/02/09	reach 8.5m	early 08/02/09	8.46	3am 08/02/09
	4:02 pm 07/02/09	at 8.66m nearing peak		8.71 (Peak)	5pm 07/02/09

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