Australian Government
Bureau of Meteorology

Water Information
DATA › INFORMATION › INSIGHT

Sunshine Coast and Mary River Floods

April 2009

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1. The flood hits Country Life Pub at Kin Kin. Photo-Kupa Ngaira
2. Kin Kin Road at Pomona is under a metre of water thanks to Six Mile Creek bursting its banks. Picture Megan Slade
3. Damaged road in Kin Kin.
4. Flood-waters raged through Kin Kin.
5. The flood hit Kin Kin with enough force to roll a log truck. Photo-Jason Dougherty
6. The Mary River floods across the Kidd Bridge at Gympie where the river height was 11m and was expected to peak at 14m. Picture-Ian Dickenson.

Photos from the Courier Mail newspaper website and The Daily newspaper website.

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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1. Introduction

Two major weather events over southeast Queensland in the first two weeks of April 2009 produced heavy rain and thunderstorms causing rapid stream rises and local flooding in the Sunshine Coast region.

Very heavy rainfall was recorded on 02/04/09 in the Kin Kin and Cooran areas. In the 24 hours to 9am on the 03/04/09 Black Pinch Road Alert had over 400 mm of rainfall with other stations in the area recording well over 200 mm. Other areas of the Sunshine Coast recorded rainfalls of over 100 mm in the same period. This heavy rainfall caused river rises throughout the Sunshine Coast streams however most notably in Six Mile Creek.

As reported by the State Disaster Management Group "…SES volunteers were activated across the North Coast region to undertake temporary roof repairs and sandbagging jobs, with major flash flooding affecting areas between Eumundi and Cooran. In the 24 hours to 6am on the 04/04/09 the SES 132 500 number received 547 calls across Queensland. Of these calls, 139 were from the Noosa area, 76 from Maroochydore, 72 from the Gold Coast and 51 from Brisbane region."

About two weeks later further heavy rainfall was recorded during the 24 hours to 9am on the 14/04/09 in a widespread area stretching from the Mount Kanigan area southwards to Caboolture. At Mount Wolvi (just south of Mount Kanigan) 262mm was recorded in the 24 hours to 9am on the 14/04/09. A catchment average of 170mm was recorded in the Maroochy River with the Mooloolah River receiving around 130mm. Further south in the Pine and Caboolture catchments an average of 175mm was recorded. This rainfall brought widespread river rises throughout the three catchments causing moderate flooding in most areas.

This report provides a summary and analysis of the meteorology and hydrology of the Sunshine Coast and Mary River Floods of April 2009. A Flood Warning Network Map for the Pine and Caboolture Rivers, Flood Warning Network Map for the Mooloolah and Maroochy Rivers, Flood Warning Network Map for the Noosa River, Flood Warning Network Map for the Mary River shows the location of flood warning stations referred to in this report.

2. Meteorological Summary

Two major weather events over southeast Queensland in the first two weeks of April 2009 produced heavy rain and thunderstorms causing rapid stream rises and local flooding in the Sunshine Coast region.

A trough adjacent to the Queensland coast, which was the system responsible for the Coffs Harbour flooding over New South Wales on the 31st of March, produced widespread rain and thunderstorms over the southeast corner of Queensland during the 2nd and 3rd of April. This rainfall caused rapid local stream rises and flash flooding in the Sunshine Coast region between Cooran and Eumundi and parts of the Maroochy and Mooloola Rivers.

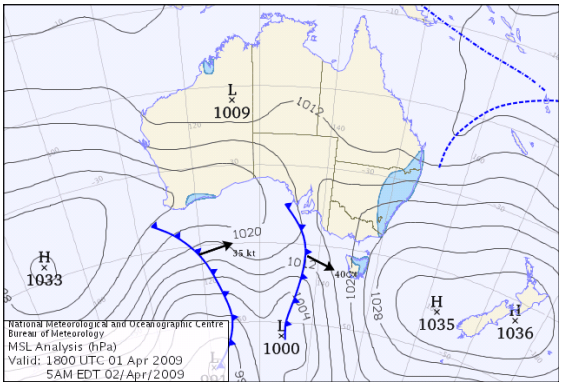
On Monday 13th of April a mean sea level trough lay over the Capricornia coast down to the southeast Queensland coast. An upper level trough, with an axis centred over the Capricornia coast to south west Queensland, aided deepening of the trough and the development of a low pressure system on the Sunshine Coast overnight on the 13th April. This combined trough and low pressure system produced areas of heavy rain and isolated thunderstorms, causing rapid local stream rises and flash flooding in the Mary River tributaries. Flooding once again occurred in Six Mile Creek, less than two weeks after flooding earlier in the month.

This chapter presents a discussion and analysis of the meteorological conditions that led to the above mentioned flooding.

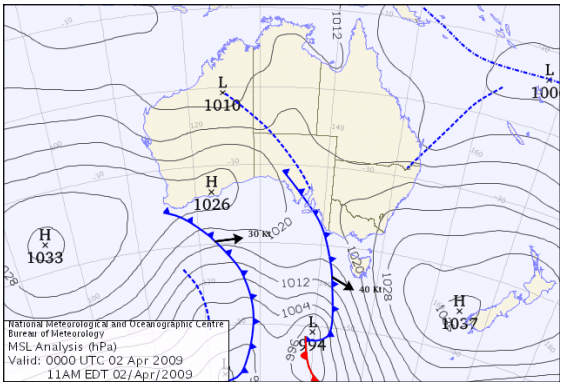
2.1 Meteorological Analysis

Early on the 2nd of April a mean sea level trough lay off the south Queensland coast as shown in the 6am mean sea level pressure analysis in Figure 2.1.1a. A large area of showers and thunderstorms developed along this trough system as was evident in imagery from Mt Stapylton radar. See Figure 2.1.2a. The trough tracked slowly westward to cross the coast by 10am on the morning of the 2nd of April. The rain and thunderstorms also tracked westward with the movement of the trough as is evident from the radar image at 10am on the 2nd of April, as shown in Figure 2.1.2b.

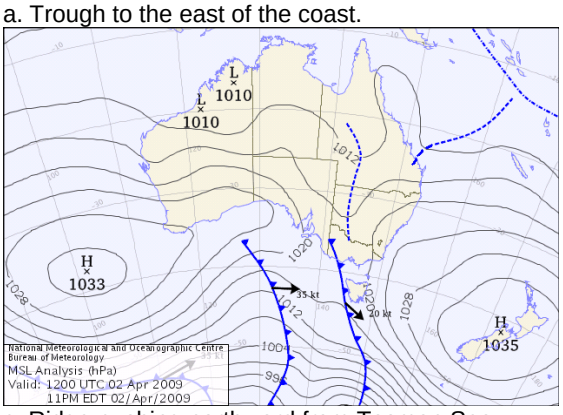
Figure 2.1.1 Mean Sea Level Pressure Charts from 02/04/2009 to 03/04/2009.



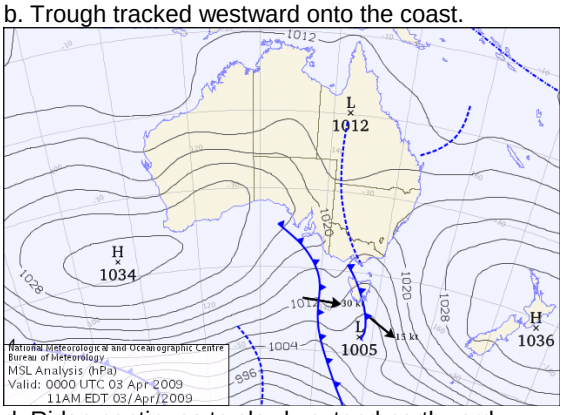
a. Trough to the east of the coast.



b. Trough tracked westward onto the coast.

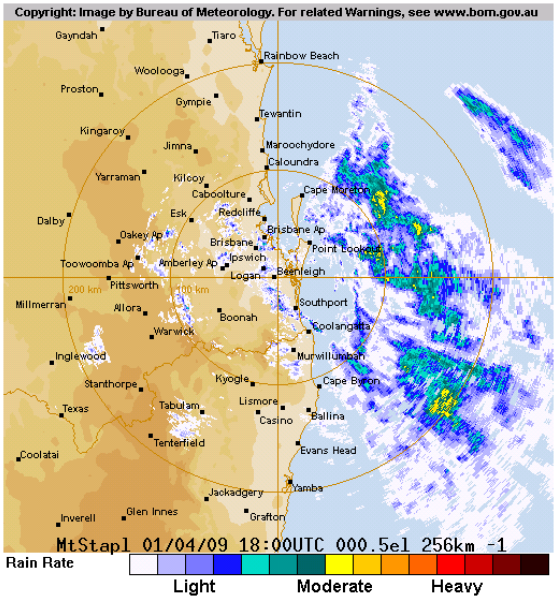


c. Ridge pushing northward from Tasman Sea.

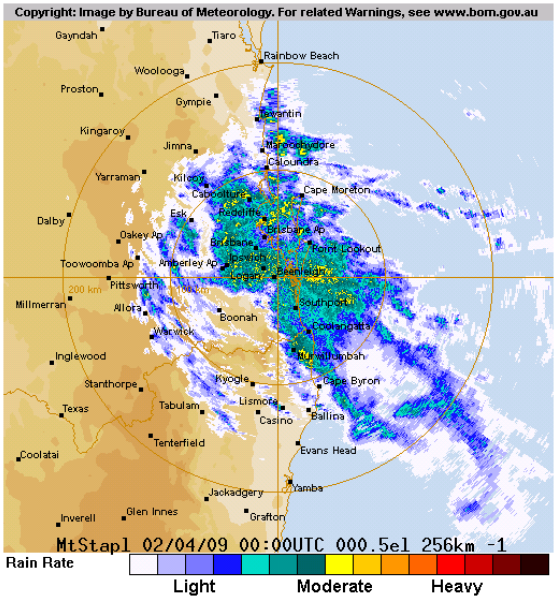


d. Ridge continues to slowly extend northward.

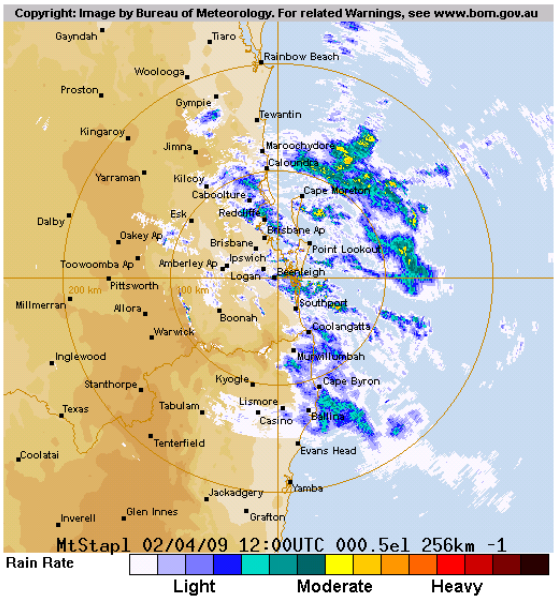
Figure 2.1.2 Imagery from Mt Stapylton radar on the 02/04/2009 and 03/04/2009.



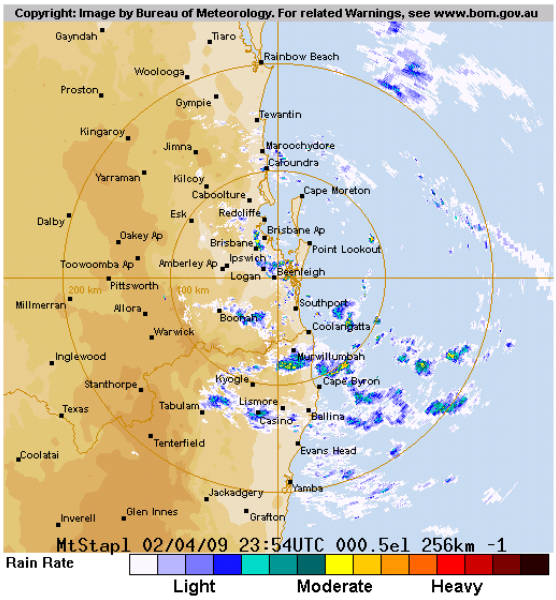
a. 6am on the 02/04/2009.



b. 10am on the 02/04/2009.



c. 10pm on the 02/04/2009.

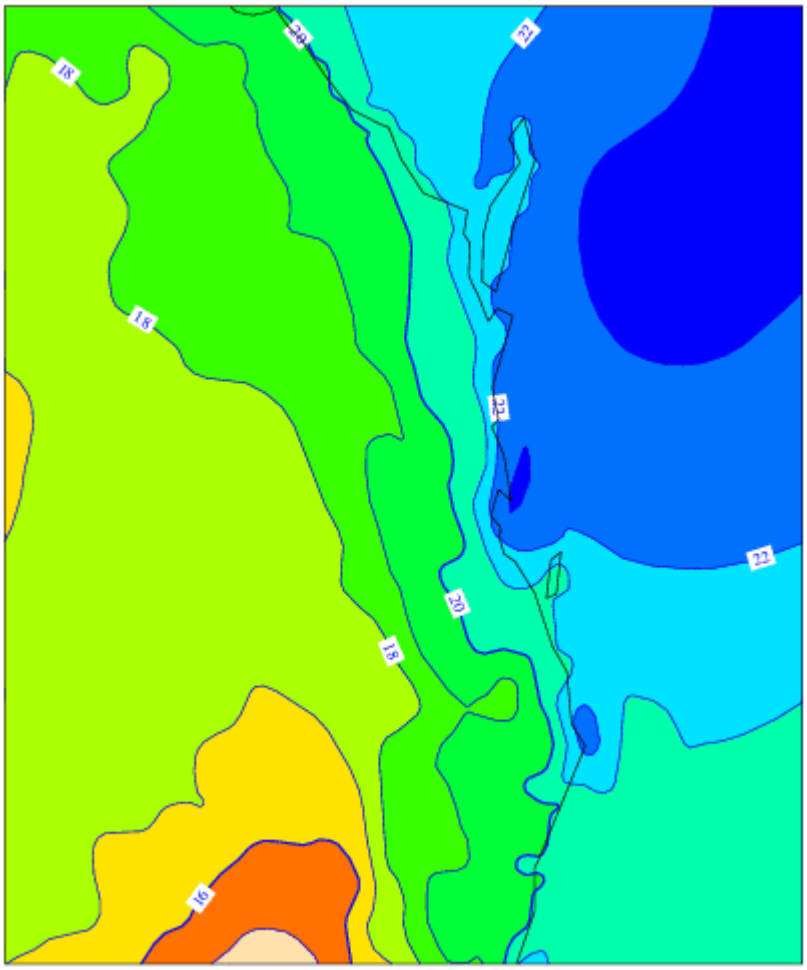


d. 10am on the 03/04/2009.

The onshore easterly airstream brought moisture laden air on to the coast as is evident in the dewpoint temperatures recorded in the region, shown in the analysis in Figure 2.1.3.

Figure 2.1.3 Dewpoint analysis at 10am on the 02/04/2009.

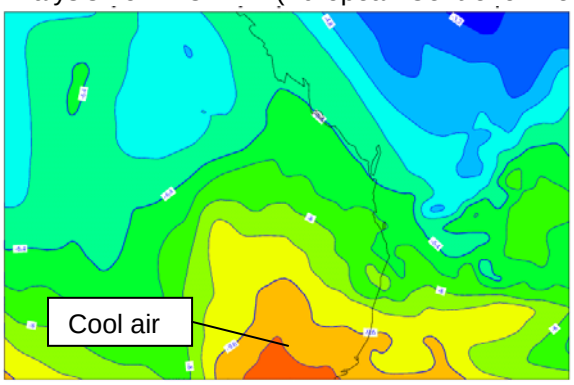
Analysis from Meso-LAPS (Mesoscale Limited Area Prediction System).



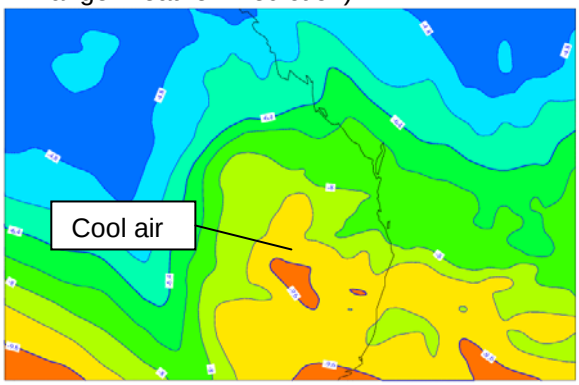
In the middle levels, at around 5500 metres above the surface, an area of cold air moved over the region during the 2nd and 3rd of April, as shown in Figure 2.1.4, assisting to increase instability over southeast Queensland.

Figure 2.1.4 Middle level temperatures on the 02/04/2009 and 03/04/2009.

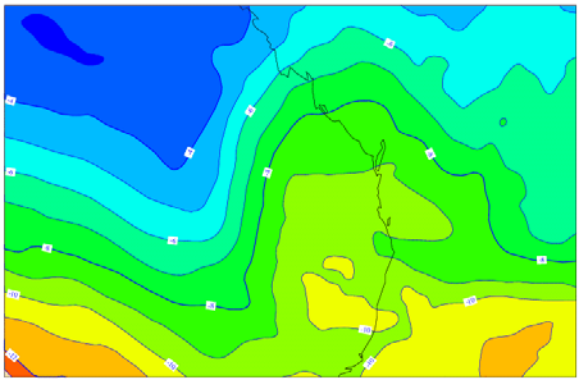
Analysis from ECMWF (European Centre for Medium Range Weather Prediction).



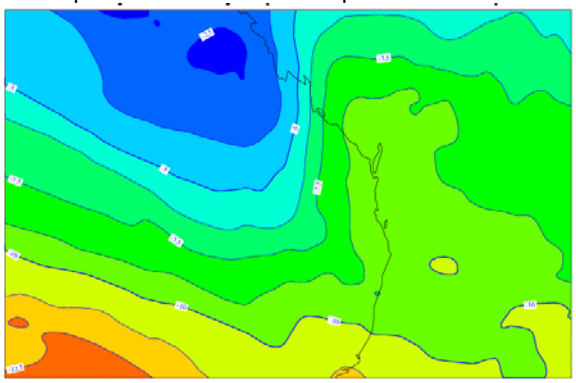
a. Temperatures at 5500m at 10am on 02/04/2009.



b. Temperatures at 5500m at 10pm on 02/04/2009.



c. Temperatures at 5500m at 10am on 03/04/2009.

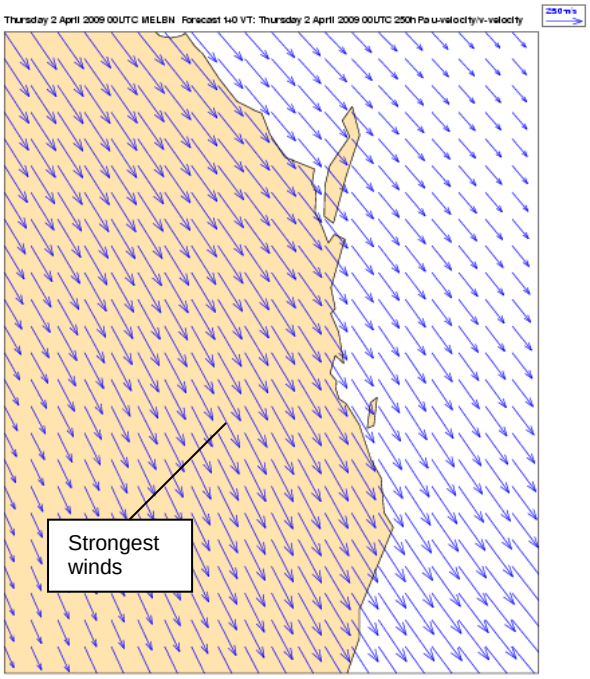


d. Temperatures at 5500m at 10pm on 03/04/2009.

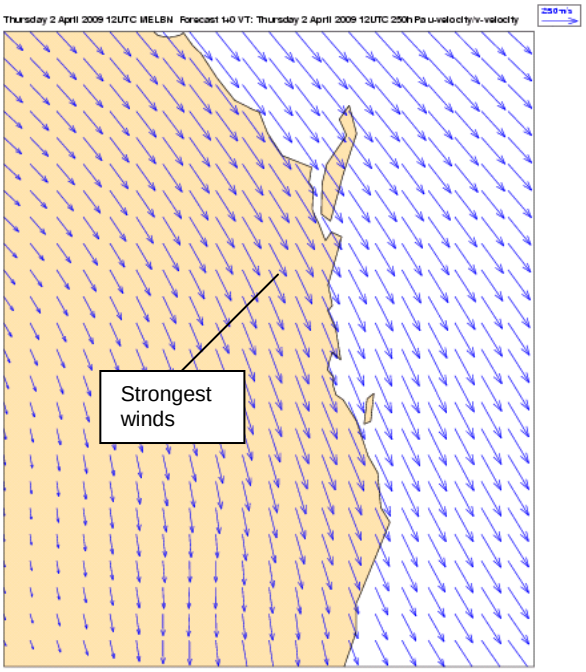
In the Upper Levels at around 10,500 metres (250 hectopascals), an area of strong winds (jetstream) passed over the region during the 2nd of April. This is evident in the 250 hectopascal wind analysis as shown in Figure 2.1.5a and 2.1.5b, where the length of the arrow indicates the strength of the wind. The key in the top right hand corner of each image represents 25 metre per second winds.

Figure 2.1.5 Upper level winds on the 02/04/2009 and 03/04/2009.

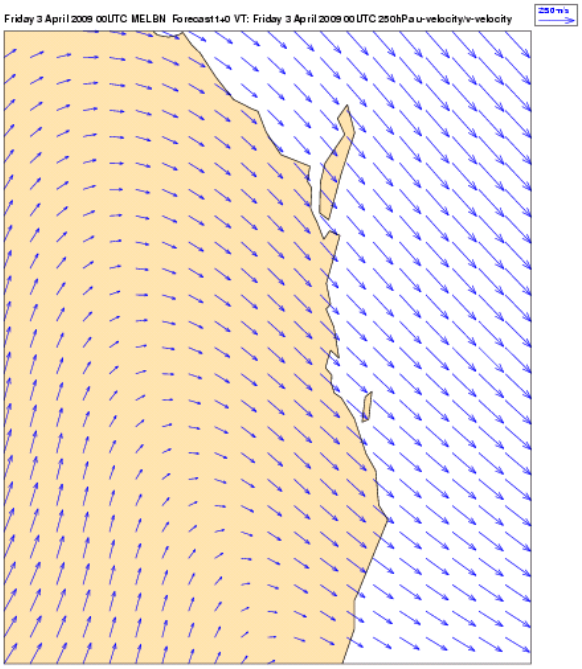
Analysis from Meso-LAPS (Mesoscale Limited Area Prediction System).



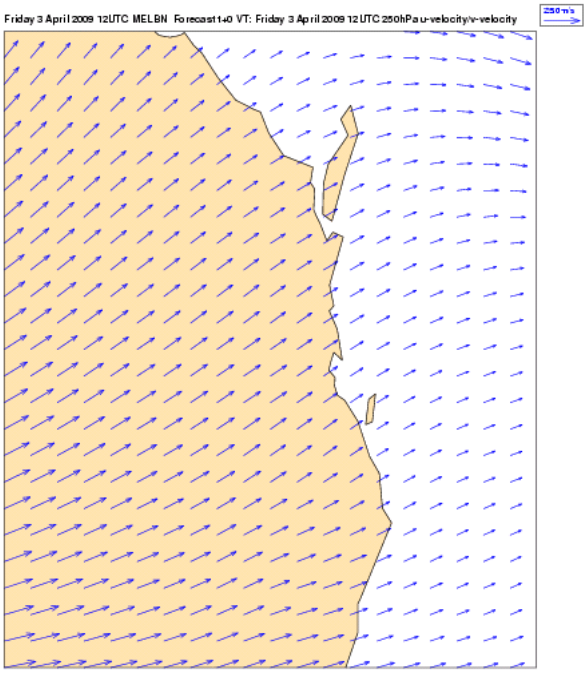
a. Wind at 10,500m at 10am on 02/04/2009.



b. Wind at 10,500m at 10pm on 02/04/2009.



c. Wind at 10,500m at 10am on 03/04/2009.



d. Wind at 10,500m at 10pm on 03/04/2009.

The interaction of this upper level jet with middle level cold air and instability at the surface on the mean sea level trough was sufficient to produce intense rainfall during the 2nd and 3rd of April particularly on the Sunshine Coast. Rainfall totals in the 24-hours to 9am on the 3rd of April are shown in Table 3.4.1. Maps displaying the spatial distribution of rainfall during this period are shown in Figures 3.2.1 and 3.2.2.

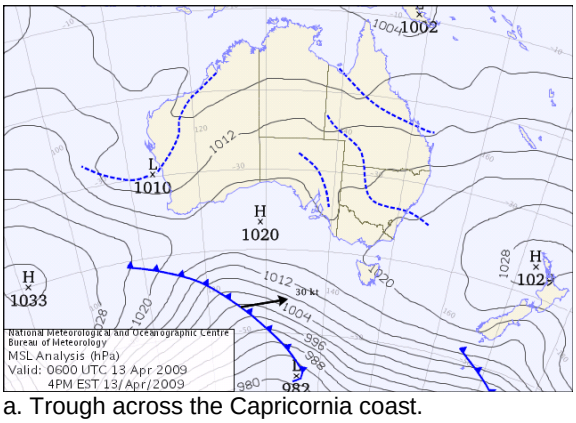
During the 4th of April, the Mean Sea Level ridge slowly extended along the southern Queensland coast and pushed the trough northward. This is evident in Figures 2.1.1c and 2.1.1d.

Although middle level cool air remained over the region during the 4th of April as shown in Figures 2.1.4c and 2.1.4d, the upper level jetstream moved offshore, stabilising conditions at that level. See Figures 2.1.5c and 2.1.5d.

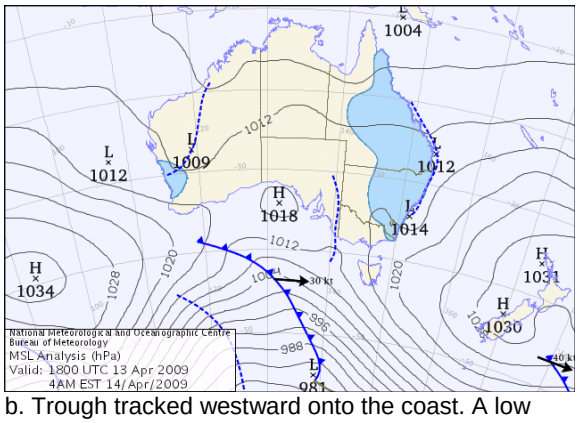
The combination of stable conditions at the surface with the development of the mean sea level ridge and lighter winds in the higher levels weakened the rainband over the region. However, sufficient instability remained and in combination with a moist onshore airstream, showers continued throughout the region for the next one to two days.

By the afternoon of the 13th of April, a mean sea level trough crossed the Capricornia coast and extended southward over waters to the east of southern Queensland, see Figure 2.1.6a. In the upper levels at 5500 metres, a series of troughs lay to the west of the surface system, figure 2.1.8, and cooler air at the same level also moved over the region.

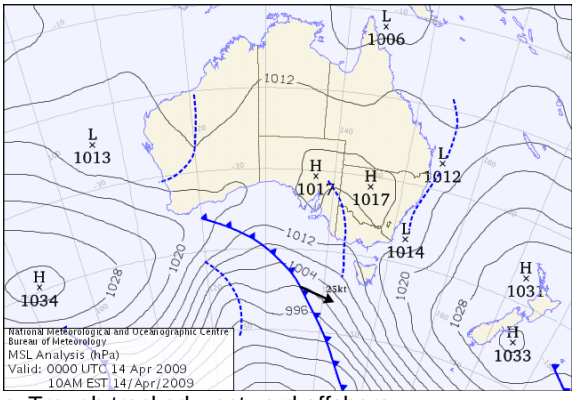
Figure 2.1.6 Mean Sea Level Pressure Charts from 13/04/2009 to 14/04/2009.



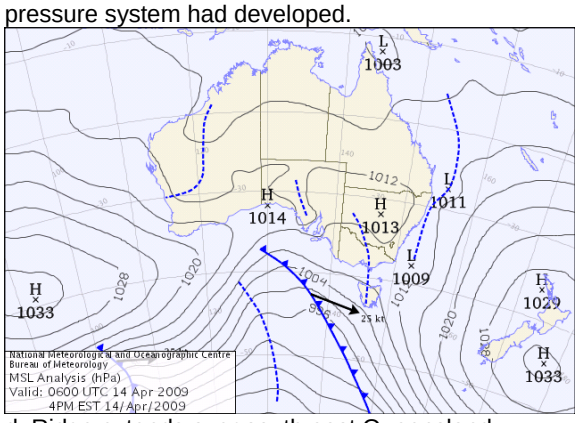
a. Trough across the Capricornia coast.



b. Trough tracked westward onto the coast. A low pressure system had developed.

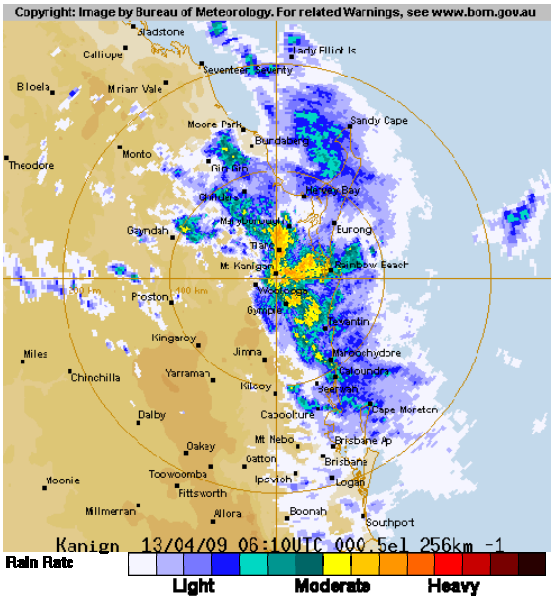


c. Trough tracked westward offshore.

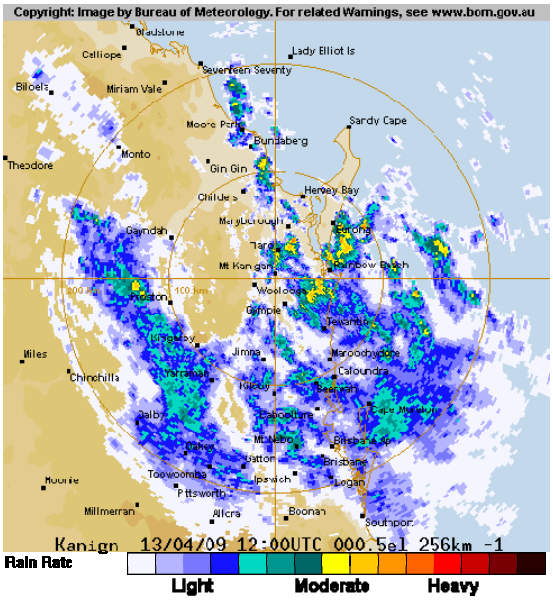


d. Ridge extends over south east Queensland.

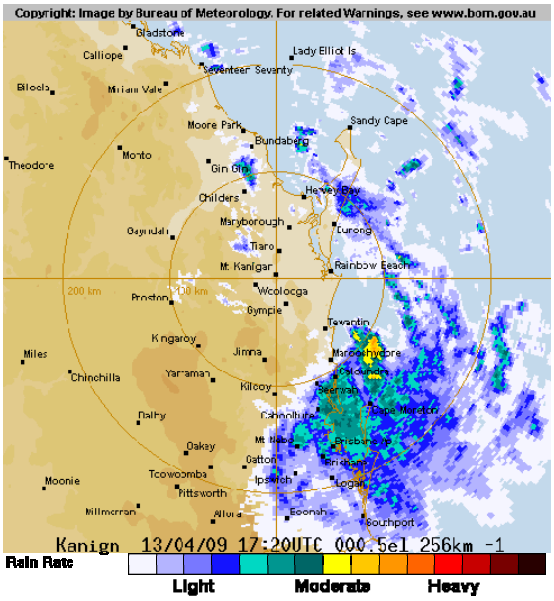
Figure 2.1.7 Imagery from Gympie (Mt Kanigan) radar on the 13/04/2009 to 14/04/2009.



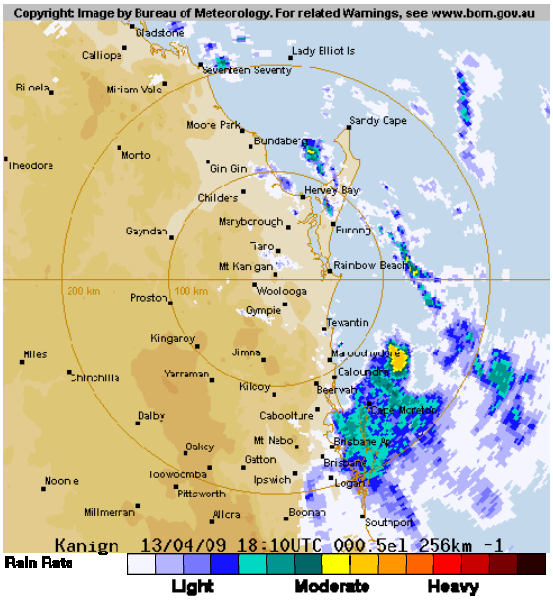
a. 4:10pm on the 13/04/2009.



b. 10:00pm on the 13/04/2009.

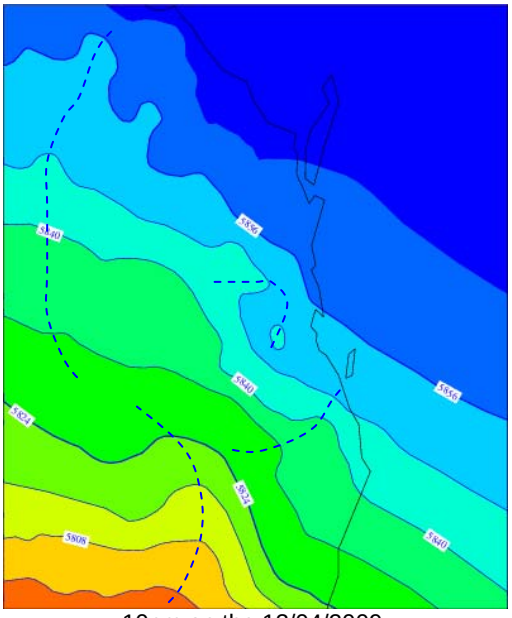


c. 3:20am on the 14/04/2009.

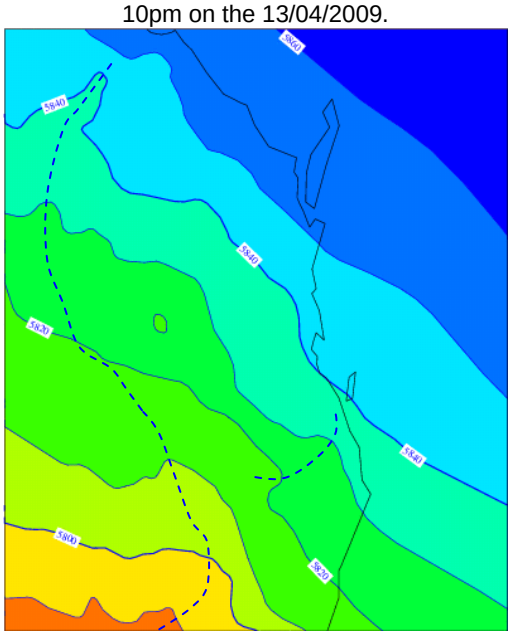


d. 6:10am on the 14/04/2009.

Figure 2.1.8 Middle level Geopotential Heights on the 13/04/2009 and 14/04/2009.
Analysis from Meso-LAPS (Mesoscale Limited Area Prediction System). Trough marked by dashed blue lines.



10pm on the 13/04/2009.



10am on the 14/04/2009

An analysis of the wind profile up to 5500 metres at 10am on the 13th of April, see Figure 2.1.9, indicates winds turning anti-clockwise with height. Such a profile is associated with large-scale ascent of air and studies by Bonell, Callaghan and Connor (2005) reveal that this is a typical wind structure that will produce intense rainfall over Queensland. Typically, where winds were onshore at low levels and turned anti-clockwise through 90 degrees or less between 1500 metres and 5500 metres, the most intense rainfalls are recorded. This was the case over southeast Queensland on the 13th of April, where low level winds were onshore. As a result heavy rainfall developed, as can be seen from radar imagery at 4.10pm on the 13th of April, Figure 2.1.7a.

Figure 2.1.9 Wind vectors between 3000m - 5500m at 10am on the 13/04/2009.
Analysis from ECMWF (European Centre for Medium Range Weather Forecasts).

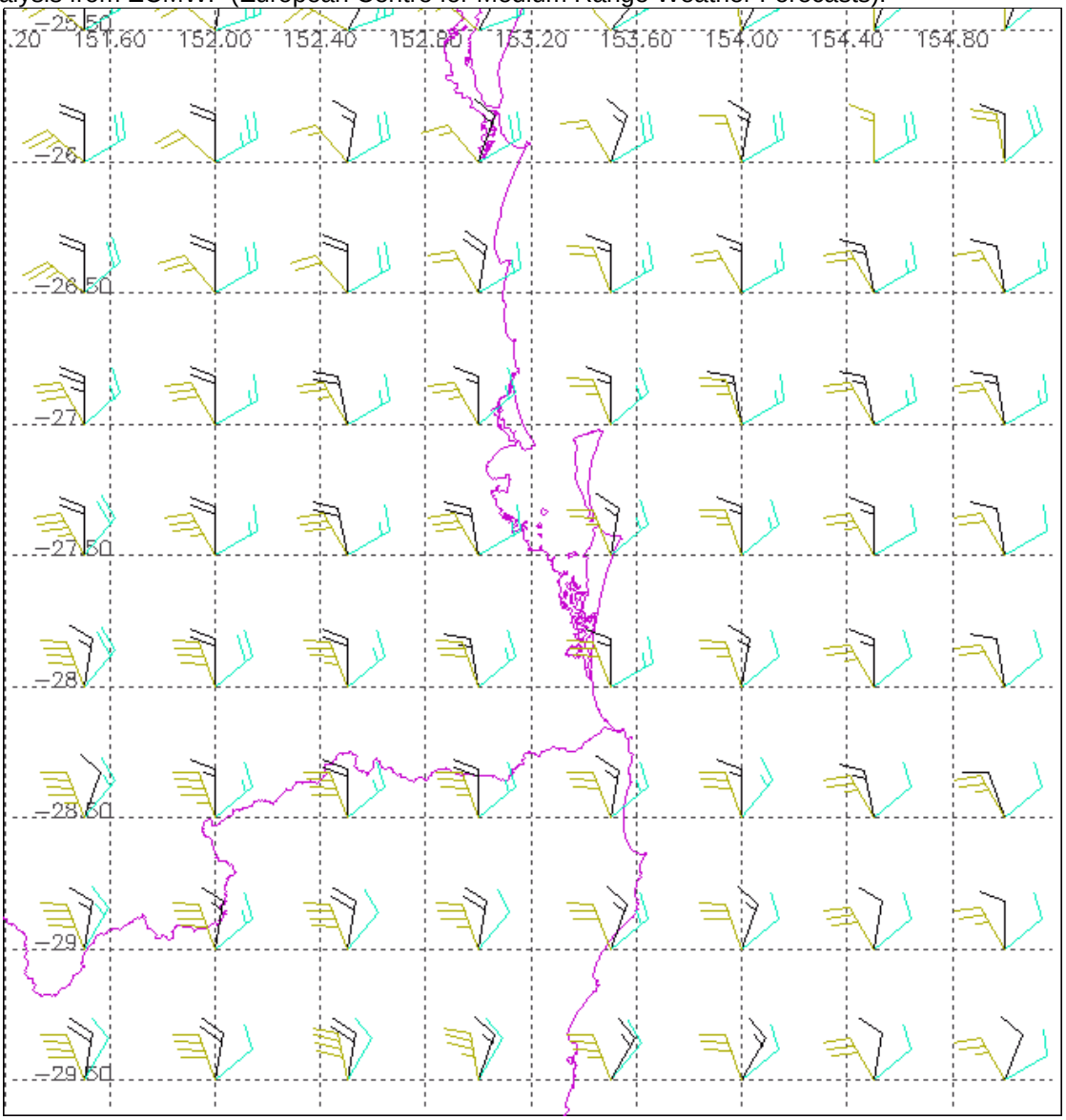
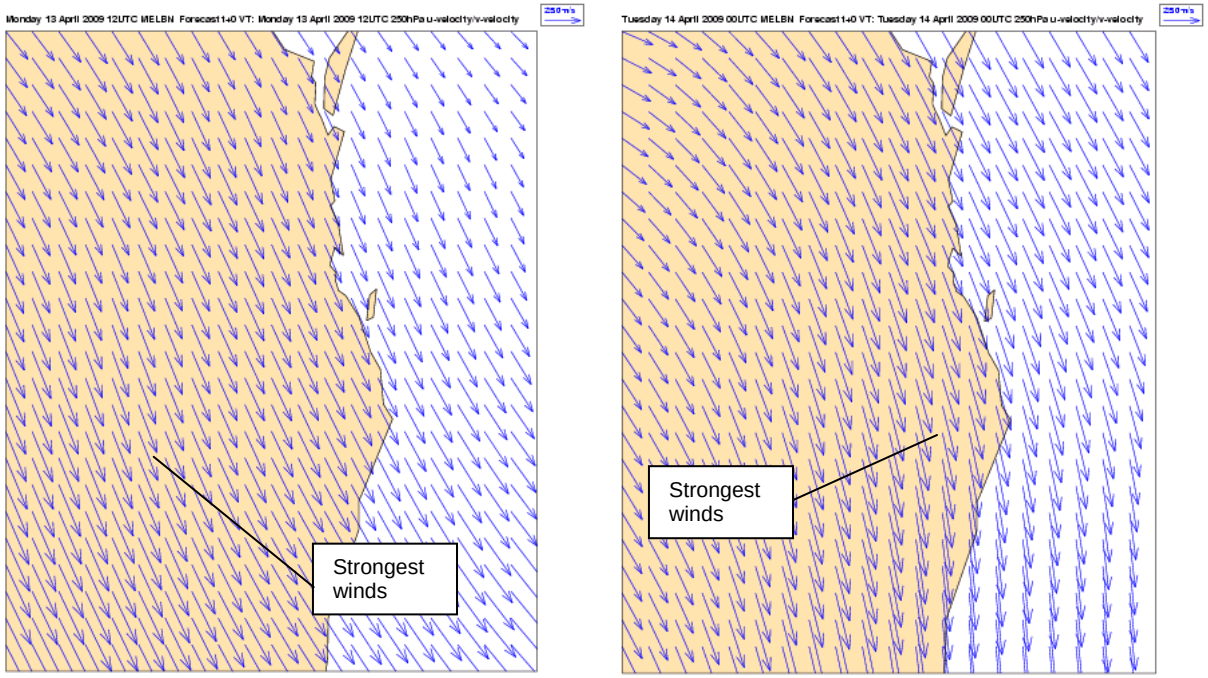


Figure 2.1.10 Upper level winds on the 13/04/2009 and 14/04/2009.
Analysis from Meso-LAPS (Mesoscale Limited Area Predicition System).



a. Wind at 10,500m at 10pm on 13/04/2009.

b. Wind at 10,500m at 10am on 14/04/2009.

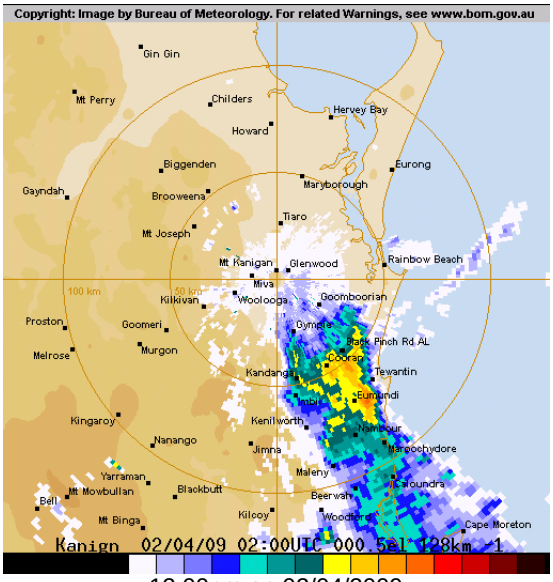
Strong winds in the upper levels at 10pm on the 13th April, figure 2.1.10a, and a trough in the middle levels, figure 2.1.8, provided sufficient instability about the surface trough to cause it to deepen and form a low near the Sunshine Coast overnight on the 13th April. The position of the low at 4am on the 14th of April is shown in figure 2.1.6b. The deepening of the low caused the instability to shift to the south of the system, consequently, rain and thunderstorms moved southward down the coast clearing the south Queensland coast by 6am on the 14th of April. This is evident in radar imagery at 6.10am on the 14th of April as shown in Figure 2.1.7d. Although conditions remained unstable in the upper levels during the 14th of April, the lower levels became more stable as the surface trough cleared to the east and ridging developed over the region. Consequently, the warm air advection over southeast Queensland decayed reducing precipitation to only isolated showers.

Rainfall totals in the 24-hours to 9am on the 13th and 14th of April are shown in Table 3.4.2. Maps displaying the spatial distribution of rainfall during this period are shown in Figures 3.2.3 to 3.2.6.

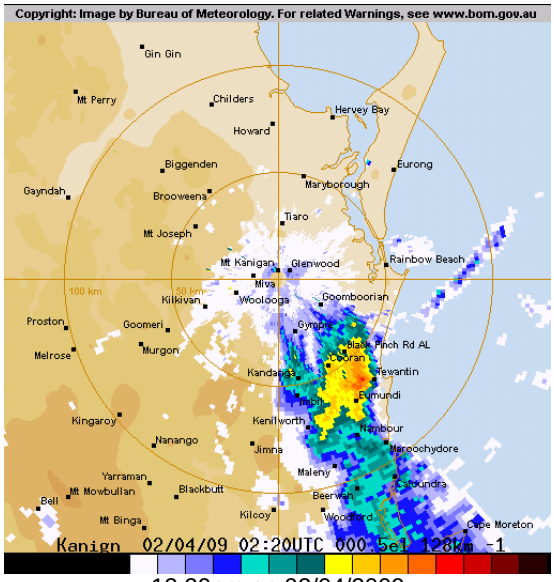
2.2 Radar Imagery Analysis

Imagery from the Mt Kanigan radar during the most intense period of rainfall on the 2nd of April is shown in Figure 2.1.4. Between 12 midday and 2pm, Black Pinch Road Alert received 258mm of rain (464mm in the 24 hours to 9am on the 3rd April). Radar imagery during this period, figure 2.2.1, shows a broad area of heavy rain with embedded thunderstorms. These storms remained near stationary over the region and persisted for more than two hours.

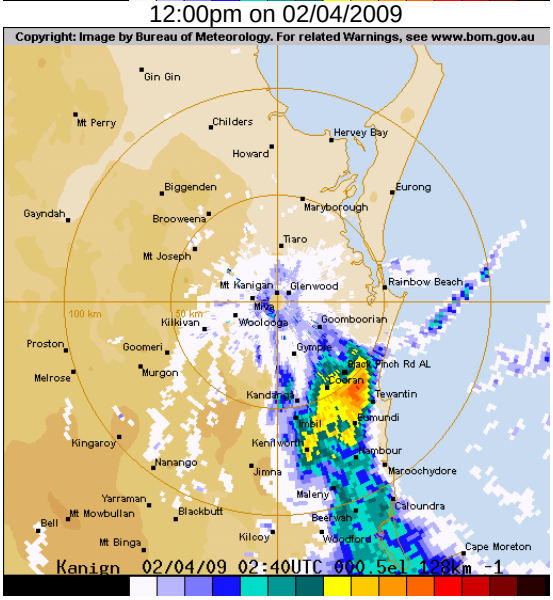
Figure 2.2.1 Radar Imagery from Mt Kanigan on 02/04/2009.



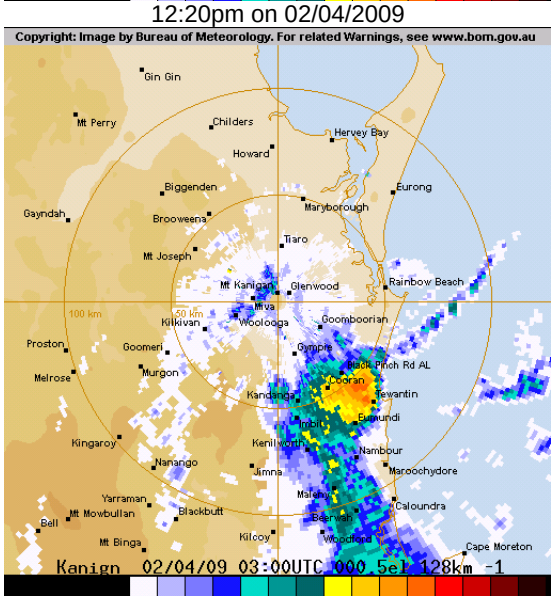
12:00pm on 02/04/2009



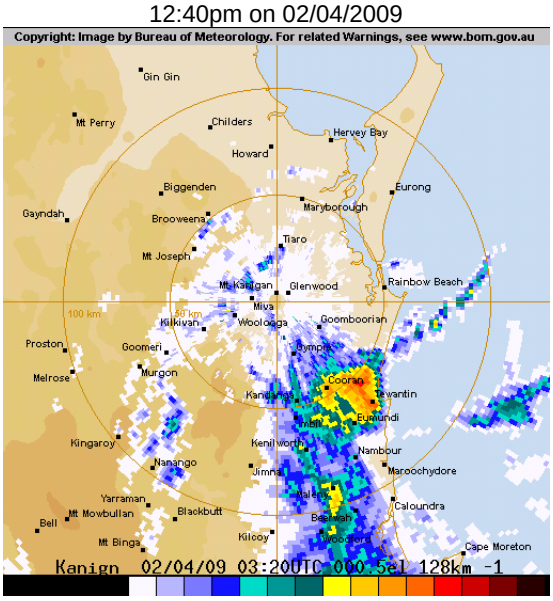
12:20pm on 02/04/2009

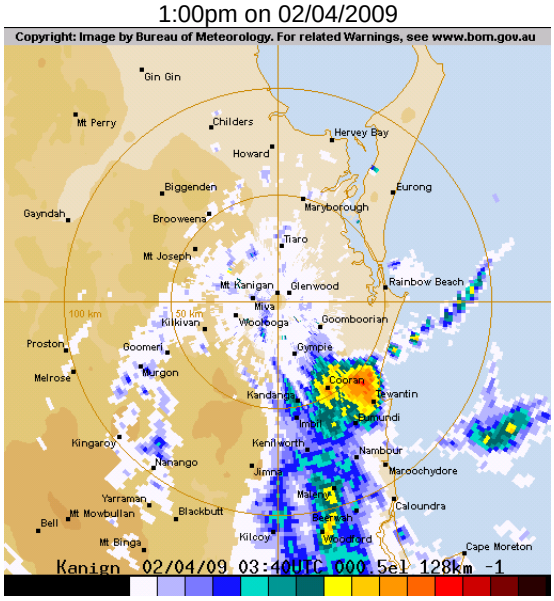


12:40pm on 02/04/2009



1:00pm on 02/04/2009



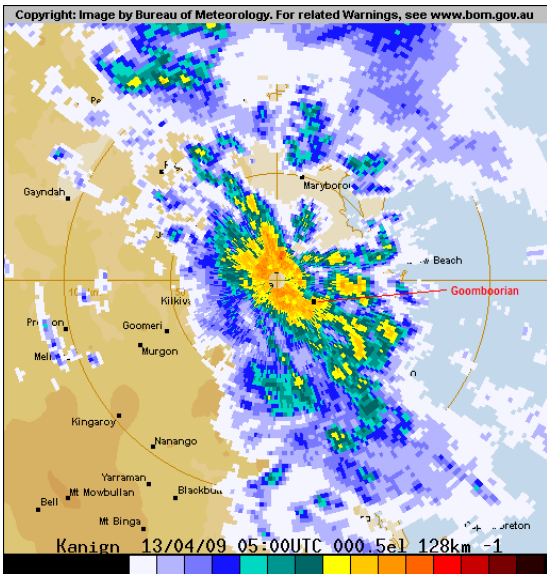


1:20pm on 02/04/2009 1:40pm on 02/04/2009

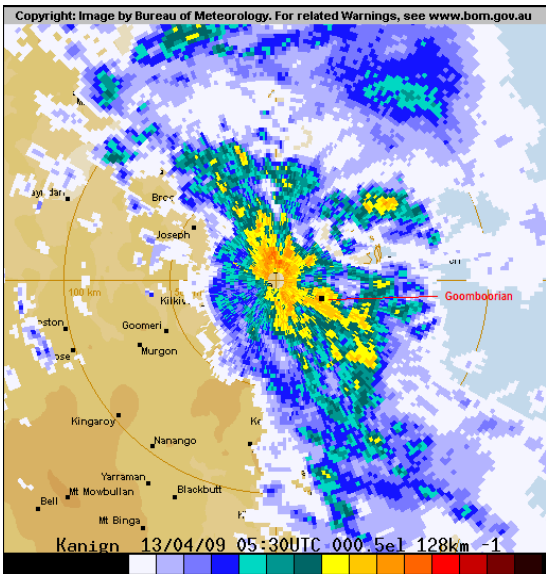
The thunderstorm cells moved slowly northeast producing 124mm of rainfall at Boreen Point Alert between 2:00pm and 4:00pm before gradually weakening.

The heaviest rainfall in the 24-hours to 9am on the 14th of April was recorded along Tinana Creek between Teddington Weir and Mount Wolvi. Although Goomboorian did not record the highest 24-hour rainfall total, it did record the most intense rainfall of 171mm in 3 hours, occurring between 3pm and 6pm on the 13th of April. Imagery from the Mount Kanigan radar from 3:00pm to 5:30pm on the 13th of April is shown in Figure 2.2.2 and clearly identifies heavy rain and thunderstorms persisting over Goomboorian (marked by the red arrow) throughout the period. Although the widespread heavy rain drifted southeast, further isolated heavy rain areas developed over the Tinana Creek area during the evening producing hourly rainfall totals above 40mm. The general rainband then cleared southeast by early on the 14th of April.

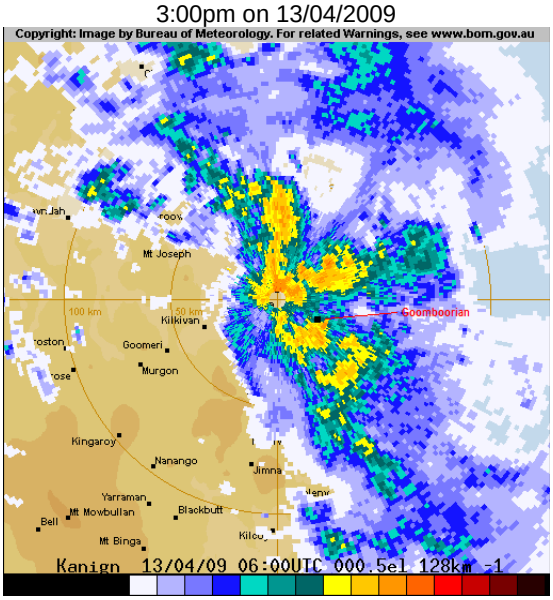
Figure 2.2.2 Radar Imagery from Mt Kanigan on 13/04/2009.



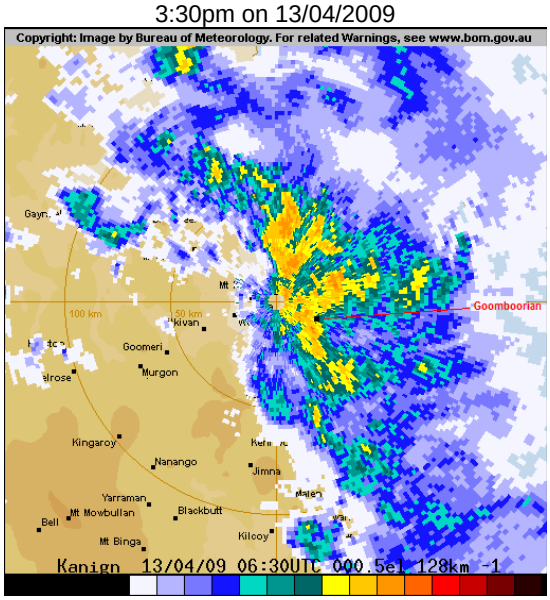
3:00pm on 13/04/2009



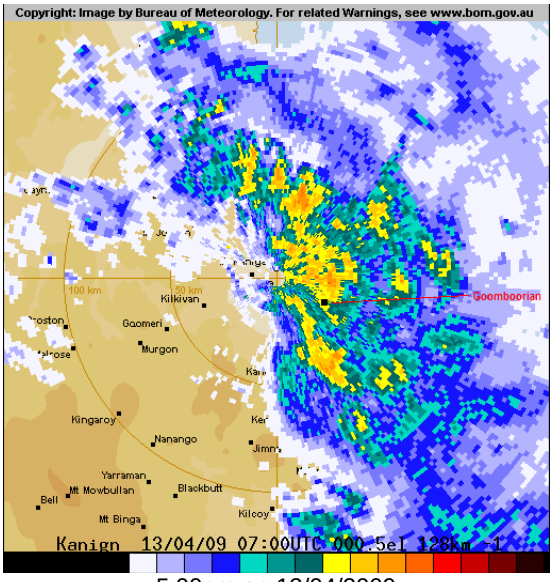
3:30pm on 13/04/2009



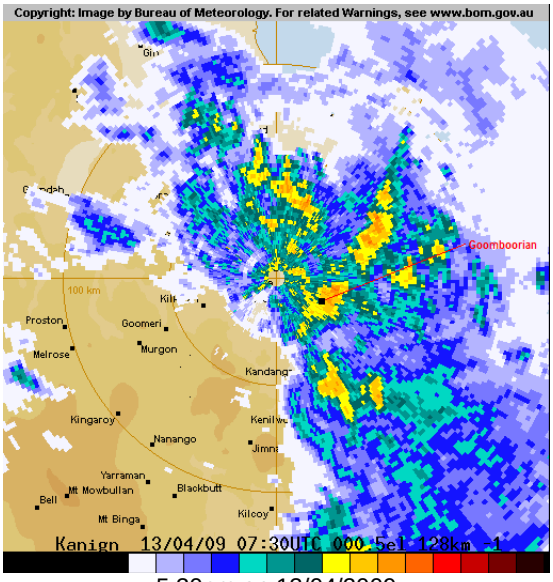
4:00pm on 13/04/2009



4:30pm on 13/04/2009



5:00pm on 13/04/2009



5:30pm on 13/04/2009

3. Hydrology

Heavy rainfall was recorded in the Six Mile Creek and in the north Maroochy River area during the 24 hours to 9am on the 03/04/09. This caused flash flooding and river rises to above major flood level at three river height stations, Lake MacDonald Drive, Eumundi and Mountain Creek. Widespread minor to moderate flooding occurred throughout the rest of the Sunshine Coast, however these levels receded very quickly.

Heavy rainfall was then recorded during the afternoon and evening of the 13/04/2009, in a more widespread area stretching from the Pine and Caboolture Rivers north to the Mary River and Tinana Creek area. Once again flash flooding and river rises occurred causing major flooding at four stations.

The Pine and Caboolture Rivers experienced large flows due to the heavy rainfall. The flooding in the Burpengary Creek and Caboolture River reached moderate flood level with the North Pine Dam receiving large inflows from the rainfalls recorded in the catchment. The intense rainfall recorded in Tinana Creek caused a moderate flooding along the creek from Tagigan Rd to Teddington Weir. The combined flows from the Mary River and Tinnana Creek caused higher then normal tide levels at Maryborough but the river did not reach minor flood level.

3.1 Peak River Heights

The flooding caused by both periods of heavy rainfall in the Burpengary Creek, Caboolture, Mooloolah, Maroochy and Mary Rivers was the most significant in the region since 2008. The peak river heights recorded between the 02/04/09 – 04/04/09 and 13/04/09 – 15/04/09 are shown in Table 3.1.1 and 3.1.2 respectively.

Table 3.1.1 Peak height comparison to records between 02/04/09 and 04/04/09

Gauging station	02/04/09-04/04/09 peak (metres)	Start of record	Ranking	Highest since	Highest on record
Mooloolah River at Jordan St	5.15m	2004	1st	New Record	New Record
Mooloolah River at Palmview	4.64m	2004	1st	New Record	New Record
Mountain Creek at Mountain Creek	3.45m	1996	=3rd	June 2008	3.53m May 1999
North Maroochy River at Eumundi	6.46m	1982	19th	June 2008	7.29m Apr 1989
Yandina Creek at Yandina Creek	5.21m	1996	5th	June 2008	5.61m Aug 2007
Doonan Creek at Doonan Creek	4.30m	1996	2nd	March 1997	4.31m Mar 1997
Petrie Creek at West Woombye	3.60m	2007	1st	New Record	New Record
Paynter Creek at Palmwoods Sportsground	4.65m	2007	1st	New Record	New Record
Paynter Creek at Diddilibah	3.46m	1994	=3rd	June 2008	4.11m Aug 2007
Six Mile Creek at Lake MacDonald Drive	5.60m	2002	3rd	June 2008	5.70m Jun 2008
Six Mile Creek at Cooran	10.07m	1981	9th	August 2007	11.94m Feb 1992
Mary River at Gympie Weir	9.46m	1996	10th	June 2008	22.36m Feb 1999
Mary River at Miva TM	8.06m	1910	40th	June 2008	20.80m Jan 1974
Mary River at Home Park	6.36m	1982	31st	June 2008	20.57m Feb 1992

Table 3.1.2 Peak height comparison to records between 13/04/09 and 15/04/09

Gauging station	13/04/09 to 15/04/09 peak (metres)	Start of record	Ranking	Highest since	Highest on record
Burpengary Creek at Burpengary (Rowley Rd)	20.15m	1972	3rd	February 1999	20.30m Feb 1972
Burpengary Creek at Burpengary (Dale St)	10.19m	1972	5th	February 1999	11.15m Feb 1972
Waraba Creek at Upper Wamuran	29.37m	1972	4th	April 1989	31.61m Feb 1972

Gauging station	13/04/09 to 15/04/09 peak (metres)	Start of record	Ranking	Highest since	Highest on record
Caboolture River at Caboolture	7.79m	1972	4th	April 1989	9.91m Feb 1972
Mooloolah River at Jordan St	5.05m	2004	=2nd	April 2009	5.15m Apr 2009
Mooloolah River at Palmview	4.44m	2004	2nd	April 2009	4.64m Apr 2009
Mountain Creek at Mountain Creek	3.15m	1996	8th	April 2009	3.53m May 1999
North Maroochy River at Eumundi	6.91m	1982	=7th	June 2008	7.29m Apr 1989
Yandina Creek at Yandina Creek	5.51m	1996	=2nd	June 2008	5.61m Aug 2007
Doonan Creek at Doonan Creek	4.45m	1996	1st	New Record	New Record
Petrie Creek at West Woombye	2.60m	2007	3rd	April 2009	3.60m Apr 2009
Caboolture River at Upper Caboolture	10.64m	2003	1st	New Record	New Record
Paynter Creek at Palmwoods Sportsground	4.45m	2007	3rd	April 2009	4.65m Apr 2009
Paynter Creek at Diddilibah	3.40m	1994	7th	April 2009	4.11m Aug 2007
Mary River at Moy Pocket	8.42m	1957	43rd	June 2008	16.80m Feb 1999
Mary River at Dagun Pocket	9.85m	1963	46th	June 2008	18.43 Feb 1999
Six Mile Creek at Lake MacDonald Drive	5.65m	2002	2nd	June 2008	5.70m Jun 2008
Six Mile Creek at Cooran	9.87m	1981	12th	April 2009	11.94m Feb 1992
Mary River at Gympie Weir	12.48m	1996	3rd	August 2007	22.36m Feb 1996
Mary River at Miva	10.85m	1898	84th	August 2007	23.08m Feb 1898
Mary River at Home Park	10.08m	1982	11th	February 1999	20.57m Feb 1992
Mary River at The Barrage	6.32m	1991	5th	February 1999	13.25m Feb 1992
Tinana Creek at Tagigan Road	7.02m	1974	6th	February 1999	8.53m Feb 1992
Tinana Creek at Bauple East	11.31m	1979	5th	August 2007	14.37m Feb 1992

Figure 3.1.1 Peak height map from the 01/04/09 to 08/04/09.

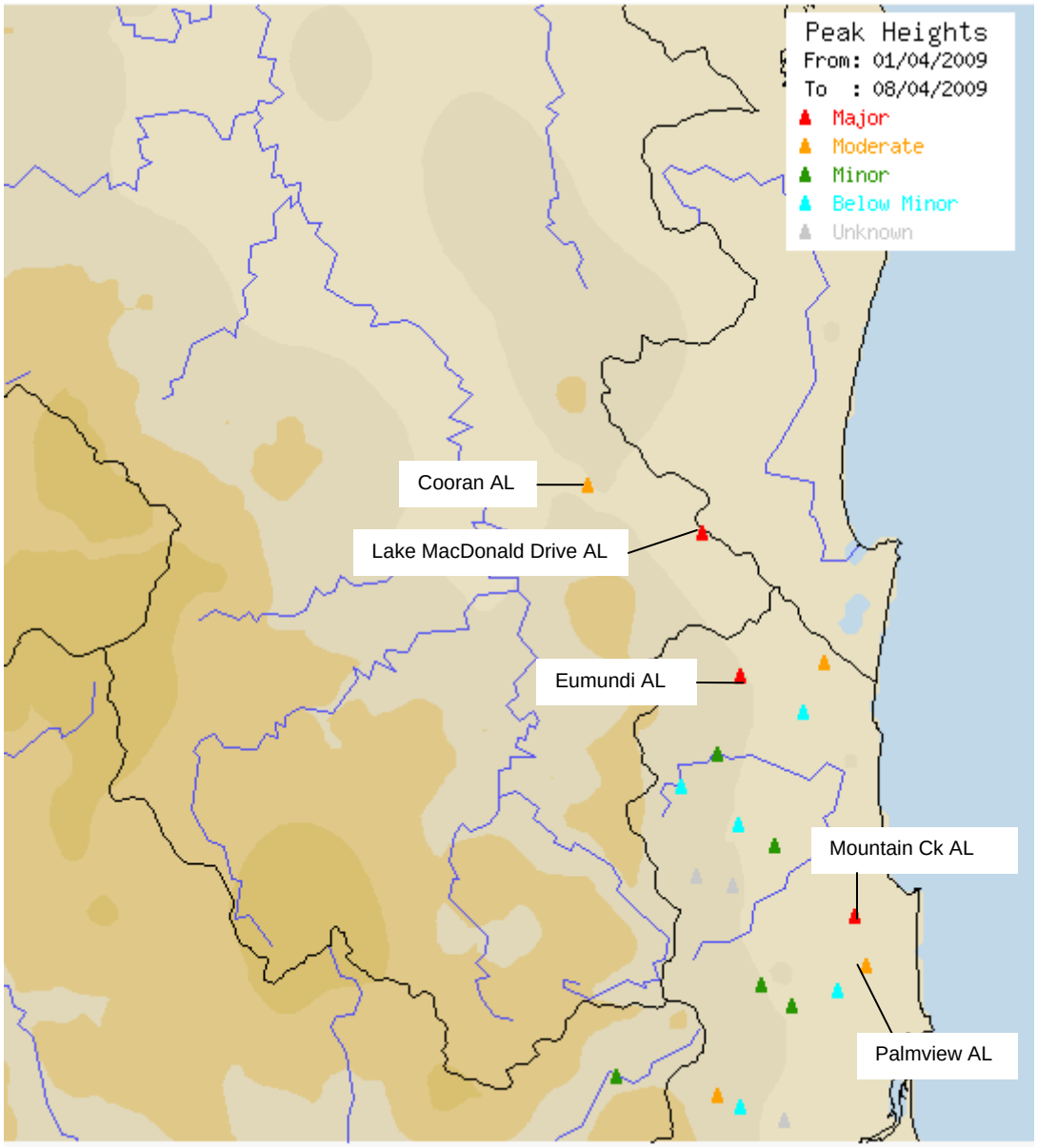


Figure 3.1.1 shows the peak heights recorded in the Coochin Creek, Mooloolah, Maroochy and upper Mary Rivers between the 01/04/09 and the 08/04/2009.

Figure 3.1.2 Peak height map from the 13/04/09 to 16/04/09.

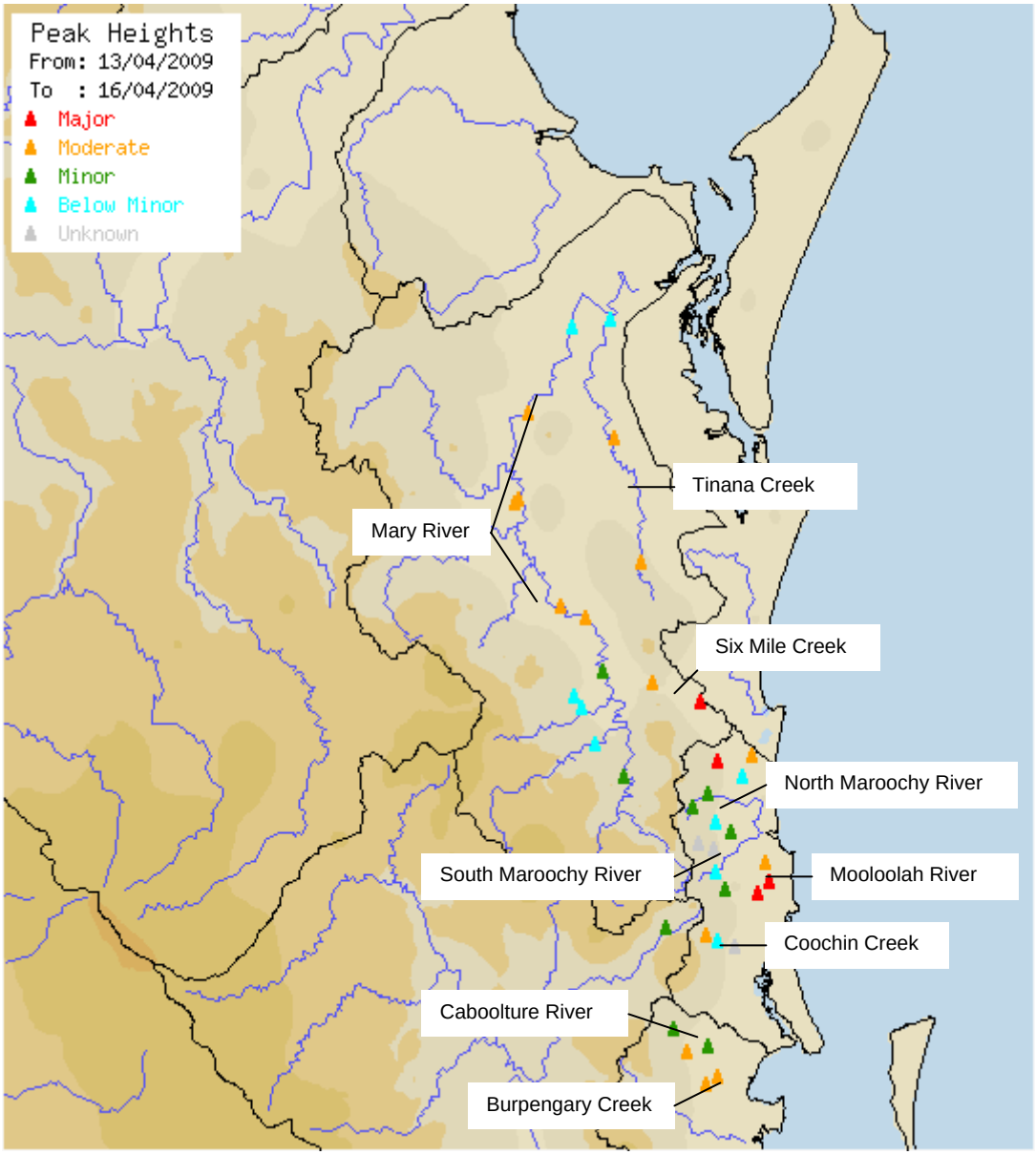


Figure 3.1.2 shows the peak heights recorded in the Burpengary and Coochin Creeks and in the Caboolture, Mooloolah, Maroochy and Mary Rivers between the 13/04/09 and the 16/04/2009.

3.2 Rainfall Maps

During the 24 hour period to 9am on the 03/04/2009 the most significant rainfall was recorded along Six Mile Creek most notably in the Kin Kin-Cooran area. Rainfalls in excess of 460 mm were recorded at Black Pinch Road with un-official readings up to 600 mm being reported. These totals are shown in figures 3.2.1 and 3.2.2.

During the 24 hour period to 9am on the 14/04/2009 the most significant rainfall was recorded along Tinana Creek with more widespread falls extending further south to the Pine and Caboolture River catchments. Rainfall totals for this period are summarised in figures 3.2.3, 3.2.4, 3.2.5 and 3.2.6.

The rainfall amounts in Figures 3.2.1 to 3.2.6 are all given in millimeters. Refer to the Flood Warning Network Map for the Pine and Caboolture Rivers, Flood Warning Network Map for the Mooloolah and Maroochy Rivers, Flood Warning Network Map for the Noosa River, Flood Warning Network Map for the Mary River for the station names of the rainfall locations used in Figures 3.2.1-3.2.6.

Figure 3.2.1 Rainfall map for the 24 hours to 9am on the 03/04/09.

Figure 3.2.1 shows the rainfalls recorded in the Mooloolah and Maroochy Rivers in the 24 hours to 9am on the 03/04/2009.

Figure 3.2.2 Rainfall map for the 24 hours to 9am on the 03/04/09.

Figure 3.2.2 shows the rainfalls recorded in the Noosa and upper Mary Rivers in the 24 hours to 9am on the 03/04/2009.

Figure 3.2.3 Rainfall map for the 24 hours to 9am on the 14/04/09.

Figure 3.2.3 shows the rainfalls recorded in the Pine and Caboolture Rivers in the 24 hours to 9am on the 14/04/2009.

Figure 3.2.4 Rainfall map for the 24 hours to 9am on the 14/04/09.

Figure 3.2.4 shows the rainfalls recorded in the Mooloolah and Maroochy Rivers in the 24 hours to 9am on the 14/04/2009.

Figure 3.2.5 Rainfall map for the 24 hours to 9am on the 14/04/09.

Figure 3.2.5 shows the rainfalls recorded in the Noosa and upper Mary Rivers in the 24 hours to 9am on the 14/04/2009.

Figure 3.2.6 Rainfall map for the 24 hours to 9am on the 14/04/09.

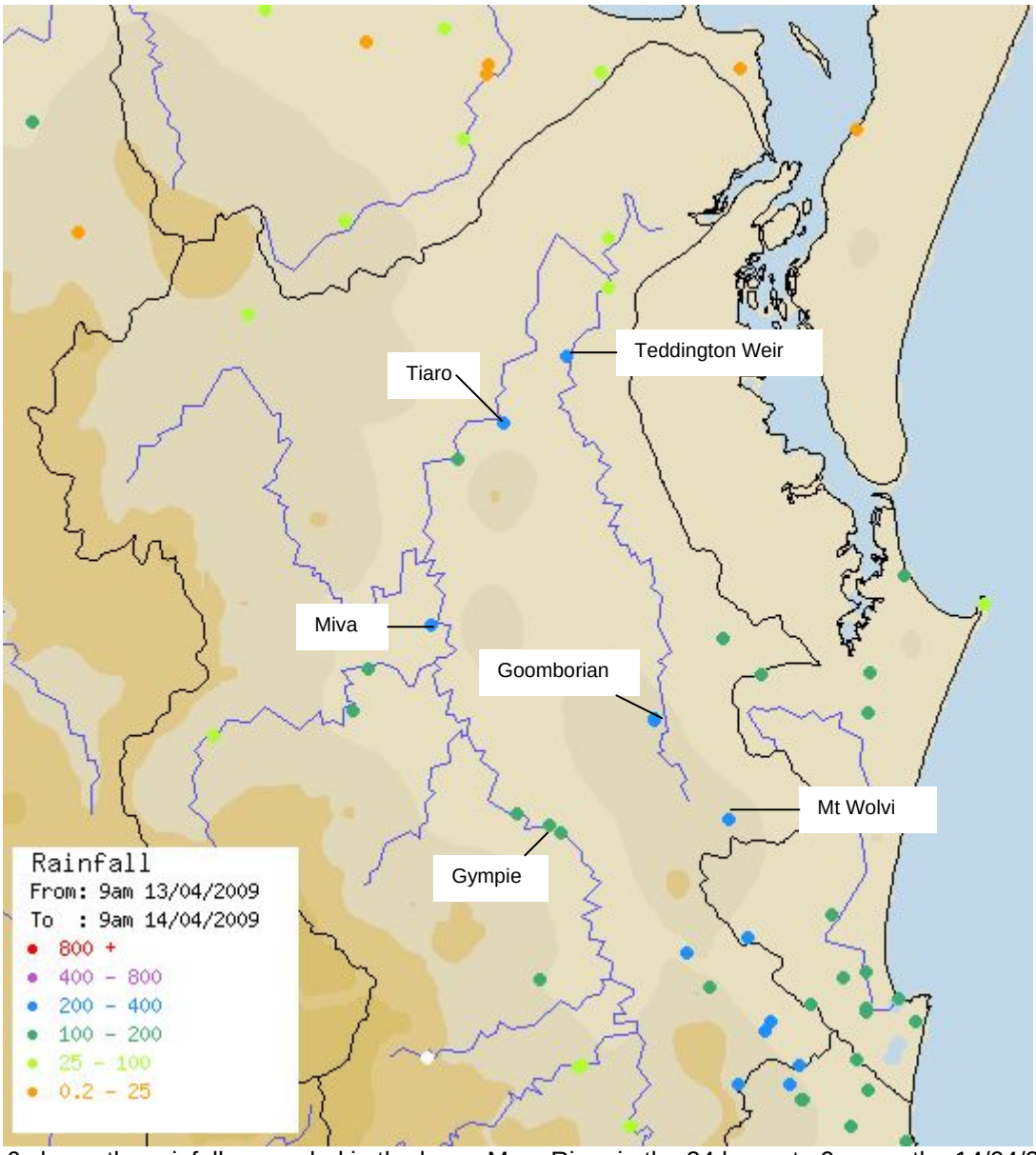


Figure 3.2.6 shows the rainfalls recorded in the lower Mary River in the 24 hours to 9am on the 14/04/2009.

3.3 Rainfall Intensity

The most intense rainfall recorded during the 24 hours to 9am on the 03/04/09 occurred in the Mooloolah, Maroochy and upper Mary Rivers, specifically in the Kin Kin and Cooran areas. The two rainfall stations from that area that have been selected for Intensity Frequency Duration rainfall analysis are Cooran Alert and Black Pinch Road Alert.

The most statistically significant short duration rainfall occurred at Black Pinch Road AL, where for the 1 hour to 24 hour durations to 9:00am on 03/04/09 the observed totals were assessed as being greater than 1% AEP (100 year Average Recurrence Interval (ARI)) intensity, as shown in Figure 3.3.2.

The hourly hyetographs for the Black Pinch Road Alert and Cooran Alert stations are shown in Figure 3.3.1. For each of these stations the time period when the most intense rainfall was recorded is shown.

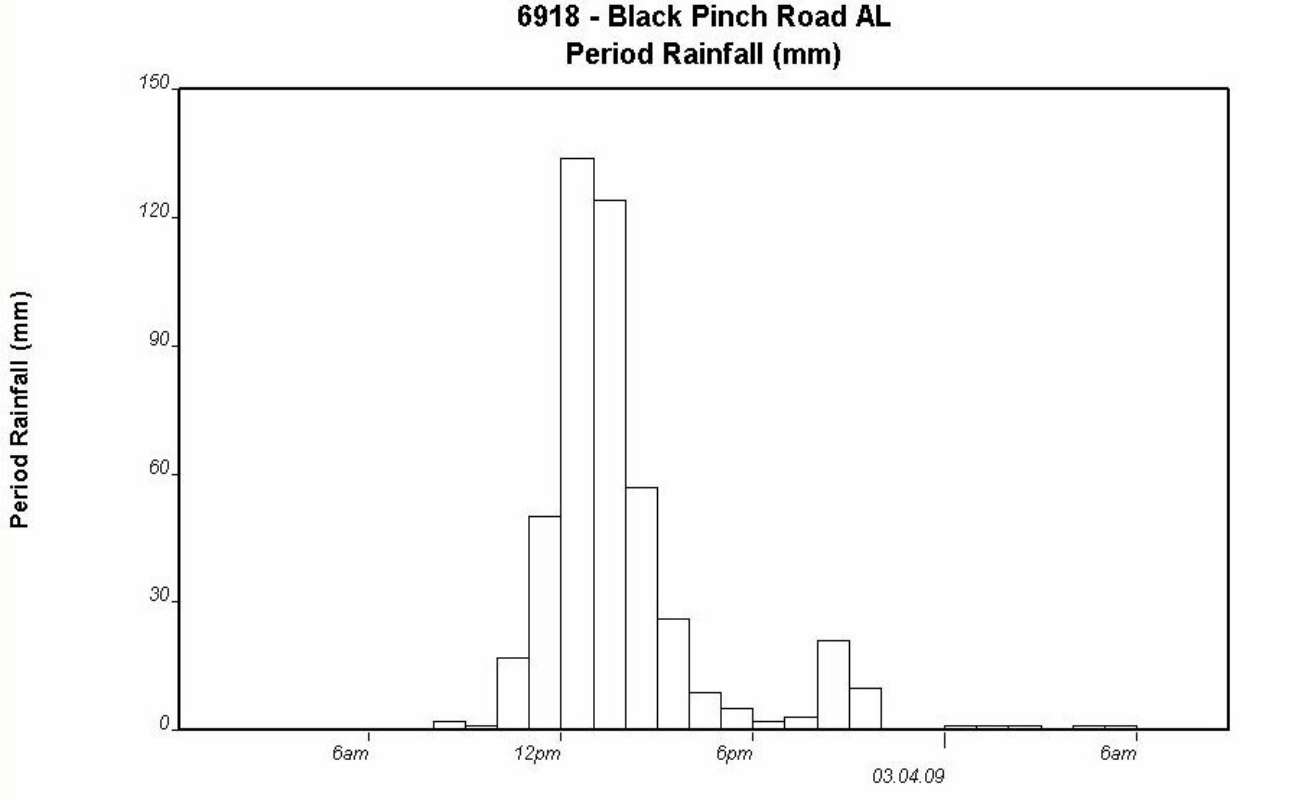
The most intense rainfall recorded during the 24 hours to 9am on the 14/04/09 occurred in the Caboolture, Mooloolah, Maroochy and Mary Rivers, most notably in the Tinana Creek area. The two rainfall stations from that area that have been selected for Intensity Frequency Duration rainfall analysis are Teddington headwater Telemeter and Goomborian Telemeter.

The most statistically significant short duration rainfall occurred at Goomborian Telemeter where for the 3 hour to 12 hour duration observed totals were assessed as being greater than 1% AEP (100 year Average Recurrence Interval (ARI)) intensity, as shown in Figure 3.3.4.

The hourly hyetographs for the Teddington Headwater Telemeter and Goomborian Telemeter stations are shown in Figure 3.3.3. For each of these stations the time period when the most intense rainfall was recorded is shown.

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 Black Pinch Road Alert and Cooran Alert



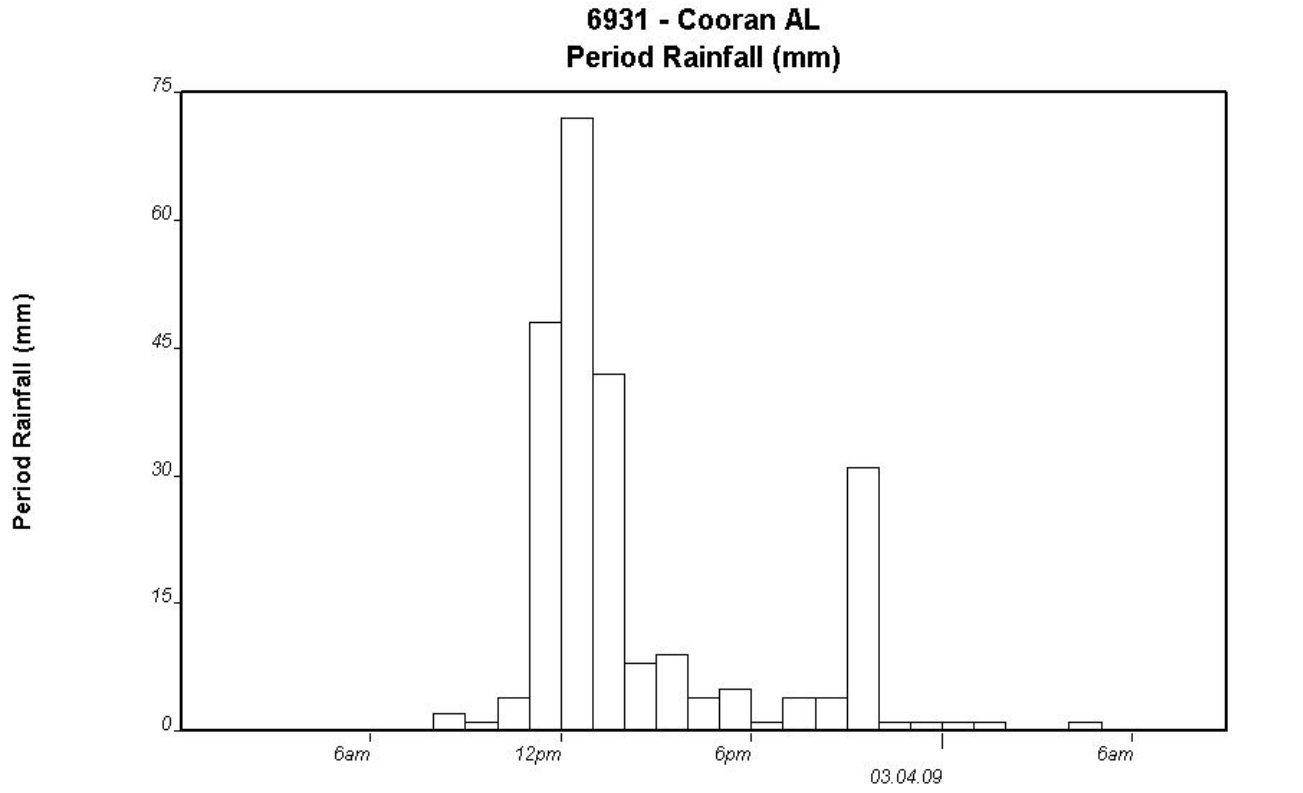


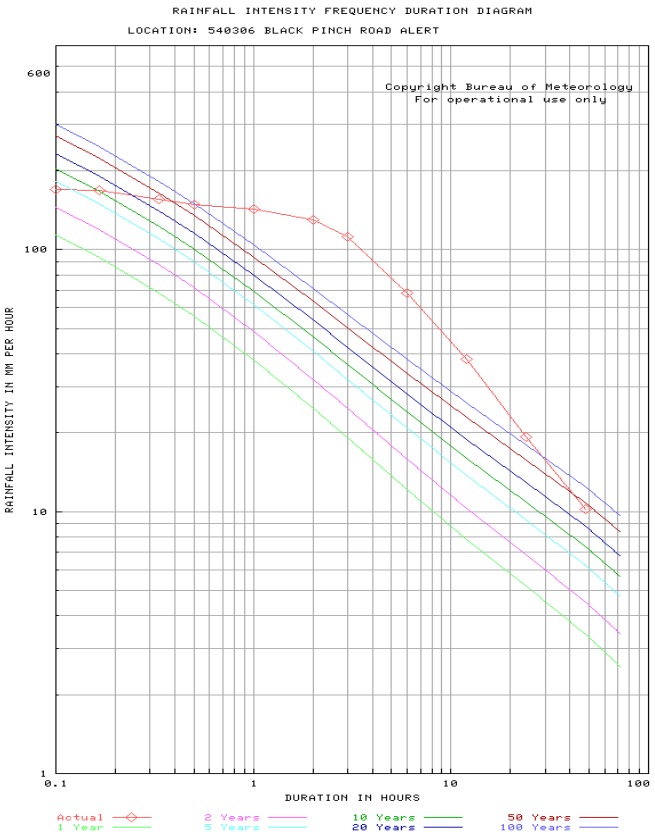
Figure 3.3.2 IFD analysis for Black Pinch Road Alert and Cooran Alert

RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS

LOCATION: 540306 BLACK PINCH ROAD ALERT

Analysis of the rainfall for the 48 hours to Sat Apr 4 09:00:00 2009

Rainfall (mm)	Period Ending	ARI (years)
14	5 mins ending at 12:40:00 02/04/2009	2-5
17	6 mins ending at 12:41:00 02/04/2009	2-5
28	10 mins ending at 12:40:00 02/04/2009	10-20
52	20 mins ending at 12:45:00 02/04/2009	20-50
74	30 mins ending at 12:55:00 02/04/2009	50-100
143	60 mins ending at 13:25:00 02/04/2009	>100
260	2 hours ending at 13:55:00 02/04/2009	> 100
335	3 hours ending at 14:25:00 02/04/2009	> 100
410	6 hours ending at 16:35:00 02/04/2009	> 100
458	12 hours ending at 21:15:00 02/04/2009	> 100
464	24 hours ending at 09:00:00 03/04/2009	> 100
491	48 hours ending at 09:00:00 04/04/2009	20-50



RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS

LOCATION: 540326 COORAN ALERT

Analysis of the rainfall for the 48 hours to Sat Apr 4 09:00:00 2009

Rainfall (mm)	Period Ending	ARI (years)
9	5 mins ending at 13:00:00 02/04/2009	1
10	6 mins ending at 13:01:00 02/04/2009	1
17	10 mins ending at 13:00:00 02/04/2009	1-2
30	20 mins ending at 13:05:00 02/04/2009	2-5
40	30 mins ending at 13:05:00 02/04/2009	2-5
74	60 mins ending at 13:05:00 02/04/2009	10-20
127	2 hours ending at 13:25:00 02/04/2009	50-100
162	3 hours ending at 14:00:00 02/04/2009	> 100
185	6 hours ending at 16:15:00 02/04/2009	20-50
232	12 hours ending at 21:55:00 02/04/2009	20-50
237	24 hours ending at 09:00:00 03/04/2009	5-10
308	48 hours ending at 09:00:00 04/04/2009	5-10

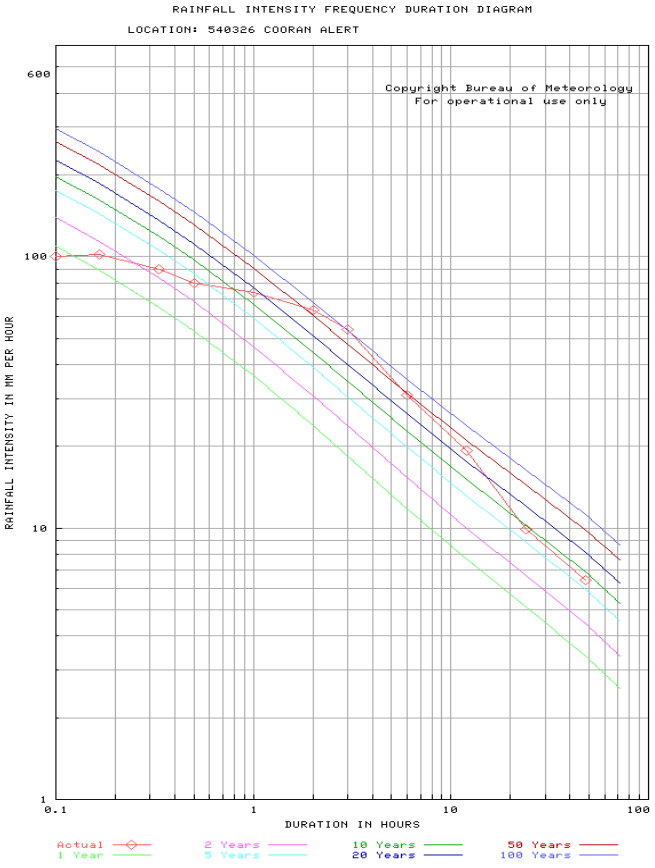
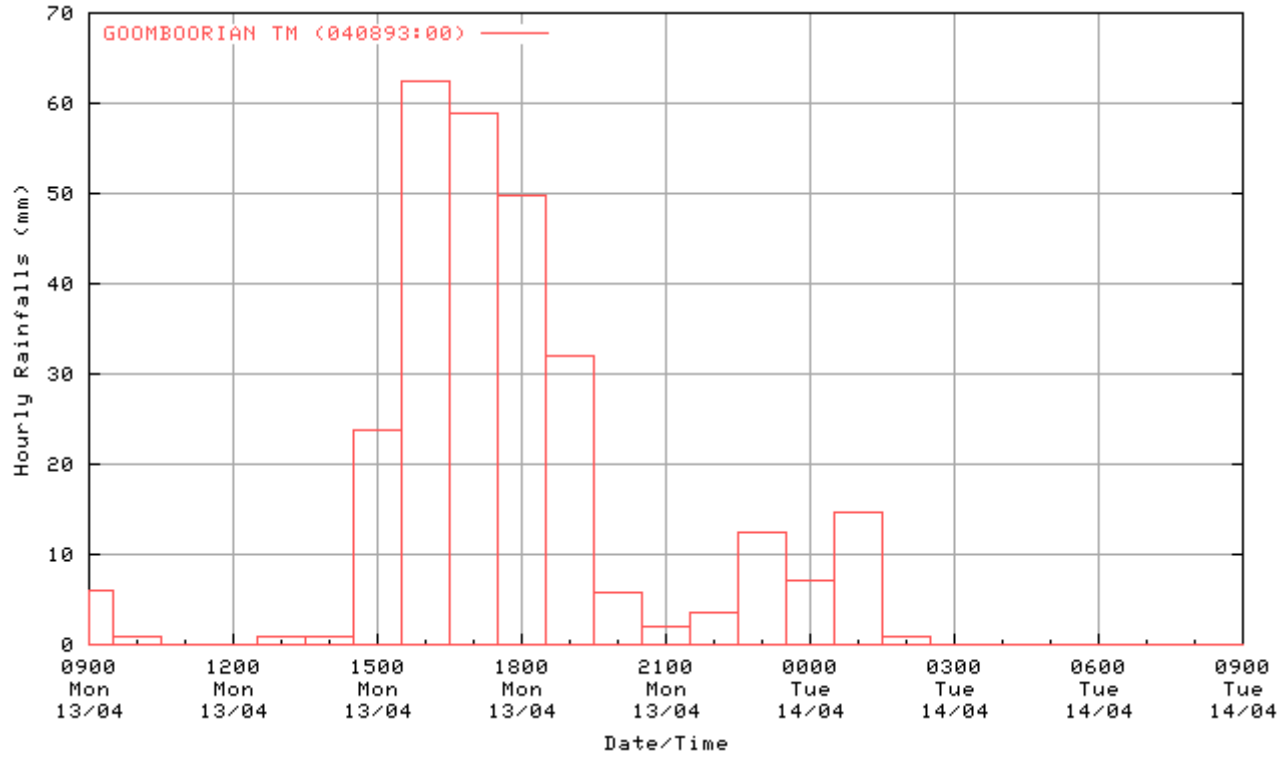


Figure 3.3.3 Hourly hyetographs for Goomborian TM and Teddington Weir TM



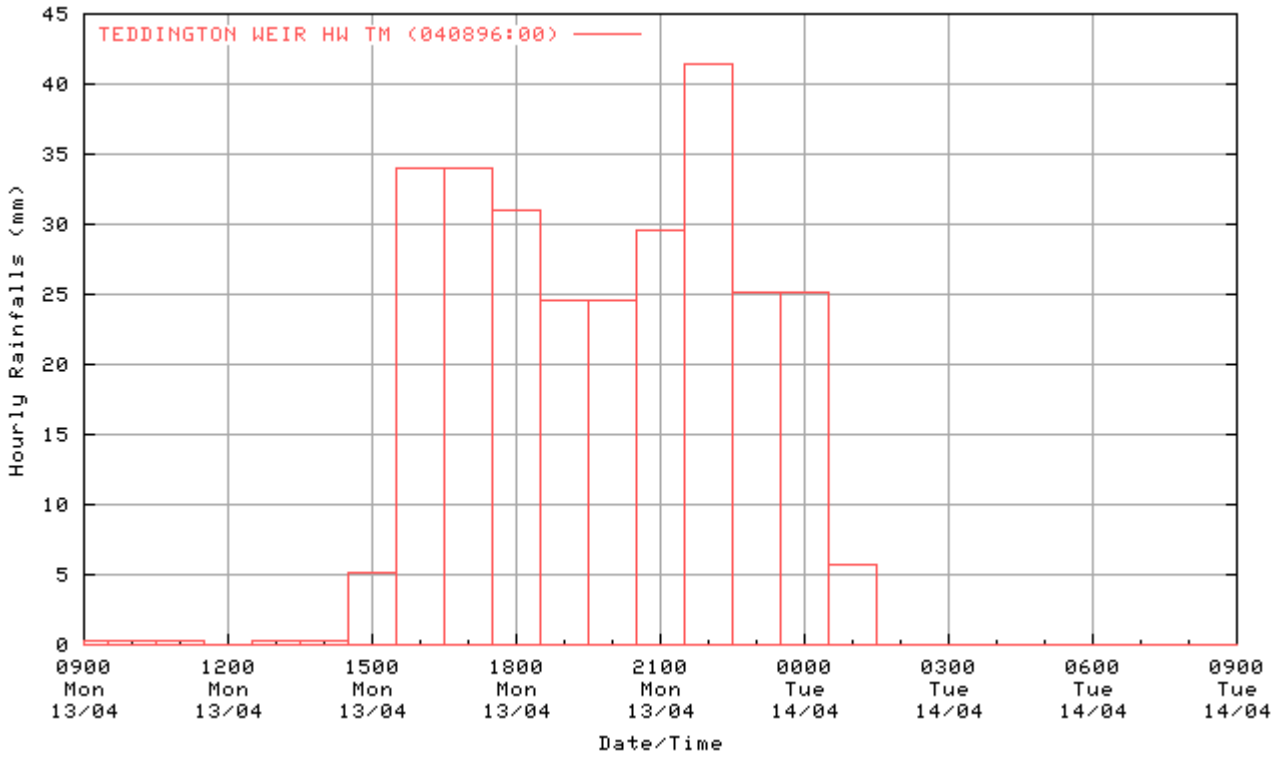


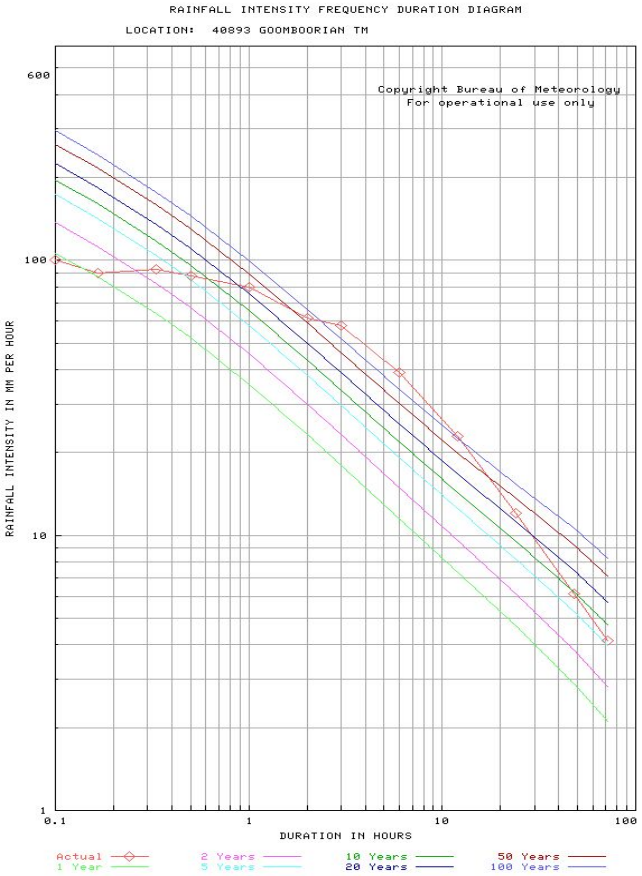
Figure 3.3.4 IFD analysis for Goomborian TM and Teddington Weir TM

RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS

LOCATION: 040893 GOOMBOORIAN TM

Analysis of the rainfall for the 168 hours to Fri Apr 17 08:00:00 2009

Rainfall (mm)	Period Ending	ARI (years)
8	5 mins ending at 15:55:00 13/04/2009	< 1
10	6 mins ending at 15:56:00 13/04/2009	1
15	10 mins ending at 16:10:00 13/04/2009	1-2
31	20 mins ending at 16:10:00 13/04/2009	2-5
44	30 mins ending at 16:10:00 13/04/2009	5-10
80	60 mins ending at 16:30:00 13/04/2009	20-50
123	2 hours ending at 16:50:00 13/04/2009	50-100
174	3 hours ending at 17:55:00 13/04/2009	> 100
234	6 hours ending at 20:25:00 13/04/2009	> 100
274	12 hours ending at 01:10:00 14/04/2009	> 100
289	24 hours ending at 01:10:00 14/04/2009	20-50
295	48 hours ending at 01:05:00 14/04/2009	5-10
297	72 hours ending at 05:30:00 15/04/2009	5-10

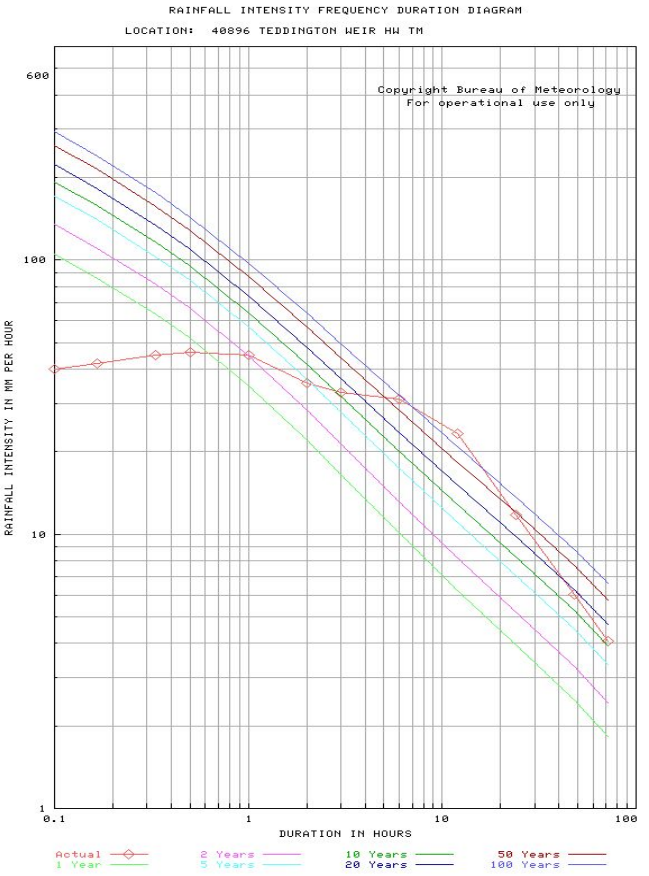


RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS

LOCATION: 040896 TEDDINGTON WEIR HW TM

Analysis of the rainfall for the 168 hours to Fri Apr 17 08:00:00 2009

Rainfall (mm)	Period Ending	ARI (years)
3	5 mins ending at 20:55:00 13/04/2009	< 1
4	6 mins ending at 20:56:00 13/04/2009	< 1
7	10 mins ending at 21:00:00 13/04/2009	< 1
15	20 mins ending at 21:10:00 13/04/2009	< 1
23	30 mins ending at 21:20:00 13/04/2009	< 1
45	60 mins ending at 21:45:00 13/04/2009	2-5
71	2 hours ending at 22:45:00 13/04/2009	2-5
99	3 hours ending at 17:50:00 13/04/2009	10-20
187	6 hours ending at 21:45:00 13/04/2009	50-100
280	12 hours ending at 00:55:00 14/04/2009	> 100
283	24 hours ending at 00:55:00 14/04/2009	20-50
289	48 hours ending at 00:55:00 14/04/2009	10-20
293	72 hours ending at 00:55:00 14/04/2009	10-20



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, Red values indicate recorded maximums.

Refer to the Flood Warning Network Map for the Pine and Caboolture Rivers, Flood Warning Network Map for the Mooloolah and Maroochy Rivers, Flood Warning Network Map for the Noosa River, Flood Warning Network Map for the Mary River for the station names of the rainfall locations used in Table 3.4.1.

Table 3.4.1 Rainfall totals for the Mooloolah, Maroochy, Noosa and Mary Rivers.

Station Name	24 hour rainfall to 9am on April			Total (mm)
	2	3	4	
Mooloolah				
Bald Knob AL *	33	116	95	**244**
Ewen Maddock Dam AL *	48	173	93	**314**
Jordan St AL *	43	133	71	**247**
Caloundra Wtp	45	134		**179**
Sippy Downs AL *	26	142	76	**244**
Sugarbag Rd AL *	46	146	90	**282**
Palmview AL *	20	66	66	**152**
Meridan Way AL *	51	142	58	**251**
Parrearra Weir U/s AL *	42	155	22	**219**
Tanawha AL *	27	152	157	**336**
Bundilla AL *	18	123	29	**170**
Mountain Creek AL *	25	142	76	**243**
Golden Beach AL *		14	120	**134**
Landsborough	30			**30**
Landsborough AL *	36	140	73	**249**
Hume Lane AL *	22	132	58	**212**
Old Gympie Road AL *	32	145	46	**210**
Beerwah AL *	32	138	40	**210**
Numerical Average	**32**	**121**	**73**	**201**
Maximum	**51**	**173**	**157**	**336**
Maroochy				
Eerwah Vale AL *	2	173	83	**258**
Eerwah Vale	2	200	117	**319**
Ball Lookout AL *	3	195	54	**252**
Eumundi	6	164	56	**226**
Eumundi AL *	4	172	79	**255**
Eumundi TM *	4	165	83	**252**
Mapleton AL *	14	120	69	**203**
Yandina TM *	5	136	80	**221**
Yandina AL *	5	130	73	**208**
Dunethin Rock AL *	6	123	57	**186**
Yandina Creek AL *	5	123	16	**144**
Upper Doonan AL *	2	106	24	**132**
Doonan Creek AL *	3	115	14	**132**

Station Name	24 hour total to 9am on April			Total (mm)
	1	2	3	
Maroochy continued				
Coolum AL *	2	86	4	**92**
Stoney Wharf Road AL *	9	123	35	**167**
West Woombye AL *	17	117	142	**276**
Nambour AWS *	18	125	122	**265**
Nambour AL *	13	118	129	**260**
Palmwoods	18	104	139	**261**
Palmwoods AL *	17	106	95	**218**
Palmwoods Sportsground A AL	17	113	105	**235**
Diddillibah AL *	12	133	138	**283**
Eudlo AL *	23	132	113	**268**
Eudlo Flats Rd AL *	16	137	92	**245**
Maroochydore Depot AL *	21	148	41	**210**
Picnic Point AL *	16	153	42	**211**
Maroochydore AWS *	9	127	33	**169**
Numerical Average	**10**	**135**	**75**	**220**
Maximum	**23**	**200**	**142**	**319**
Noosa				
Rainbow Beach SYN	0	14	10	**24**
Coops Corner TM *	0	34	25	**59**
Mt Bilewilam AL *	1	26	28	**55**
Mount Elliot AL *	0	21	20	**41**
Mount Wolvi AL *	1	150	18	**169**
Black Pinch Road AL *	2	464	27	**493**
Boreen Point AL *	1	237	24	**262**
Lake Cooroibah AL *	1	101	39	**141**
Mount Tinbeerwah AL *	2	245	77	**324**
Tewantin AWS *	1	93	33	**127**
Tewantin AL *	1	86	27	**114**
Noosa Heads AL *	1	105	17	**123**
Numerical Average	**1**	**131**	**29**	**161**
Maximum	**2**	**464**	**77**	**493**
Mary				
Maleny AL *	29	150	59	**238**
Maleny	22	147	67	**236**
Baroon Boat Ramp AL *	19	130	100	**249**
Baroon Dam Tw AL *	15	104	78	**197**
Obi Lookout AL *	9	83	52	**144**
West Bellthorpe AL *	19	49	50	**118**
Harper Creek AL *	17	45	32	**94**
Bellbird Creek AL *	2	28	59	**89**
Bellbird Creek TM *	1	30	59	**90**
Coolabine Creek AL *	7	39	58	**104**
Kenilworth	6	47	64	**117**
Kenilworth H/s AL *	5	42	59	**106**
Moy Pocket AL *	2	54	83	**139**

Station Name	24 hour total to 9am on April			Total (mm)
	1	2	3	
Mary continued				
Moy Pocket TM *	1	49	81	**131**
Jimna AWS *	2	10	49	**61**
Jimna AL *	2	8	43	**53**
Imbil	2	45	60	**107**
Imbil TM *	1	49	64	**114**
Zachariah TM *	1	39	20	**60**
Cooroy	1	217	119	**337**
Cooroy AL *	1	232	96	**329**
Pomona AL *	1	203	48	**252**
Cooran TM *	2	217	66	**285**
Cooran AL *	2	238	71	**311**
Gympie AWS *	0	24	21	**45**
Goomboorian TM *	0	20	11	**31**
Toolara AWS *	0	16	35	**51**
Numerical Average	**6**	**86**	**59**	**151**
Maximum	**29**	**238**	**119**	**337**

Table 3.4.2 Rainfall totals for the Caboolture, Mooloolah, Maroochy, Noosa and Mary Rivers.

Station Name	24 hour rainfall to 9am on April			Total (mm)
	12	13	14	
Pine/Caboolture				
Mitchelton(Osborne Rd AL *	13	2	60	**75**
Alderley	22	2	52	**76**
Gordon Park AL *	21	2	38	**61**
Toombul(Nudgee Rd) AL *	23	1	31	**55**
Brisbane Airport AWS *	19	Tr	25	**44**
Luggage Point AL *	23	1	32	**56**
Geebung AL *	21	1	39	**61**
Boondall	30	1	42	**73**
Everton Hills AL *	14	2	68	**84**
Aspley Reservoir AL *	16	1	53	**70**
Deagon AL *	22	2	48	**72**
Bracken Ridge Res AL *	16	2	48	**66**
Mt Glorious			190	**190**
Mt Glorious AL-P *	14	11	163	**183**
Mt Nebo	16	3	120	**139**
Highvale	11	2	108	**121**
Cedar Ck Rd AL *	11	2	157	**170**
Samford AL *	9	2	98	**109**
Samford Village AL *	14	1	107	**122**
Clear Mountain AL *	10	2	124	**136**
Drapers Crossing AL *	11	2	108	**131**
Cash's Crossing AL *	0	15	1	**16**
Normanby Way AL *	16	0	69	**85**
Laceys Creek AL *	0	12	7	**19**
Baxters Creek AL *	13	8	174	**195**
Dayboro AL *	1	12	6	**19**
North Pine Dam AL *	9	1	114	**124**
Mt Samson Rd AL *	11	5	197	**213**
North Pine Dam AL-B *	9	1	113	**123**
Narangba	13	2	179	**194**
Browns Creek AL *	12	4	174	**190**
Lake Kurwongbah AL *	10	1	146	**157**
Youngs Crossing AL *	11	1	158	**170**
Strathpine		1	159	**160**
Petrie AL *	11	2	117	**130**
Lawnton AL *	16	1	96	**111**
John Bray Park AL *	13	2	93	**108**
Murrumba Downs AL *	16	1	70	**87**
Lipscombe Rd AL *	0	13	1	**14**
Redcliffe AWS *	15	2	44	**61**
Mt Mee AL-P *	17	15	179	**211**
Mt Mee AL-B *	17	15	179	**211**
Moorina AL *	8	8	180	**196**
Burpengary(Rowley Rd) AL *	14	3	183	**200**
Burpengary (Dale St) AL *	10	4	166	**180**

Station Name	24 hour rainfall to 9am on April			Total (mm)
	12	13	14	
Pine/Caboolture continued				
Deception Bay AL *	18	3	96	**117**
Round Mt Reservoir AL *	15	12	107	**134**
Wamuran AL *	15	9	179	**203**
Upper Caboolture TM *	10	8	88	**106**
Upper Caboolture AL *	9	10	179	**198**
Caboolture Wtp AL *	8	13	163	**174**
Morayfield AL *	10	5	167	**182**
Bribie Island AL *	30	1	81	**112**
Beerburrum AWS *	16	22	87	**125**
Numerical Average	**14**	**5**	**105**	**123**
Maximum	**30**	**22**	**197**	**211**
Mooloolah				
Bald Knob AL *	23	19	85	**127**
Ewen Maddock Dam AL *	25	20	116	**161**
Jordan St AL *	26	14	97	**137**
Sippy Downs AL *	13	18	128	**159**
Sugarbag Rd AL *	6	23	101	**130**
Palmview AL *	14	9	108	**131**
Meridan Way AL *	15	16	107	**138**
Parrearra Weir U/s AL *	17	16	120	**153**
Tanawha AL *	12	19	145	**176**
Bundilla AL *	9	17	130	**156**
Mountain Creek AL *	9	17	134	**160**
Golden Beach AL *	1	27	99	**127**
Landsborough AL *	18	23	104	**145**
Hume Lane AL *	15	14	104	**123**
Old Gympie Road AL *	19	12	102	**133**
Beerwah AL *	17	15	92	**124**
Numerical Average	**15**	**17**	**111**	**143**
Maximum	**26**	**27**	**134**	**176**
Maroochy				
Eerwah Vale AL *	19	26	217	**262**
Eerwah Vale	22	27	226	**275**
Ball Lookout AL *	10	19	212	**241**
Eumundi			209	**209**
Eumundi AL *	26	12	187	**225**
Eumundi TM *	26	12	182	**220**
Mapleton AL *	27	18	124	**169**
Yandina TM *	13	11	188	**212**
Yandina AL *	11	11	170	**192**
Dunethin Rock AL *	12	14	167	**193**
Yandina Creek AL *	10	9	163	**182**
Upper Doonan AL *	4	8	149	**161**
Doonan Creek AL *	7	9	154	**170**
Coolum AL *	2	6	104	**112**
Stoney Wharf Road AL *	8	12	138	**158**
West Woombye AL *	22	24	126	**172**

Station Name	24 hour total to 9am on April			Total (mm)
	12	13	14	
Maroochy continued				
Nambour AWS *	16	19	134	**169**
Nambour AL *	11	20	140	**171**
Palmwoods	27	22	110	**159**
Palmwoods AL *	20	19	108	**147**
Palmwoods Sportsground A AL	20	24	127	**171**
Diddillibah AL *	8	20	131	**159**
Eudlo AL *	37	12	102	**151**
Eudlo Flats Rd AL *	19	22	157	**198**
Picnic Point AL *	9	18	181	**208**
Maroochydore AWS *	3	10	130	**143**
Numerical Average	**16**	**16**	**155**	**186**
Maximum	**37**	**27**	**226**	**275**
Noosa				
Rainbow Beach SYN	9	23	125	**157**
Coops Corner TM *	5	15	168	**188**
Mt Bilewilam AL *	4	12	156	**172**
Mount Elliot AL *	6	20	178	**204**
Mount Wolvi AL *	7	12	262	**281**
Black Pinch Road AL *	10	22	202	**234**
Boreen Point AL *	14	17	168	**199**
Lake Cooroibah AL *	6	19	129	**154**
Mount Tinbeerwah AL *	6	28	141	**175**
Tewantin AWS *	6	22	188	**216**
Tewantin AL *	3	8	161	**172**
Noosa Heads AL *	2	8	140	**150**
Numerical Average	**7**	**17**	**168**	**171**
Maximum	**14**	**28**	**262**	**281**
Mary				
Maleny AL *	35	22	88	**145**
Maleny	36	23	91	**150**
Baroon Boat Ramp AL *	36	20	134	**190**
Baroon Dam Tw AL *	27	20	109	**156**
Obi Lookout AL *	18	13	99	**130**
West Bellthorpe AL *	13	8	40	**61**
Harper Creek AL *	19	15	58	**92**
Bellbird Creek AL *	9	12	45	**66**
Bellbird Creek TM *	9	12	44	**65**
Coolabine Creek AL *	10	11	66	**87**
Kenilworth H/s AL *	9	18	63	**90**
Moy Pocket AL *	18	19	82	**119**
Moy Pocket TM *	17	18	79	**114**
Jimna AWS *	5	2	74	**81**
Jimna AL *	5	3	68	**76**
Imbil	8	13	81	**102**
Imbil TM *	8	14	86	**108**

Station Name	24 hour total to 9am on April			Total (mm)
	12	13	14	
Mary continued				
Zachariah TM *		8	117	**125**
Cooroy	7	24	202	**233**
Cooroy AL *	5	26	200	**231**
Pomona AL *	15	23	198	**236**
Cooran TM *	9	16	195	**220**
Cooran AL *	10	17	212	**239**
Gympie AWS *	8	9	110	**127**
Gympie AL	6	8	138	**152**
Fishermans Pocket	4	6	110	**120**
Kilkivan TM *	5	6	29	**40**
Woolooga	6	7	114	**127**
Brooyar TM *	6	6	152	**164**
Miva	10	9	216	**135**
Brooweena TM *	6	4	35	**45**
Home Park TM *	6	9	166	**181**
Tiaro Po	4	12	250	**266**
Goomboorian	2	13	266	**281**
Goomboorian TM *	3	18	276	**297**
Toolara AWS *	7	15	187	**209**
Teddington Weir Hw TM *			281	**281**
Tinana Barrage Hw TM *	3	10	83	**96**
Maryborough AWS	2	5	39	**50**
Numerical Average	**11**	**13**	**125**	**146**
Maximum	**36**	**26**	**281**	**297**

3.5 Peak Heights

Table 3.5.1 and 3.5.2 shows the recorded peak heights for the two periods of heavy rainfall. Peak heights that are highlighted in red are major floods.

Table 3.5.1 Peak flood heights recorded between 02/04/09 and 06/04/09.

Station No.	Station Name	Date	Height (metres)	Flood Class
Mooloolah River				
540345	MOOLOOLAH ALERT	04/04/2009 07:10	5.09	Moderate
540344	JORDAN STREET ALERT	04/04/2009 11:58	5.15	Major
540351	PALMVIEW ALERT	04/04/2009 16:25	4.64	Major
540220	MOUNTAIN CREEK ALERT	04/04/2009 09:57	3.45	Major
Maroochy River				
540093	EUMUNDI ALERT	02/04/2009 22:00	6.46	Major
540089	KIAMBA ALERT	04/04/2009 05:07	3.18	Minor
540092	YANDINA ALERT	04/04/2009 04:12	3.03	Minor
540223	YANDINA CREEK ALERT	03/04/2009 00:13	5.21	Below Minor
540218	DOONAN CREEK ALERT	02/04/2009 03:45	4.30	Moderate
540419	WEST WOOMBYE ALERT	04/04/2009 02:50	3.60	Unknown
540088	WARANA BRIDGE ALERT	04/04/2009 05:39	6.84	Minor
540420	PALMWOODS S'GROUNDS ALERT	04/04/2009 06:30	4.65	Unknown
540083	DIDDILLIBAH ALERT	04/04/2009 15:26	3.46	Minor
540222	EUDLO ALERT	04/04/2009 04:52	4.20	Below Minor
Mary River				
540327	LAKE MACDONALD DRIVE ALERT	02/04/2009 19:40	5.60	Major
540326	COORAN ALERT	02/04/2009 18:35	10.07	Moderate
540215	GYMPIE WEIR TM	04/04/2009 19:30	9.46	Minor
040824	FISHERMANS POCKET TM	05/04/2009 01:30	10.22	Minor
040826	MIVA TM	05/04/2009 14:20	8.06	Minor
040833	HOME PARK TM	06/04/2009 00:00	6.36	Below Minor
540039	THE BARRAGE TM	06/04/2009 0600	4.74	Below Minor

Table 3.5.2 Peak flood heights recorded between 13/04/09 and 16/04/09.

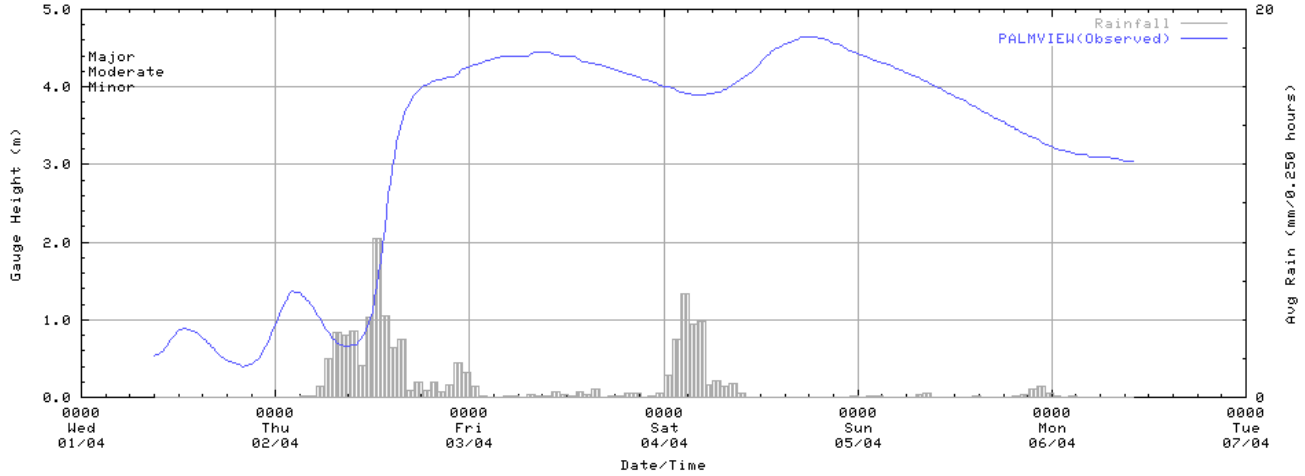
Station No.	Station Name	Date	Height (metres)	Flood Class
Burpengary Creek				
540245	BURPENGARY (Rowley Rd) ALERT	13/04/2009 21:20	20.15	Moderate
540242	BURPENGARY (Dale ST) ALERT	13/04/2009 22:47	10.19	Moderate
Caboolture River				
540244	WAMURAN ALERT	13/04/2009 19:05	29.37	Minor
540357	UPPER CABOOLTURE ALERT	13/04/2009 20:37	10.64	Moderate
540243	CABOOLTURE WTP ALERT	130/04/2009 22:48	7.79	Minor
Mooloolah River				
540345	MOOLOOLAH ALERT	14/04/2009 05:25	4.40	Below Minor
540344	JORDAN STREET ALERT	14/04/2009 08:25	5.05	Major
540351	PALMVIEW ALERT	14/04/2009 16:22	4.44	Major
540220	MOUNTAIN CREEK ALERT	13/04/2009 22:20	3.15	Moderate
Maroochy River				
540093	EUMUNDI ALERT	14/04/2009 00:26	6.91	Major
540089	KIAMBA ALERT	13/04/2009 21:49	3.08	Minor
540092	YANDINA ALERT	13/04/2009 18:43	3.28	Minor
540223	YANDINA CREEK ALERT	14/04/2009 02:23	5.51	Below Minor
540218	DOONAN CREEK ALERT	14/04/2009 03:45	4.45	Moderate
540419	WEST WOOMBYE ALERT	13/04/2009 21:17	2.60	Unknown
540088	WARANA BRIDGE ALERT	13/04/2009 18:47	5.59	Below Minor
540420	PALMWOODS S'GROUNDS ALERT	14/04/2009 01:07	4.45	Unknown
540083	DIDDILLIBAH ALERT	14/04/2009 09:20	3.40	Minor
540222	EUDLO ALERT	14/04/2009 00:05	3.75	Below Minor
Mary River				
540330	MOY POCKET ALERT	14/04/2009 09:34	8.42	Minor
040781	DAGUN POCKET TM	14/04/2009 19:00	9.85	Minor
540327	LAKE McDONALD DRIVE ALERT	13/04/2009 23:38	5.65	Major
540326	COORAN ALERT	14/04/2009 07:27	9.87	Moderate
540215	GYMPIE WEIR TM	15/04/2009 04:00	12.48	Moderate
040824	FISHERMANS POCKET TM	15/04/2009 06:20	13.39	Moderate
040826	MIVA TM	15/04/2009 20:45	10.76	Moderate
040833	HOME PARK TM	14/04/2009 03:40	10.08	Moderate
540039	THE BARRAGE TM	14/04/2009 04:30	6.32	Below Minor
540288	TAGIGAN ROAD TM	14/04/2009 03:00	7.02	Moderate
040679	BAUPLE EAST TM	15/04/2009 23:30	11.31	Moderate
540251	TEDDINGTON WEIR HW TM	16/04/2009 18:51	10.54	Moderate

3.6 Flood Hydrographs for the Mooloolah, Maroochy and Mary Rivers

Figures 3.6.1 through to 3.6.11 show the recorded hydrographs at selected stations during the two periods of heavy rainfall.

Figure 3.6.1 Flood hydrographs for the Mooloolah River between 01/04/09 and 07/04/09.

Mooloolah River at Palmview Alert



Mountain Creek at Mountain Creek Alert

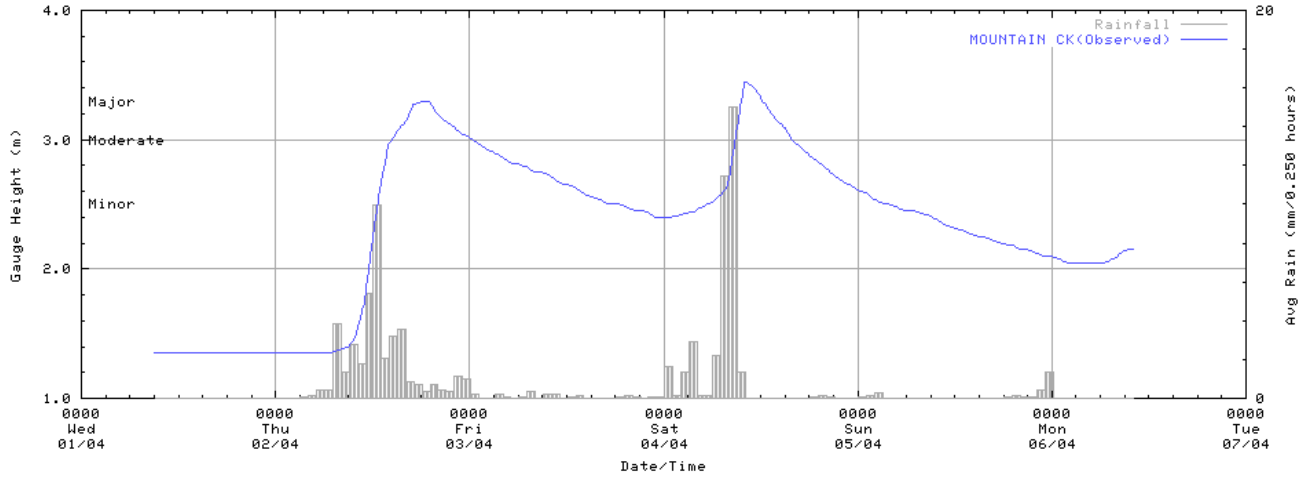
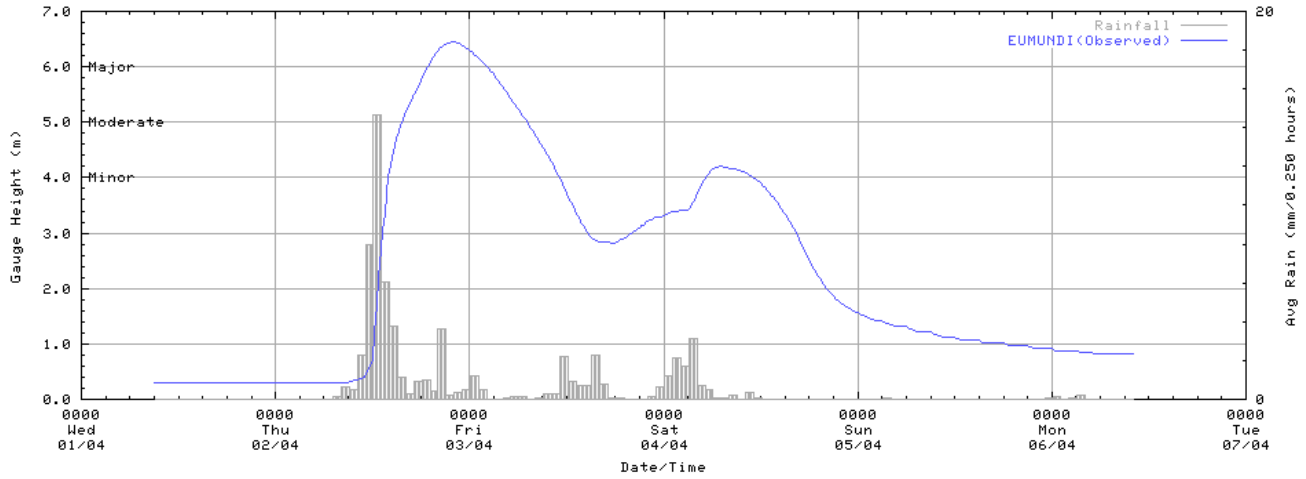


Figure 3.6.2 Flood hydrographs for the Maroochy River between 01/04/09 and 07/04/09.
North Maroochy River at Eumundi Alert



Doonan Creek at Doonan Creek Alert

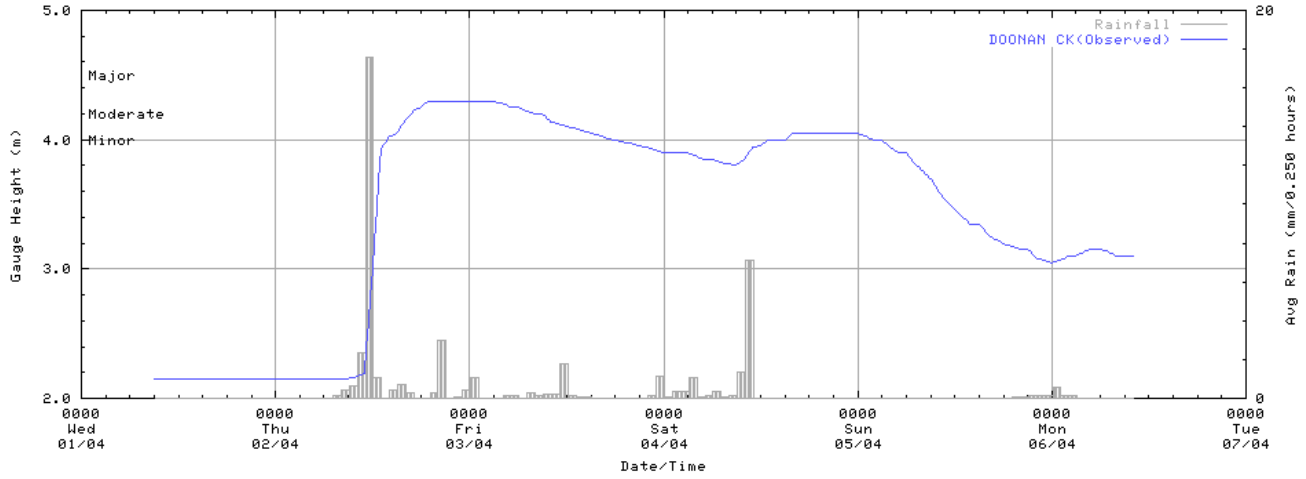
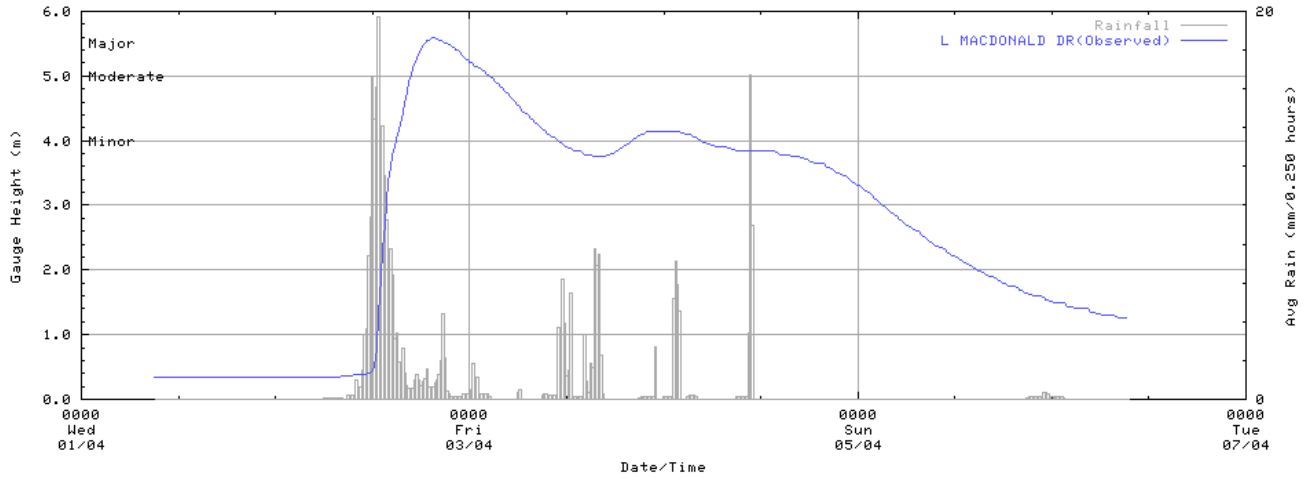


Figure 3.6.3 Flood hydrographs for the Mary River between 01/04/09 and 07/04/09.

Six Mile Creek at Lake MacDonald Drive Alert



Six Mile Creek at Cooran Alert

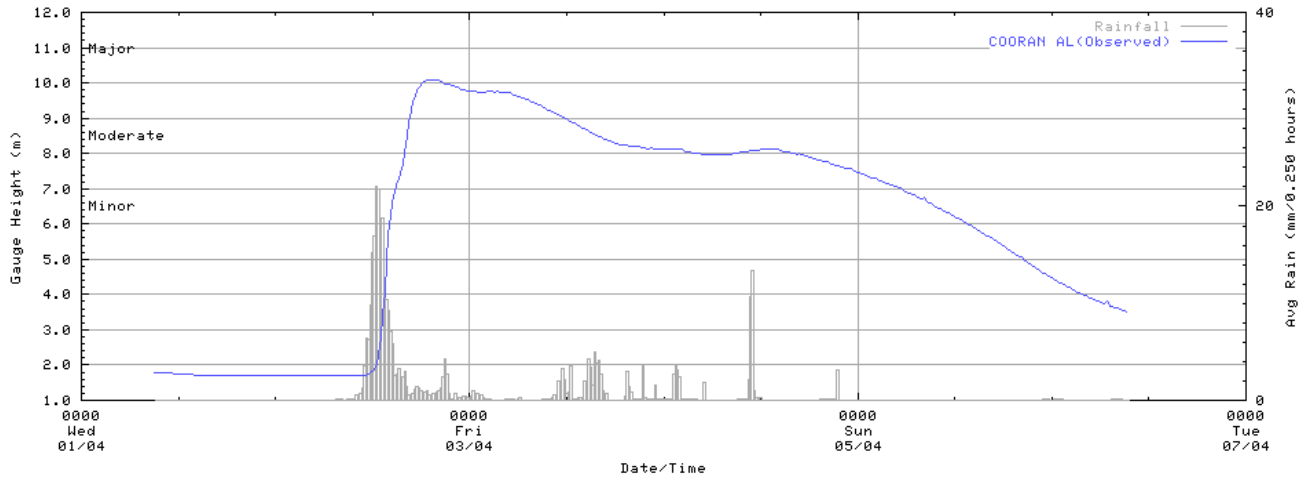
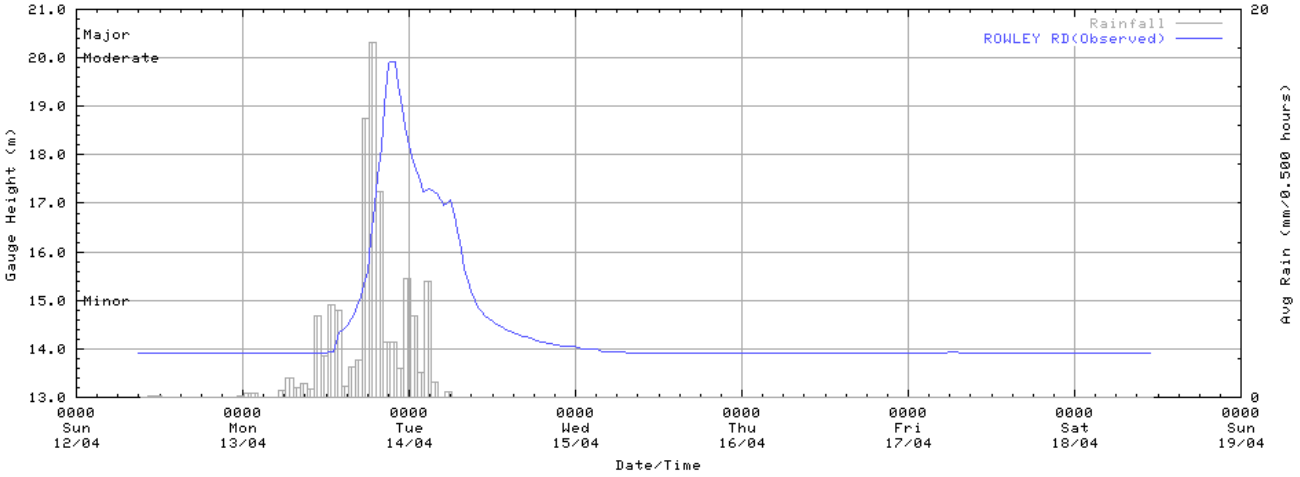


Figure 3.6.4 Flood hydrographs for Burpengary Creek between 12/04/09 and 19/04/09.

Burpengary Creek at Burpengary (Rowley Road) Alert



Burpengary Creek at Burpengary (Dale Street) Alert

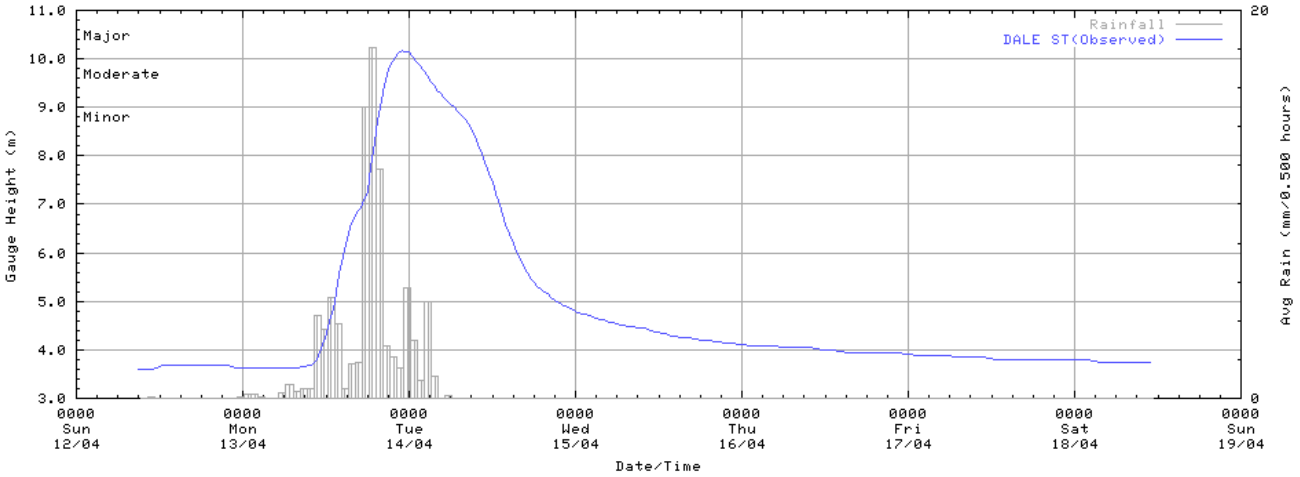
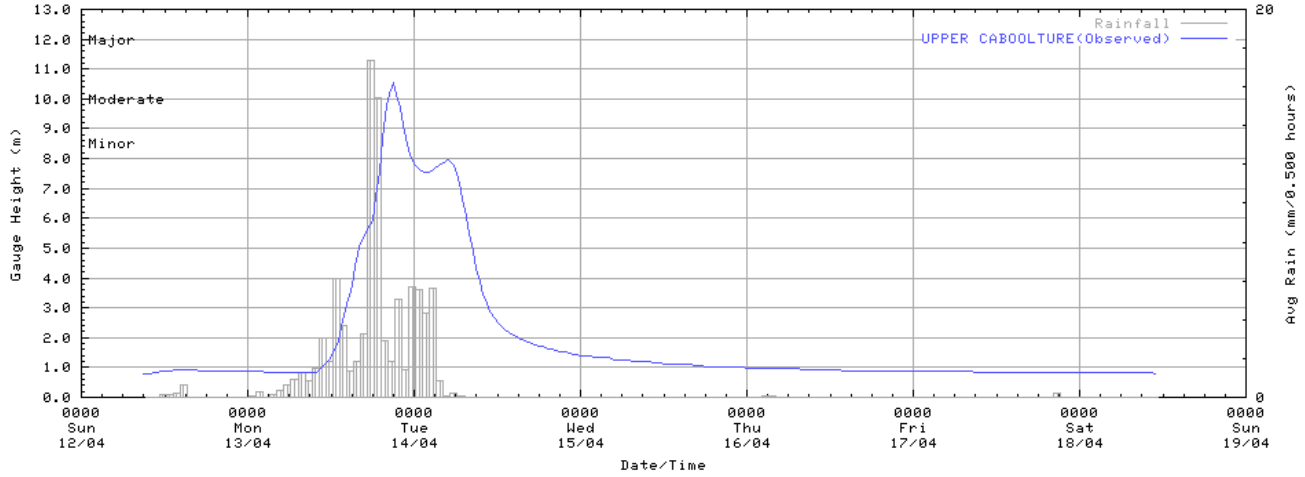
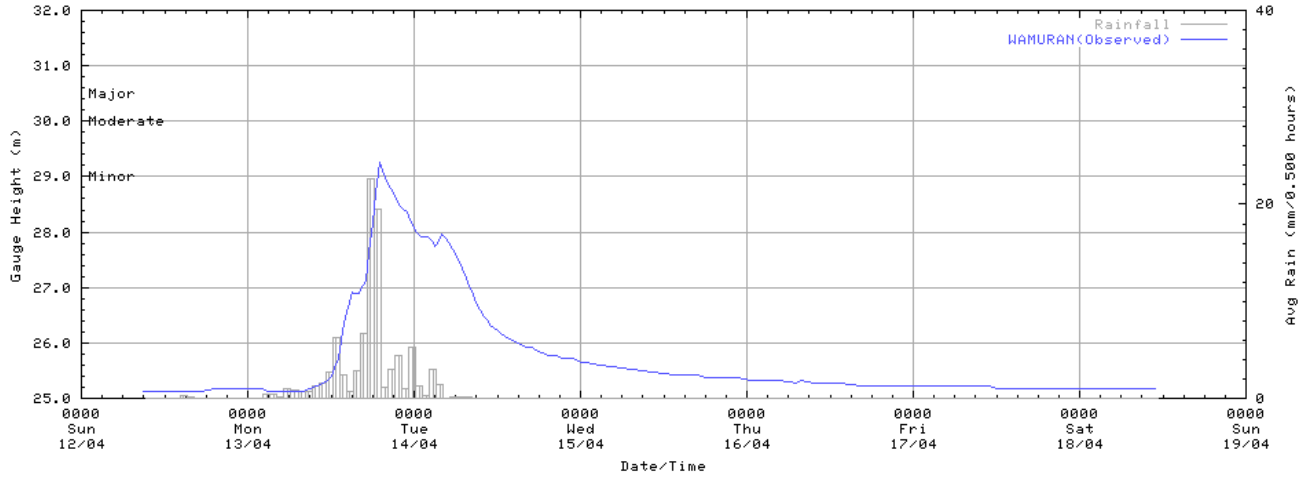


Figure 3.6.5 Flood hydrographs for the Caboolture River between 12/04/09 and 19/04/09.

Caboolture River at Upper Caboolture Alert



Waraba Creek at Wamuran Alert



Caboolture River at Caboolture Alert

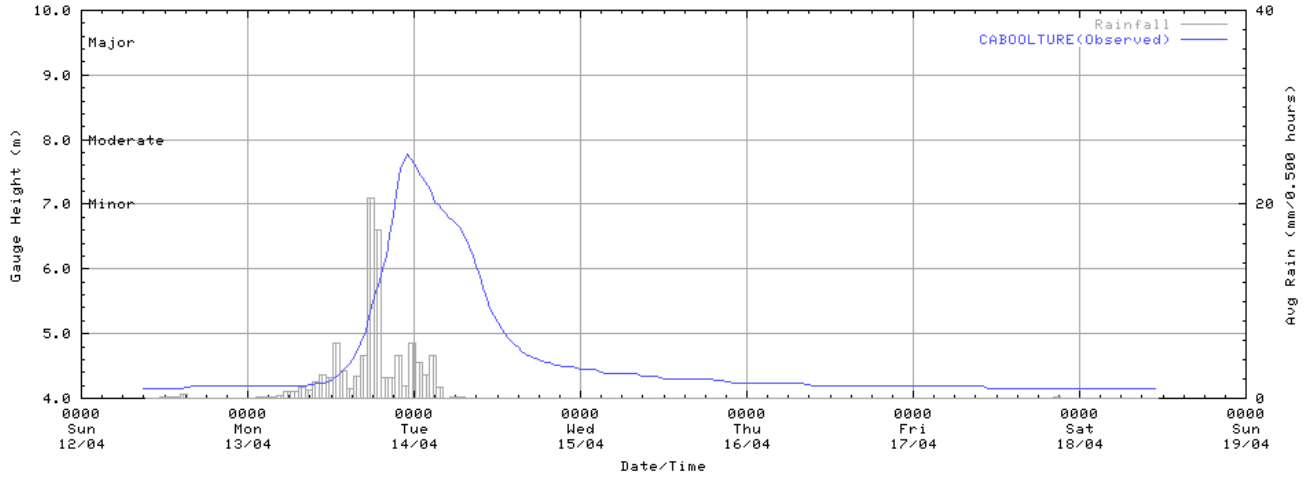
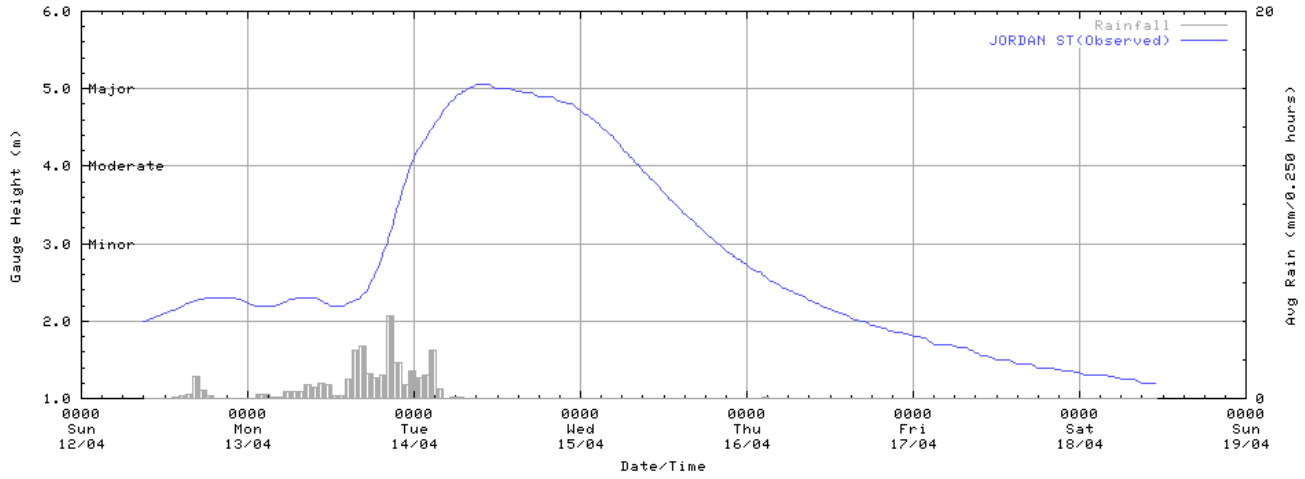
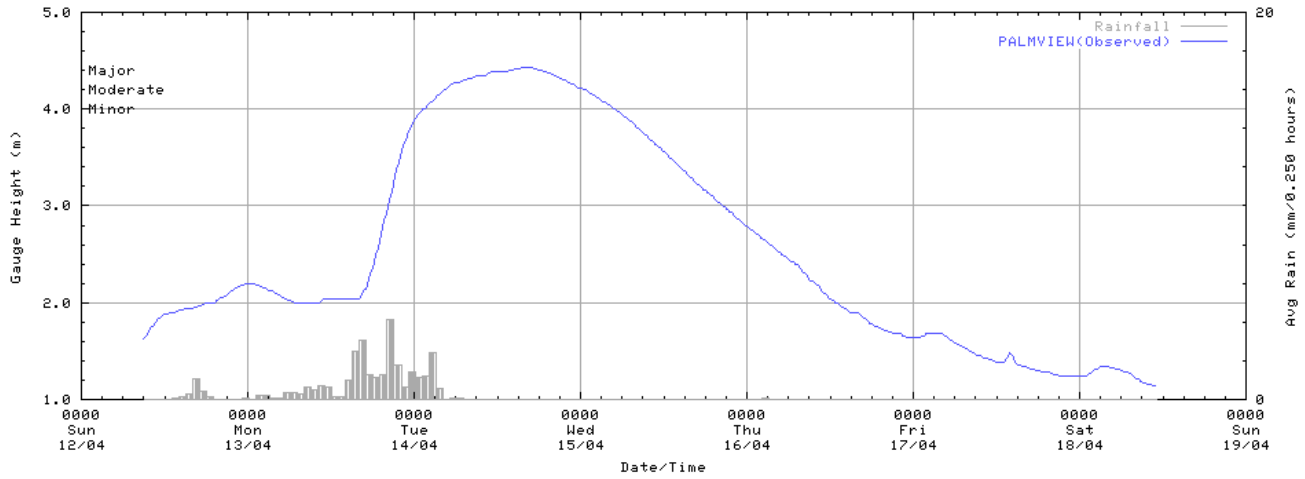


Figure 3.6.6 Flood hydrographs for the Mooloolah River between 12/04/09 and 19/04/09.

Mooloolah River at Jordan Street



Mooloolah River at Palmview Alert



Mountain Creek at Mountain Creek Alert

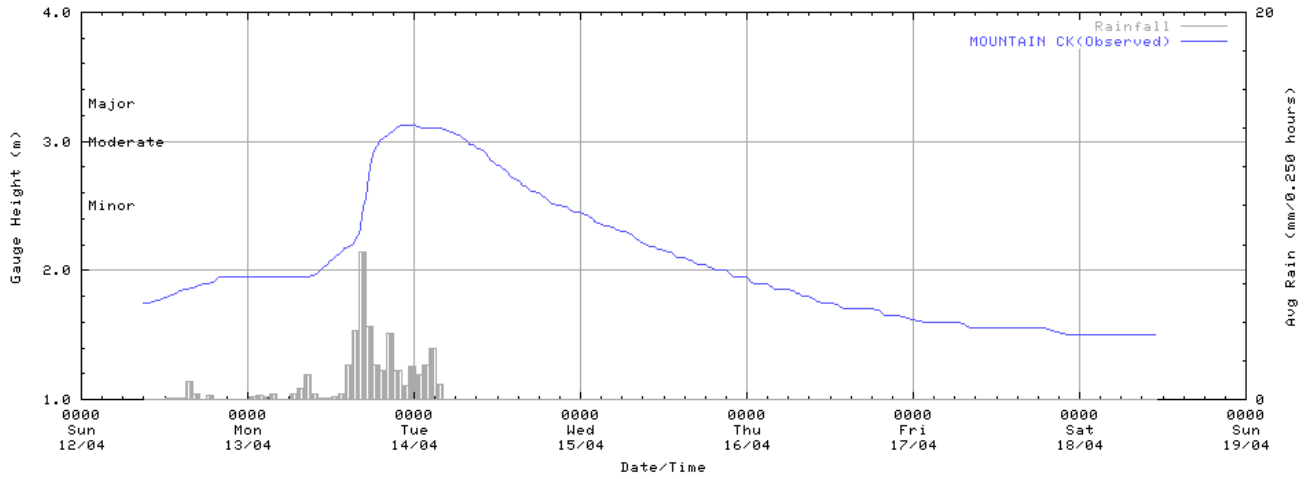
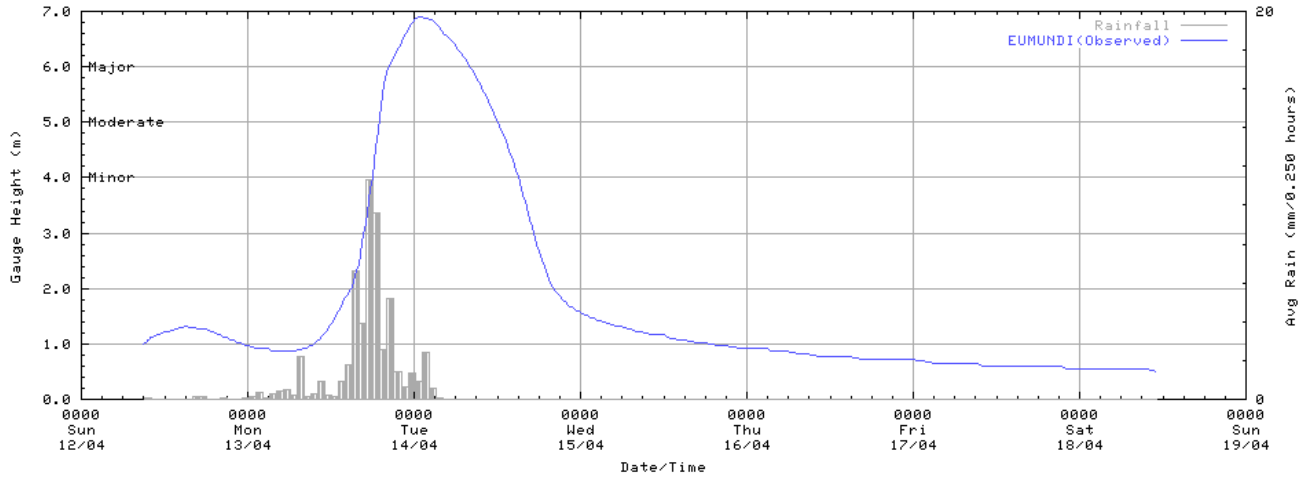
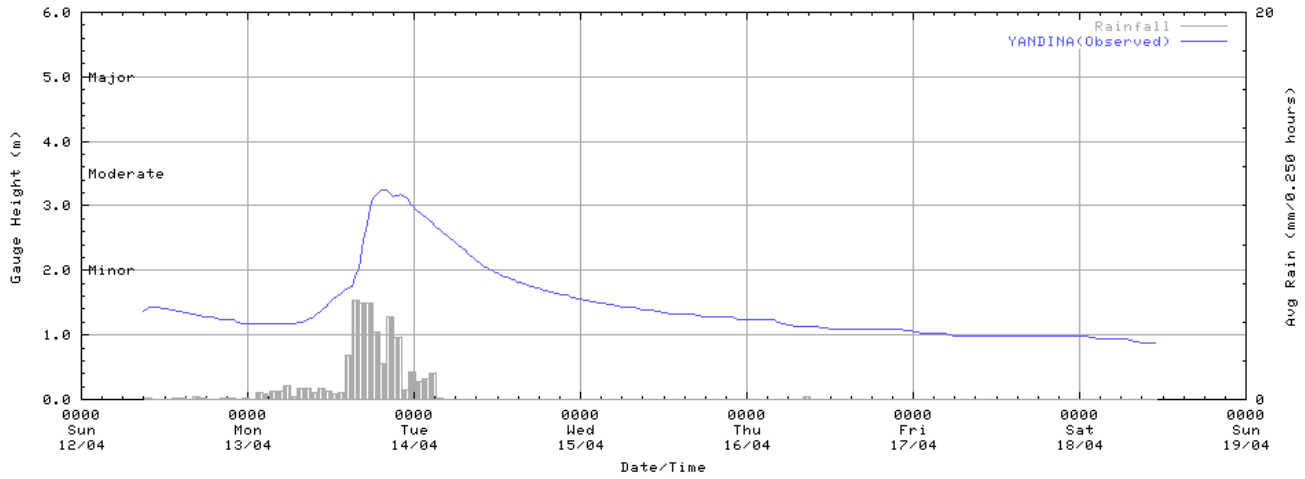


Figure 3.6.7 Flood hydrographs for the Maroochy River between 12/04/09 and 19/04/09.

North Maroochy River at Eumundi Alert



South Maroochy River at Yandina Alert



Doonan Creek at Doonan Creek Alert

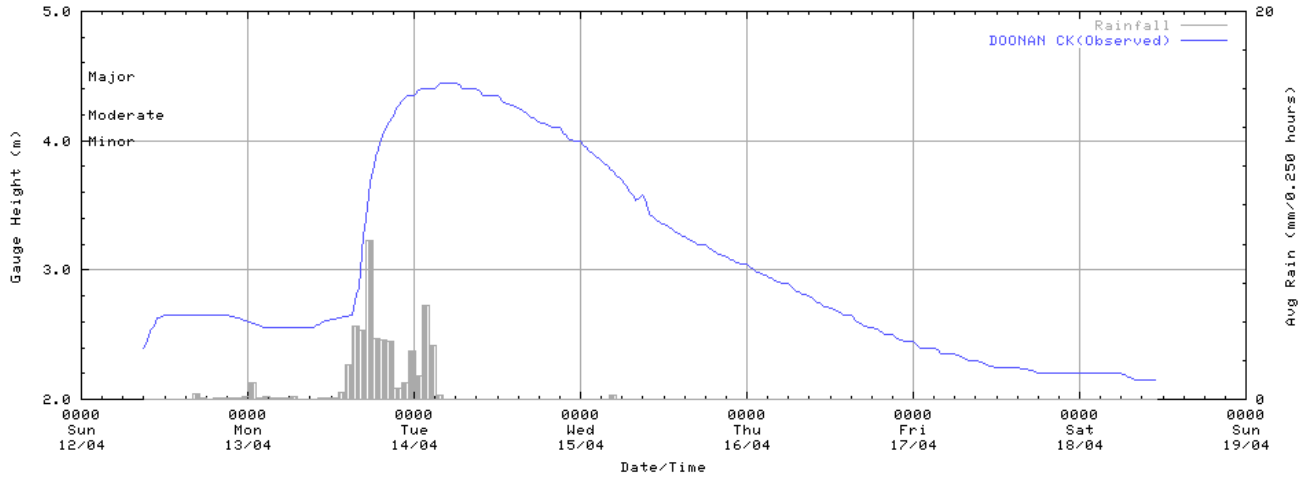
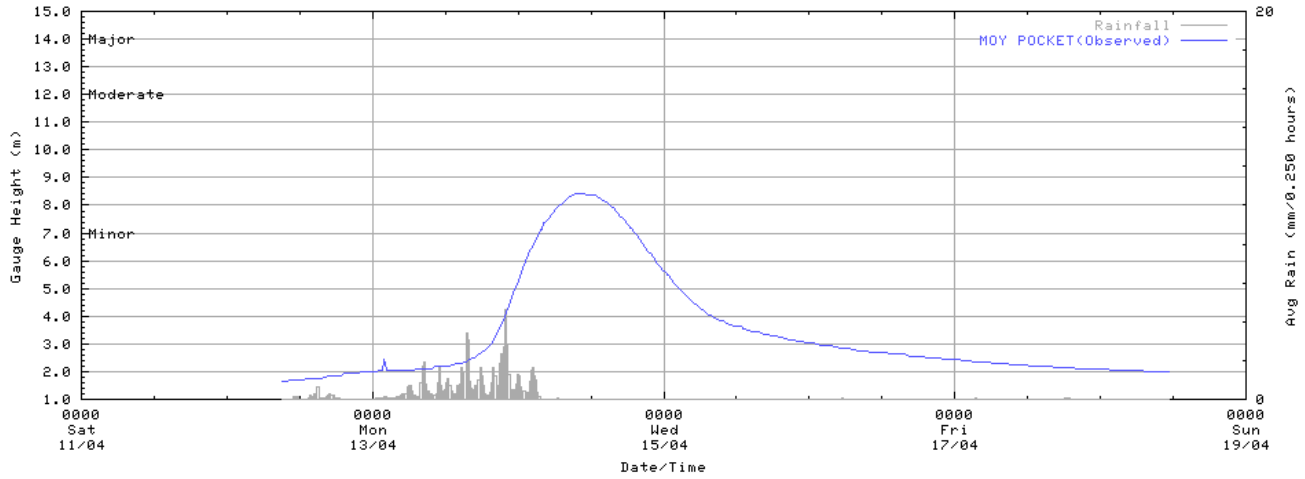
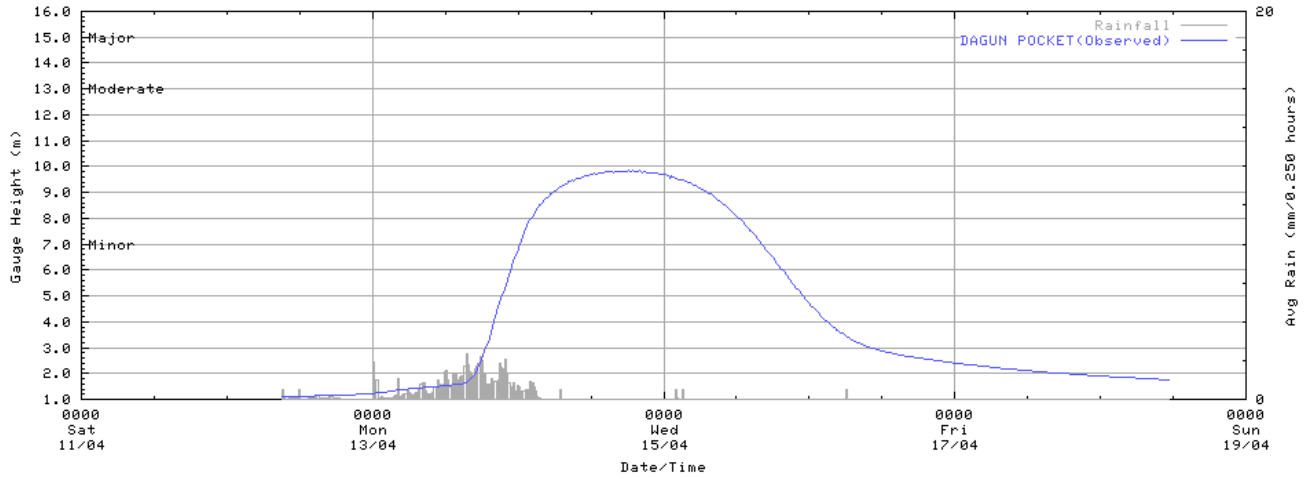


Figure 3.6.8 Flood hydrographs for the Mary River between 11/04/09 and 19/04/09.

Mary River at Moy Pocket Alert



Mary River at Dagun Pocket TM



Six Mile Creek at Lake MacDonald Drive Alert

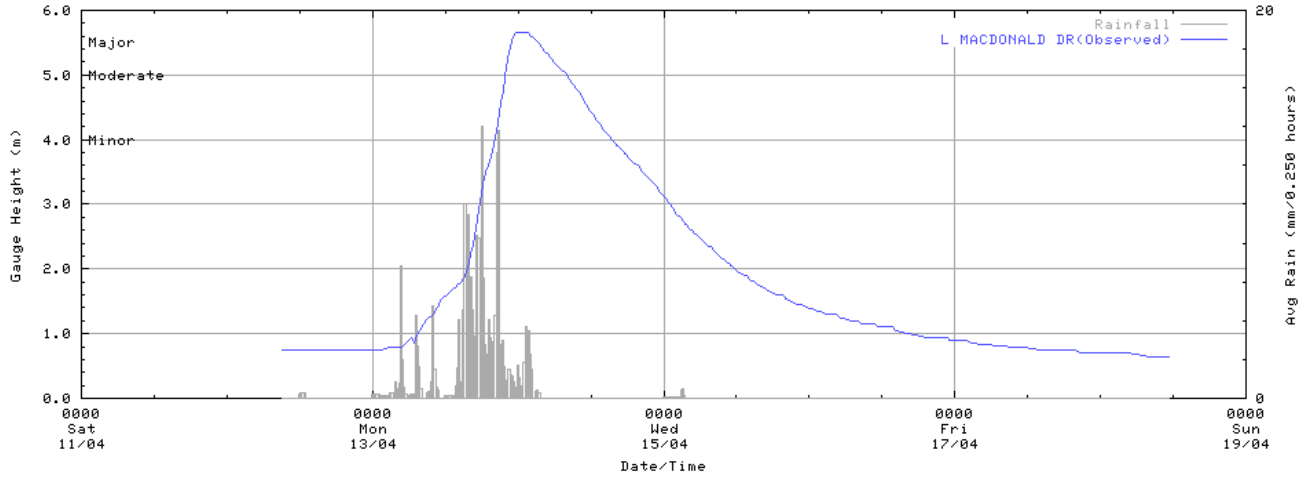
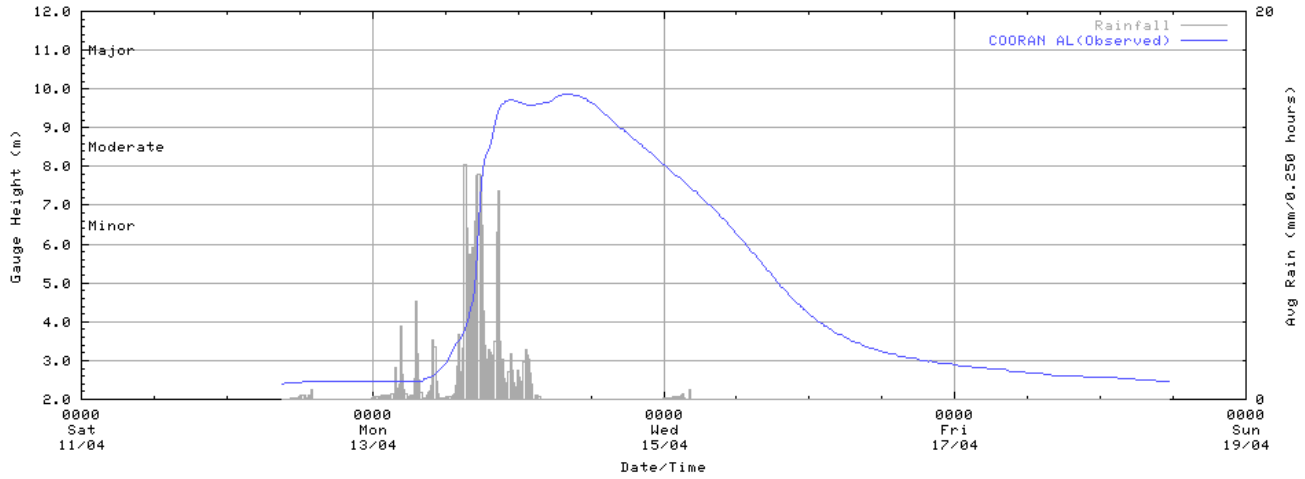
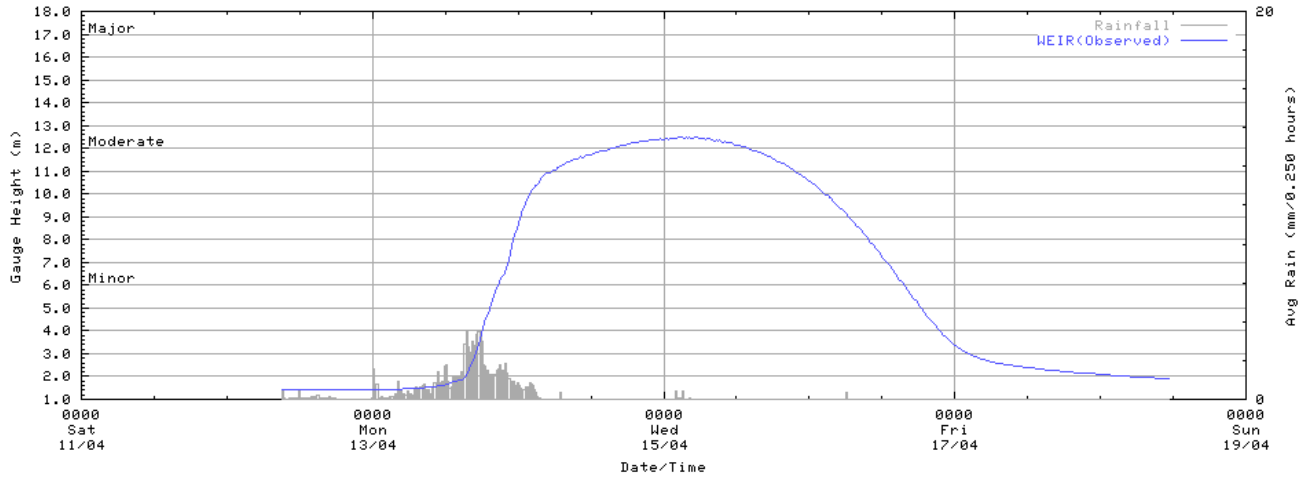


Figure 3.6.9 Flood hydrographs for the Mary River between 11/04/09 and 19/04/09.

Six Mile Creek at Cooran Alert



Mary River at Gympie Weir TM



Mary River at Fishermans Pocket TM

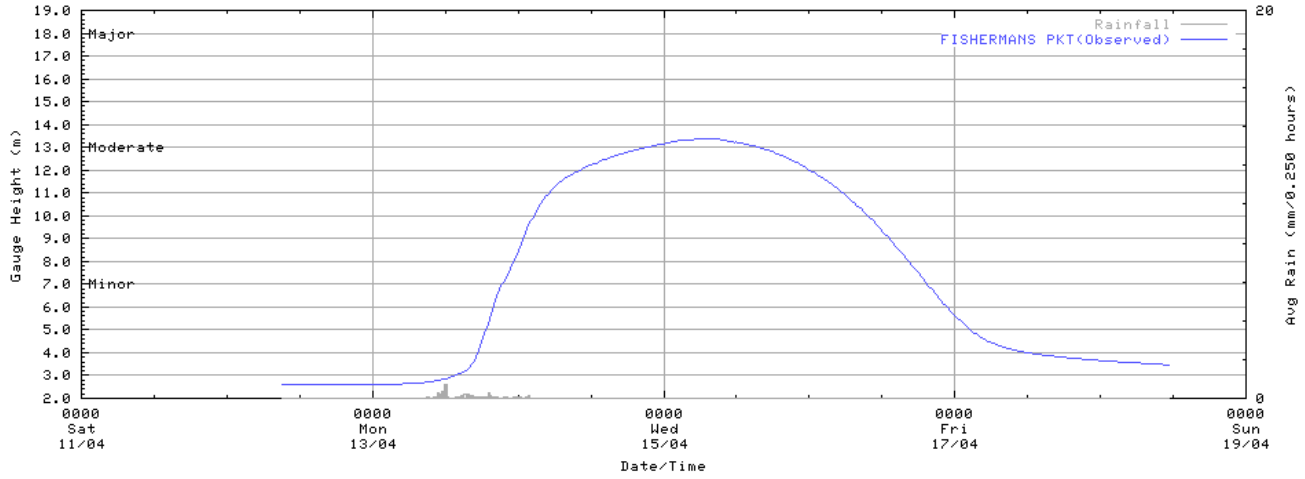
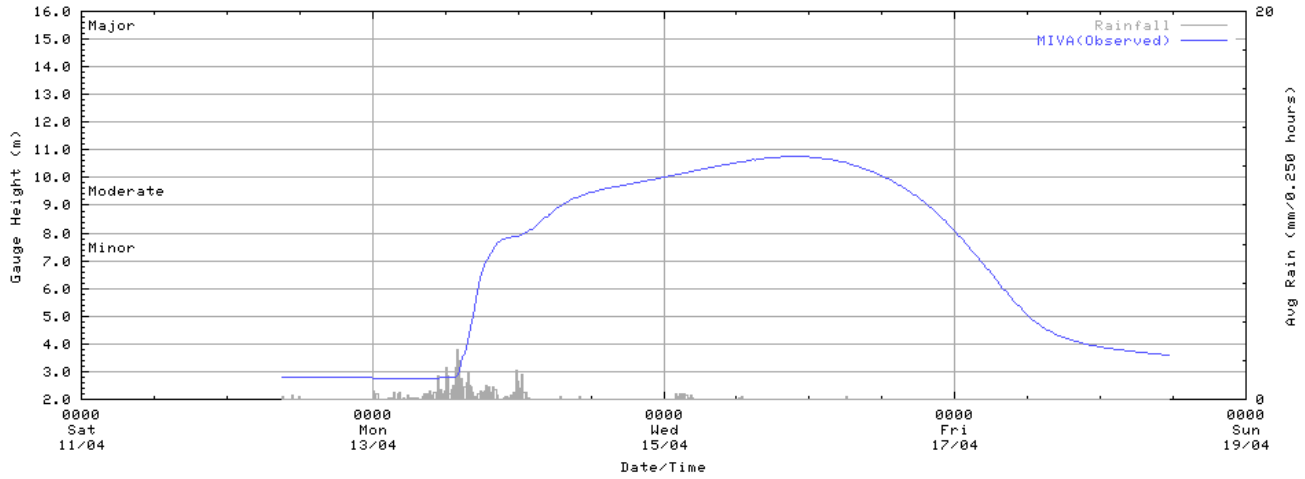
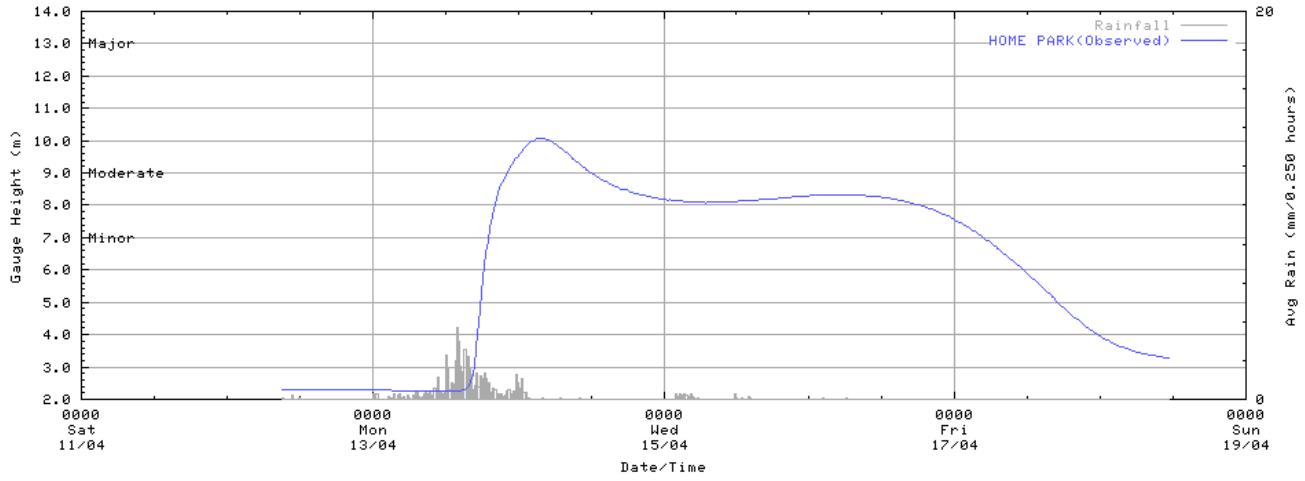


Figure 3.6.10 Flood hydrographs for the Mary River between 11/04/09 and 19/04/09.

Mary River at Miva TM



Mary River at Home Park TM



Mary River at The Barrage TM

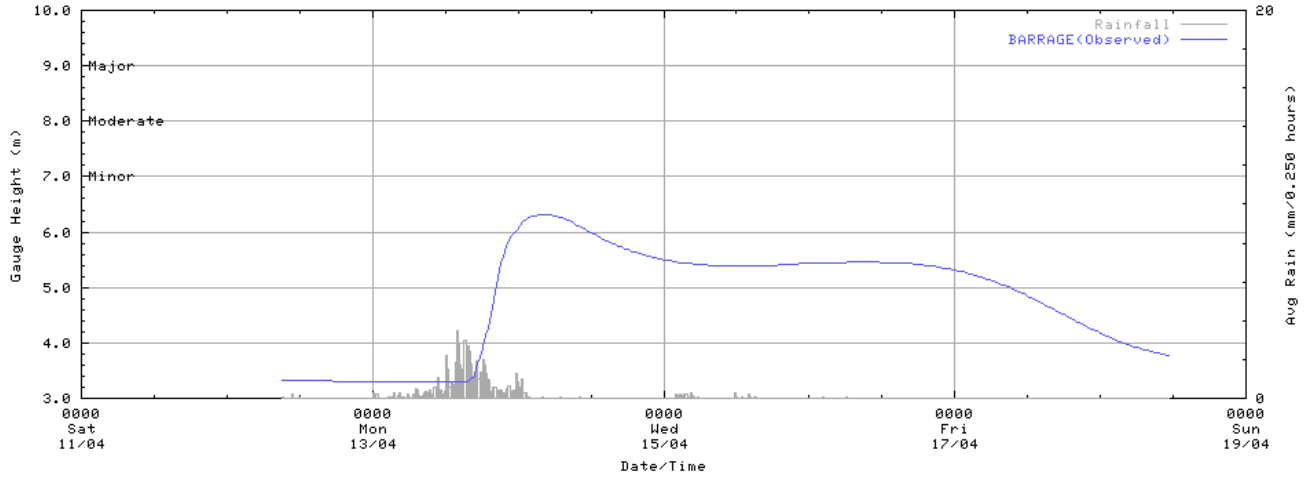
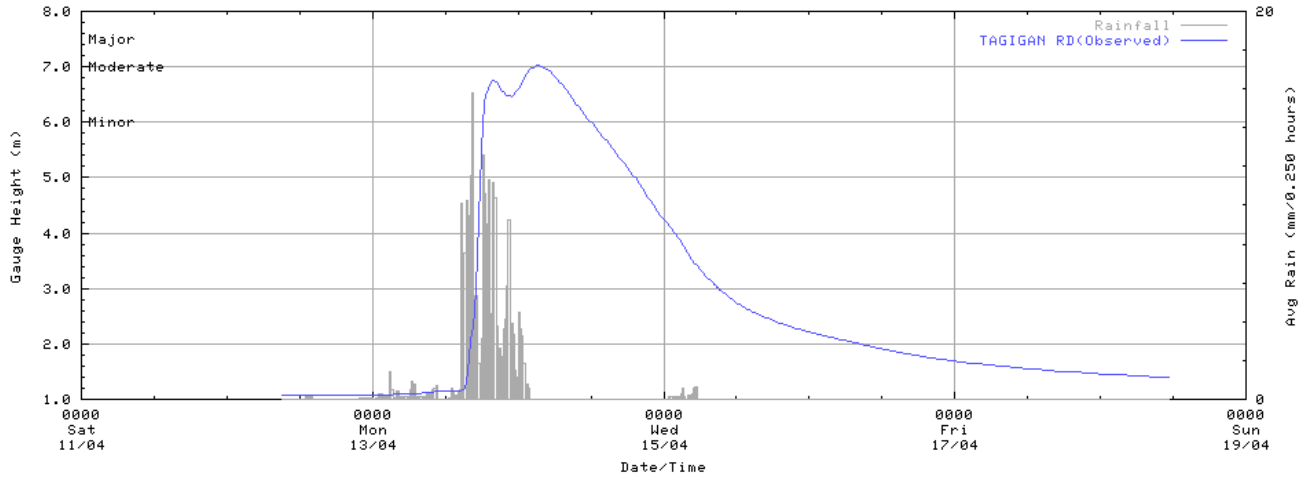
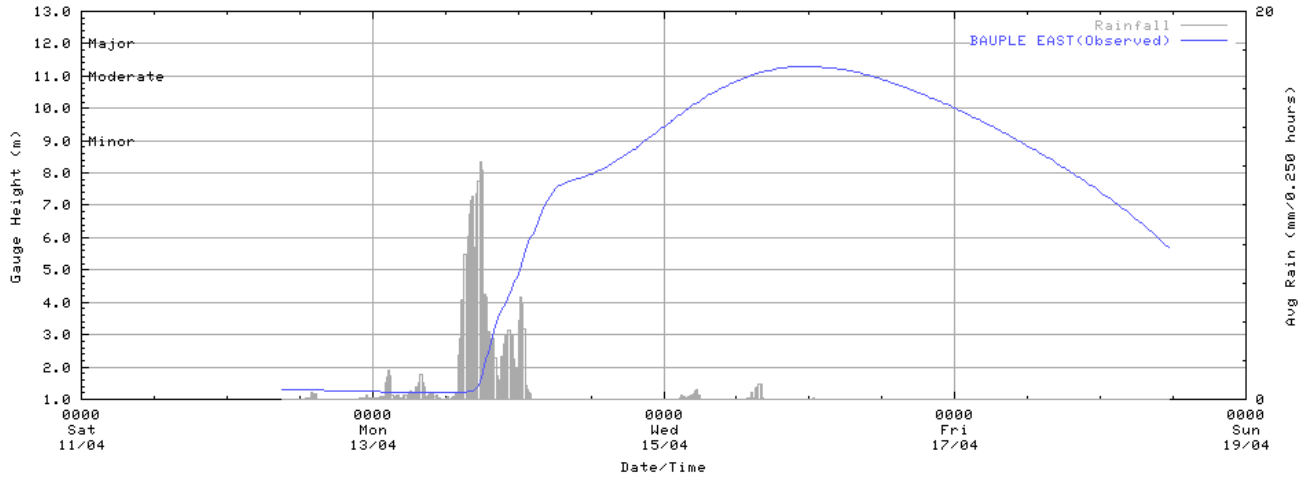


Figure 3.6.11 Flood hydrographs for the Mary River between 11/04/09 and 19/04/09.

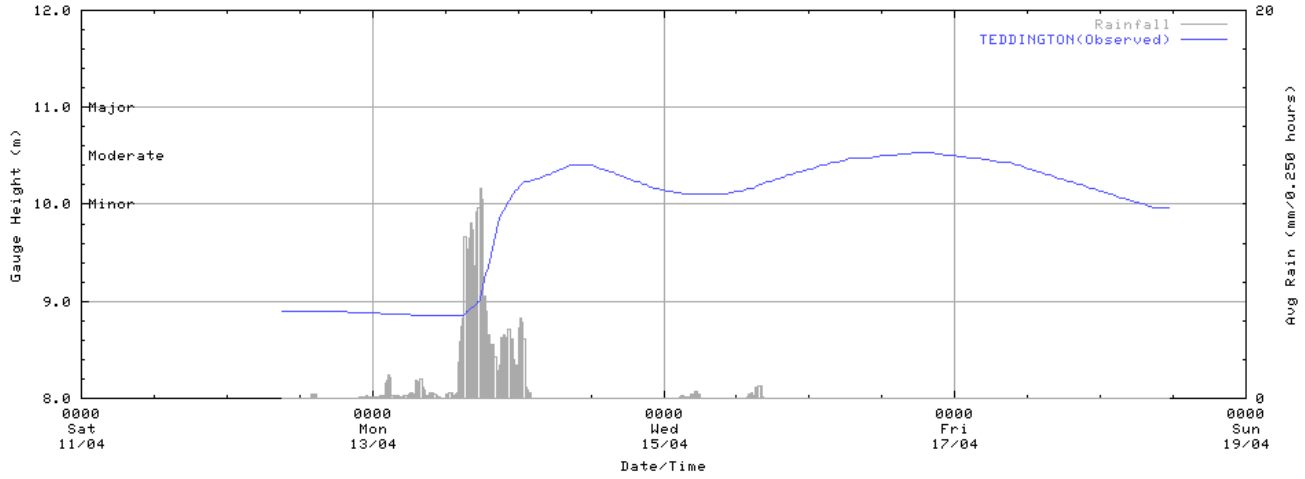
Tinana Creek at Tagigan Road TM



Tinana Creek at Bauple East TM



Tinana Creek at Teddington Weir HW TM



3.7 Warning Services for the Mooloolah, Maroochy and Mary Rivers

Table 3.7.1 Flood warnings and predictions for the Maroochy and Noosa Rivers issued between 02/04/09 and 06/04/09.

Number of Warnings	Number of Major Warnings	Number of Predictions	Number of Locations	First Warning	Last Warning
10	1	3	2	14:14pm Thurs 02/04/2009	10:07am Monday 06/04/2009

Table 3.7.2 Flood warnings and predictions for the Mary River issued between 02/04/09 and 06/04/09.

Number of Warnings	Number of Major Warnings	Number of Predictions	Number of Locations	First Warning	Last Warning
10	3	5	1	14:14pm Thurs 02/04/2009	09:54am Monday 06/04/2009

For the flood warnings issued for the Noosa, Maroochy and Mary River between 02/04/09 and the 06/04/09 a quantitative river height prediction analysis is given in Tables 3.7.3 and 3.7.4. River height predictions were made to predict the level that would be reached or exceeded.

Table 3.7.3 Quantitative predictions for Lake Cootharaba at Boreen Point, Lake Cooroibah.

Forecast Location	Time of first Height Forecast	Forecast/Time	Observed	Lead Time
Lake Cootharaba	10:30 pm Thursday 02/04/09	Exceed 1.5m by midnight 02/04/09	1.53m @ 1am Fri 03/04/09	2.5 Hours
Lake Cootharaba	10:30 pm Thursday 02/04/09	Remain below 2m Fri morning 02/04/09	1.58m (Peak) @ 10am Fri 03/04/09	10 Hours
Lake Cooroibah	10:30 pm Thursday 02/04/09	Exceed 1m during Friday am 03/04/09	1.33m (Peak) @ 5:30am Fri 03/04/09	7 Hours

Table 3.7.4 Quantitative predictions for Cooran and Gympie

Forecast Location	Time of first Height Forecast	Forecast/Time	Observed	Lead Time
Cooran	05:58 pm Thursday 02/04/09	Reach near 10.5m by midnight 02/04/09	9.77m @12am Fri 03/04/09	6 Hours
Gympie	05:58 pm Thursday 02/04/09	Exceed 6m by 9am Friday 03/04/09	5.71m @ 9am Fri 03/04/09	15 Hours
Gympie	09:23 pm Thursday 02/04/09	Exceed 6m during Friday am 03/04/09	6.02m @ 10:30am Fri 03/04/09	13 Hours

Gympie	06:24 am Friday 03/04/09	Peak about 7.5m during Friday afternoon/evening 03/04/09	9.46m @ 19:30pm Sat 04/04/09 *	41 Hours
Gympie	11:19 am Friday 03/04/09	Peak about 7.5m during Friday afternoon/evening 03/04/09	9.46m @ 19:30pm Sat 04/04/09 *	36 Hours
Gympie	03:57 pm Friday 03/04/09	Peak about 7.5m during Friday night 03/04/09	9.46m @ 19:30pm Sat 04/04/09 *	31.5 Hours
Gympie	10:08 am Saturday 04/04/09	Peak about 9.0m during Saturday morning 04/04/09 *	9.46m @ 19:30pm Sat 04/04/09	9 Hours

* Peak height forecast revised due to rainfall recorded overnight Friday night 03/04/2009.

Table 3.7.5 Flood warnings and predictions for the Coastal Streams Warnings issued between 13/04/09 and 14/04/09.

Number of Warnings	Number of Major Warnings	Number of Predictions	Number of Locations	First Warning	Last Warning
11	1	3	3	14:09pm Mon 13/04/2009	11:16am Tues 14/04/2009

Table 3.7.6 Flood warnings and predictions for the Mary River issued between 13/04/09 and 17/04/09.

Number of Warnings	Number of Major Warnings	Number of Predictions	Number of Locations	First Warning	Last Warning
11	5	16	4	07:09pm Mon 13/04/2009	10:20am Friday 17/04/2009

For the flood warnings issued for the Coastal Streams between Rockhampton and the Gold Coast and Mary River between 13/04/09 and 17/04/09 a quantitative river height prediction analysis is given in Tables 3.7.7 and 3.7.8. River height predictions were made to predict the level that would be reached or exceeded.

Table 3.7.7 Quantitative predictions for Lake Cootharaba at Boreen Point, Tewantin and Noosaville.

Forecast Location	Time of first Height Forecast	Forecast/Time	Observed	Lead Time
Lake Cootharaba	06:08 am Tuesday 14/04/09	Exceed 1.5m by late 14/04/09	1.38m(Peak) @ 10.30pm Fri 14/04/09	16.5 Hours
Tewantin	10:13 am Tuesday 14/04/09	Reach near 1m Tues-Thurs	0.95m (Peak) @ 12am Thurs 16/04/09	36 Hours
Noosaville	10:13 am Tuesday 14/04/09	Reach near 1m Tues-Thurs	0.8m (Peak) @ 11:30pm Tues 14/04/09	13 Hours

Table 3.7.8 Quantitative predictions for Gympie, Miva, Tiaro and The Barrage.

Forecast Location	Time of first Height Forecast	Forecast/Time	Observed	Lead Time
Gympie	05:42 am Tuesday 14/04/09	Possibly Peak at 14m by 6pm Tues 14/04/09	12.49m (Peak) @ 3am Wed 15/04/09	21 Hours
Gympie	11:08 am Tuesday 14/04/09	Peak at about 12.5m by 9pm Tues 14/04/09	12.49m (Peak) @ 3am Wed 15/04/09	16 Hours
Gympie	04:10 pm Tuesday 14/04/09	Peak about 12.5m by 6am Wed 14/04/09	12.49m (Peak) @ 3am Wed 15/04/09	11 Hours
Miva	05:42 am Tuesday 14/04/09	Reach about 12m by 6am Wed 15/04/09	10.76m (Peak) @ 10:30pm Wed 15/04/09	40 Hours
Miva	11:08 am Tuesday 14/04/09	Reach about 11m by 9am Wed 15/04/09	10.76m (Peak) @ 10:30pm Wed 15/04/09	35 Hours
Miva	04:10 pm Tuesday 14/04/09	Peak about 11m during Wed pm 15/04/09	10.76m (Peak) @ 10:30pm Wed 15/04/09	30 Hours
Miva	08:57 am Wednesday 15/04/09	Peak at 10.8m about 9 pm Wed 15/04/09	10.76m (Peak) @ 10:30pm Wed 15/04/09	13 Hours
Miva	04:03 pm Wednesday 15/04/09	Peak at 10.8m about 9 pm Wed 15/04/09	10.76m (Peak) @ 10:30pm Wed 15/04/09	5 Hours
Tiaro	08:57 am Wednesday 15/04/09	Peak at 8.5m during Thurs pm 16/04/09	No Data	
Tiaro	04:03 pm Wednesday 15/04/09	Peak at 8.5m during Thurs pm 16/04/09	No Data	
Tiaro	10:06 am Thursday 16/04/09	Peak at 8m during Thurs pm 16/04/09	No Data	

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