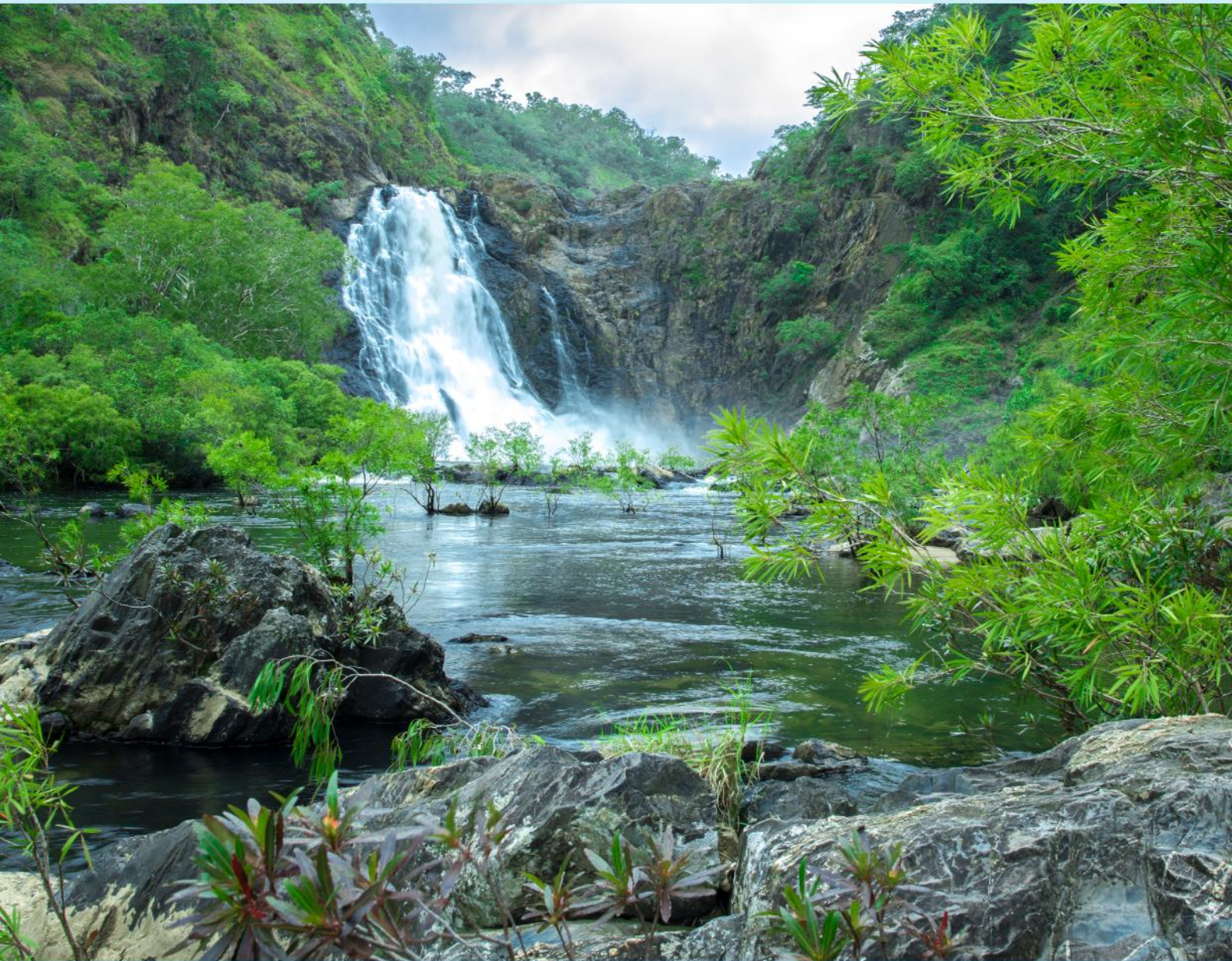




Australian Government
Bureau of Meteorology

Tropical cyclone *Ita* flood report

July 2014



Note:

1. Data in this report have 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 4 for Department of Natural Resources and Mines Usage Agreement.
3. This report is not a complete set of all data that are available; it is a representation of some of the key information.

Tropical cyclone *Ita* flood report
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Cover image: Daintree rainforest, Queensland, during wet season just before a thunderstorm.
Photograph by AH Design Concepts (iStockphoto)

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1 Introduction

The flooding caused by tropical cyclone *Ita* was short but significant for North Tropical Coast and Tablelands and the Herbert and Lower Burdekin districts. The majority of rainfall was recorded on 12 April, with the largest total (860 mm) recorded over 48 hours to 9am 13 April at Bellenden Ker Top in the Mulgrave Russell catchment.

Flooding above the moderate flood level (and in most instances above the major flood level) occurred in the following basins:

- Daintree River (Daintree Village)
- Barron River (Kamerunga Bridge)
- Mulgrave/Russell Rivers (Peetes Bridge and Gordonvale)
- Tully/Murray Rivers (Euramo and Murray Flats)
- Herbert River (Gleneagle, Abergowrie Bridge, Ingham, Gairloch and Halifax)
- Bohle River (Mt Bohle)
- Haughton River (Giru)
- Don River (Bowen).

2 Meteorological summary

Tropical cyclone *Ita* began as a tropical low pressure system southwest of the Solomon Islands in the north eastern Coral Sea on 2 April, 2014. Over the next few days it drifted westward while slowly intensifying, and was classified as a category 1 cyclone on the afternoon of 5 April.

The cyclone continued to move westward and then stalled south of Sudest Island (Papua New Guinea) for two days while continuing to intensify, reaching category 3 at 11 am on 8 April. It then started moving westward again, passing south of the Papua New Guinea mainland while maintaining its intensity as a category 3 cyclone.

On the afternoon of 10 April, *Ita* intensified very rapidly, reaching category 4 and then category 5 in the span of six hours. At the same time it turned southwest towards the Far North Queensland coast, where it made landfall near Cape Flattery at about 10 pm on the evening of Friday 11 April. *Ita* weakened somewhat in the hours leading up to landfall and at the time of writing had been rated as a category 4 cyclone at landfall, although this may be revised later once all the data have been reviewed. Cape Flattery automatic weather station recorded a maximum wind gust of 159 km/h.

Near landfall, the centre of *Ita* came within 5km of the resort at Lizard Island. Unofficial readings showed the air pressure dropped to approximately 954 hPa and wind gusts reached approximately 155 km/h before the instrument failed. Considerable vegetation damage but only minor structural damage to buildings was recorded at the resort.

Upon landfall, *Ita* continued to track southward through the inland North Tropical Coast district. It weakened reasonably quickly and passed 20 km west of Cooktown (the closest population centre to *Ita*'s initial landfall) as a category 2 cyclone. Wind gusts of approximately 125 km/h were recorded there. Around 200 buildings sustained (mostly minor) damage, while 16 buildings were severely damaged or totally destroyed. A storm surge of approximately 1.1 m occurred at about midnight, though as this arrived coincident with the low astronomical tide, little if any inundation occurred.

Ita weakened further to a category 1 cyclone and maintained this category through the rest of its two day trek southwards along the north Queensland coast, with much of the time spent over land. Gale force winds and damaging wind gusts were recorded at Lucinda, Townsville, Cape Ferguson, Mackay, and Middle Percy Island. The main impacts during this phase of *Ita*'s lifetime, though, were rainfall and flooding. Widespread 24 hour rainfalls of over 300 mm, peaking at approximately 400 mm, were recorded in the North Tropical Coast and Herbert and Lower Burdekin districts. The Daintree, Mulgrave, Haughton, and Herbert rivers all recorded major floods. Flash flooding occurred at Bowen, where 110 mm of rainfall was recorded in one hour.

2.1 Figures

Figure 2.1.1 Track of *Ita* as a tropical low (L) and tropical cyclone and from 2 to 14 April 2014

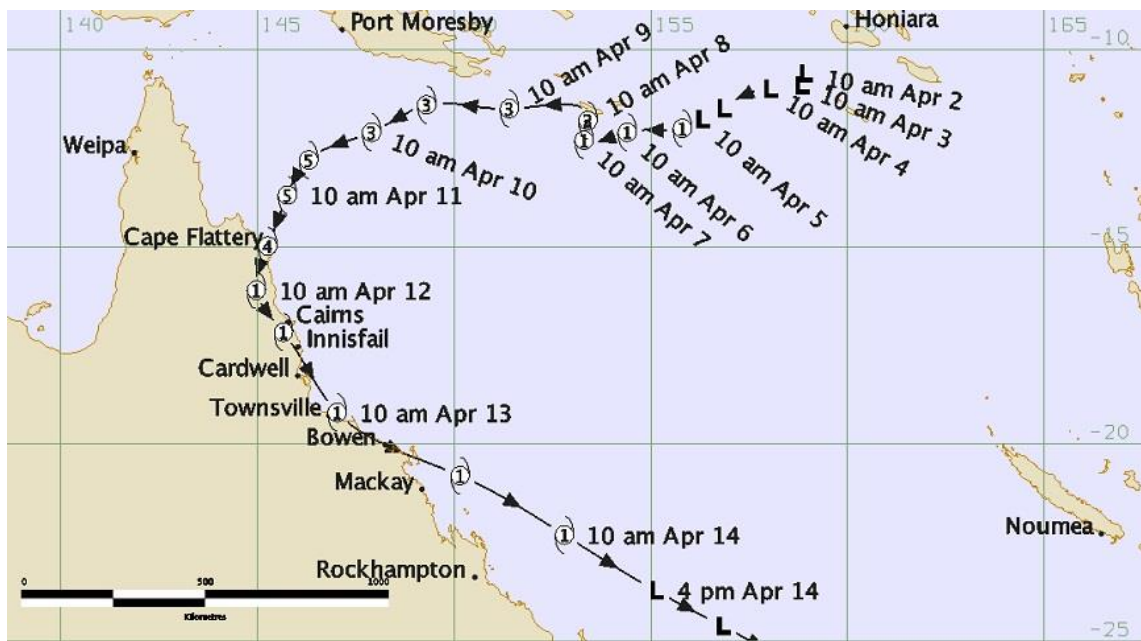
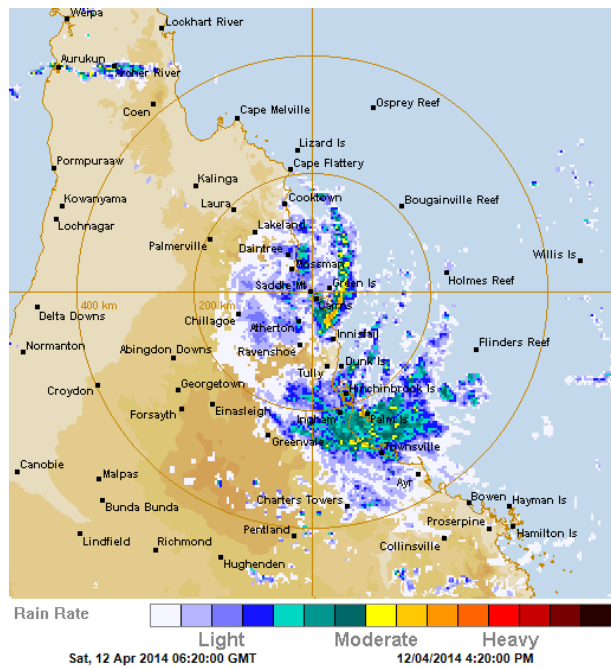
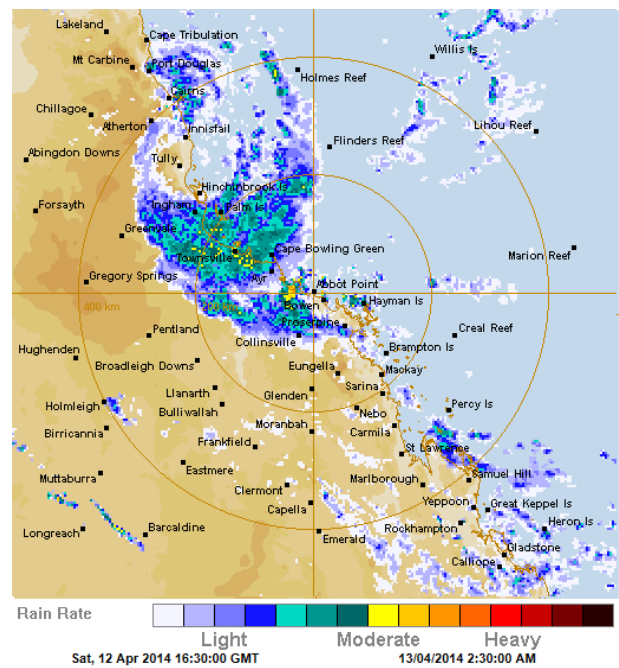


Figure 2.1.2 Radar imagery of tropical cyclone *Ita* along the tropical north coast of Queensland

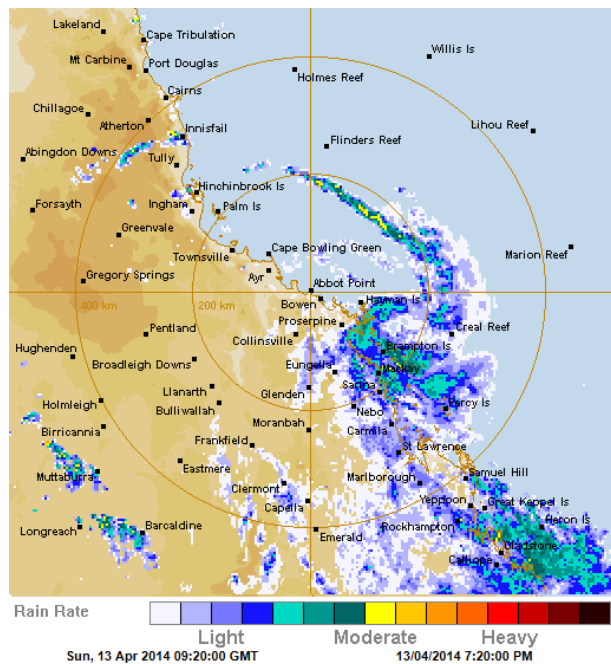
Cairns 512 km radar 4.20 pm EST on 12 April 2014



Bowen 512 km radar 2.30 am EST on 13 April 2014



Bowen 512 km radar 7.20 pm EST on 13 April 2014



3 Hydrology

Tropical cyclone *Ita* was named on 5 April approximately six days before it made landfall at 10pm on Friday, 11 April near Cape Flattery. Significant rainfall associated with the cyclone was first recorded in the 24 hours to 9 am on 12 April in the Daintree, Barron, Mulgrave/Russell, Johnstone and Herbert Rivers. As the system moved southwards over the next few days the significant rainfall moved with it, affecting the more southern catchments of the Ross/Bohle, Haughton, Lower Burdekin, Don, Proserpine, Pioneer and Fitzroy. Widespread daily totals of 100-300 mm were recorded in all coastal catchments between the Daintree Village and Proserpine between 9 am on 11 April and 9 am on 14 April. River level rises were recorded throughout the North Tropical Coast district with the following providing a summary of the flood levels recorded in each affected catchment during this event.

The hydrology presented in this report concentrates on flooding that occurred in Queensland river basins, with hydrographs and rainfall data from the Queensland Flood Warning Network stations only.

Daintree

Heavy rainfall was recorded on 11 April leading to river rises in the Daintree River. Bairds telemetry (upstream of Daintree Village) recorded 401 mm in the 24 hours to 9 am on 12 April, with widespread totals of 200 mm or more recorded throughout the area. The major flood level at Bairds was the second highest flood on record (record flood was recorded in 1957). Downstream major flood levels at the Daintree Village peaked at 10.5 m, the highest level recorded since 1996. Flood warnings for the Daintree River commenced on 11 April and were finalised on 13 April.

Barron

Heavy rainfall was recorded on 12 April resulting in significant river rises in the Barron catchment. The tributaries of the Clohesy River and Flaggy Creek were first to respond to this rainfall. Widespread rainfall totals between 50 mm and 200 mm were recorded in the 24 hours to 9 am on 12 April and were followed up with a further 100-200 mm in the 24 hours to 9 am on 13 April. Locally, heavier falls were recorded, including 337 mm at Boar Pocket. Moderate flood levels were recorded on the Barron River at Kamerunga Bridge (highest since 2006) with river levels just exceeding the minor flood level downstream at Cairns Airport (highest since 2011). Flood warnings for the Barron River commenced on 12 April and were finalised the following day.

Mulgrave/Russell

Heavy rainfall was recorded on 12 April resulting in river rises in the Mulgrave and Russell Rivers. Widespread rainfall totals of 100-150 mm were recorded in the 24 hours to 9 am on 12 April and were followed up with a further 100-250 mm in the 24 hours to 9 am on 13 April. Major flood levels were recorded at all sites on the Mulgrave River, with Peetes Bridge and Gordonvale peaking at their highest levels since March 2012. Minor to moderate flood levels were recorded in the Russell River. Flood warnings for the Mulgrave and Russell rivers commenced on 12 April and were finalised the following day.

Johnstone

Heavy rainfall was recorded on the afternoon of 12 April leading to river rises along the lower Johnstone River. Widespread rainfall totals of 50-170 mm were recorded in the 24 hours to 9 am on 12 April and were followed up with a further 100-200 mm in the 24 hours to 9 am on 13 April. Minor flood levels were recorded at all sites along the North Johnstone River. Flood warnings for the Johnstone River commenced on 12 April and were finalised on 13 April.

Tully/Murray

Rainfall was recorded during 12 April leading to river rises in the Tully and Murray catchments. Widespread rainfall totals of 50-170 mm were recorded in the 24 hours to 9 am on 12 April and were followed up with a further 150-350 mm in the 24 hours to 9 am on 13 April. Moderate flood levels were recorded along the Tully River, with Euramo recording its highest levels since January 2013. Major flood levels recorded in the Murray River at Murray Flats were the highest levels recorded since February 2009. Flood warnings for the Tully and Murray rivers commenced on 12 April and were finalised on 16 April.

Herbert

Heavy rainfall was recorded during the afternoon of 12 April leading to river rises in the lower Herbert River. Widespread rainfall totals of 25-80 mm were recorded in the 24 hours to 9 am on 12 April and were followed up with a further 50-375 mm in the 24 hours to 9 am on 13 April. Major flood levels were recorded at all sites along the Herbert River between Gleneagle and Halifax. River levels in the lower Herbert River around Ingham and Halifax (including Cordelia and Macknade) have been assessed to have been the most significant since the February 2009 flood event. Local sources suggest that 40-50 properties had water over floor level as a result of this event. Flood warnings for the Herbert River commenced on 12 April and were finalised on 16 April.

Ross/Bohle

Moderate to heavy rainfall was recorded during 13 April leading to river rises in the Ross and Bohle catchments. Widespread rainfall totals of 25-50 mm were recorded in the 24 hours to 9 am on 12 April and were followed up with a further 150-300 mm in the 24 hours to 9 am on 13 April. Moderate to major flood levels were recorded at all sites along the Bohle River. No significant river level rises were recorded along the Ross River during this event, but gate operations were required at Ross River Dam. Flood warnings for the Bohle River commenced on 13 April and were finalised on 14 April.

Haughton

Moderate to heavy rainfall was during 13 April leading to river level rises in the Haughton catchment. Widespread rainfall totals of 100-150 mm were recorded in the 24 hours to 9 am on 13 April (locally heavier falls were recorded, including 281 mm at Upper Major Creek). A further 20-70 mm fell in the 24 hours to 9 am on 14 April. Minor to moderate flood levels were recorded along the Haughton River between Mt Piccaninny and Powerline, and in Major Creek. Downstream at Giru, major flood levels peaked at their highest levels since January 2013. Flood warnings for the Haughton River began on 13 April and were finalised on 14 April.

Burdekin

Moderate to heavy rainfall was recorded in the Burdekin River catchment around Paluma during 12-13 April, with isolated falls of 260-390 mm. Heavy falls also occurred over the lower reaches of the Burdekin River during 13-14 April with daily totals of 60-90 mm. River level rises occurred across the catchment, but did not exceed the minor flood level at any location; however, river levels at Burdekin Dam exceeded the spillway height.

Don

Widespread rainfall totals of 50-200 mm were recorded in the 24 hours to 9 am on 14 April, with the majority recorded between midday and 2 pm on 13 April. Significant river level rises were recorded along the Don River between Ida Creek and Bowen Pump Station as a result of this rainfall. The forecast location of Bowen Pump Station recorded 163 mm in the two hours to 2:15 pm on 13 April. A moderate flood peak of 5.3 m occurred at Bowen Pump Station, which was the highest level recorded since February 2008. Flood warnings for the Don River began on 13 April and were finalised on 14 April.

Proserpine

Moderate to heavy rainfall was recorded within the Proserpine River catchment during this event, with significant localised flooding.

Pioneer

Moderate to heavy rainfall was recorded within the Pioneer River catchment during this event; however, apart from a small rise in Cattle Creek, no significant river level rises were recorded in this catchment.

Fitzroy

Moderate to heavy rainfall was recorded within the Connors River catchment, most notably in the northern tributaries of Prospect and Funnel Creeks, with rainfalls of 30-100 mm recorded in the 24 hours to 9 am on 14 April. River level rises were recorded across the Connors River catchment with a moderate flood peak recorded at Yatton on the Isaac River. River levels downstream remained well below minor.

3.1 Peak river heights

A map displaying the peak river heights across Queensland during 9-14 April 2014 is shown in Figure 3.1.1. As is evident, major flood levels were recorded across the far north coast of Queensland between Daintree Village and Bowen.

Figure 3.1.1 Peak flood heights observed between 9 and 14 April 2014 resulting from rainfall produced by tropical cyclone *Ita*

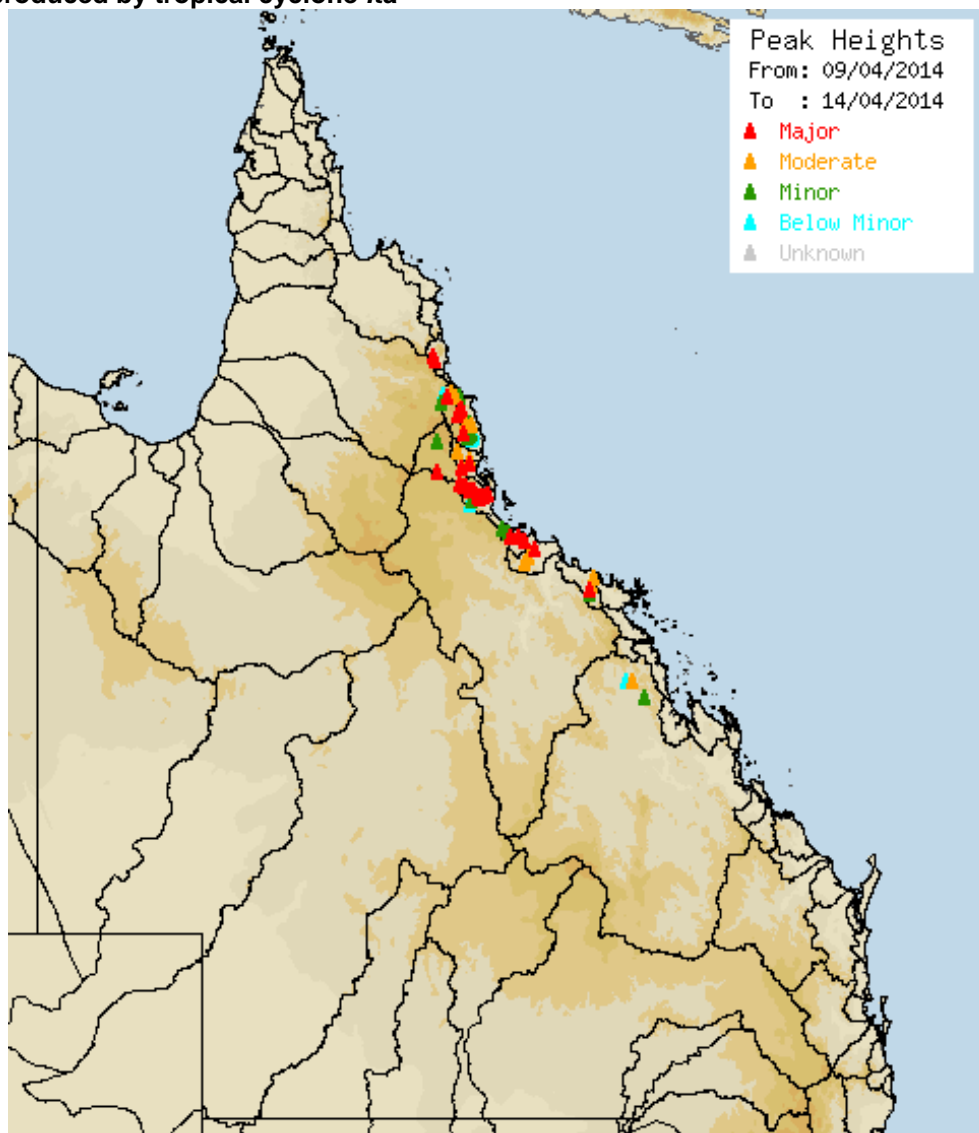


Table 3.1.1 Significant peak heights observed during 12-14 April 2014 and historical comparisons

Location	Catchment	Peak height	Flood class	Start of record	Ranking	Highest since	Record
Daintree Village	Daintree River	10.50 m	Major	1901	4th	11.81 m 03/03/1996	12.40 m 1901
Cairns Airport	Barron River	2.53 m	Minor	1967	10th	2.48 m 19/03/2012	3.80 m 07/03/1977
Kamerunga Bridge	Barron River	6.64 m	Moderate	2001	3rd	6.29 m 19/03/2012	7.94 m 05/03/2008
Gordonvale	Mulgrave River	16.3 m	Major	1967	5th	16.4 m March 2012	17.50 m 1967
Peetes Bridge	Mulgrave River	9.6 m	Major	2001	3rd	9.75 m 19/03/2012	9.75 m 19/03/2012
Mourilyan Mill	Johnstone River	6.52 m	< Minor	2001	7th	7.52 m 08/02/2014	11.32 m 06/02/2009
McAvoy Bridge	Johnstone River	5.95 m	Minor	1967	11th	5.3 m 08/02/2014	9.4 m 13/03/1967
Innisfail Wharf	Johnstone River	4.89 m	< Minor	1913	27th	4.44 m 08/02/2014	8.09 m 30/01/1913
Euramo	Tully River	8.59 m	Moderate	1967	> 50th	8.79 m 23/01/2013	9.37 m 1967
Murray Flats	Murray River	8.4 m	Major	2001	2nd	8.35 m 24/01/2013	8.71 m 07/02/2009
Gleneagle Alert	Herbert River	8.15 m	Major	1925	> 50th	10.88 m 07/02/2009	16.15 m 11/02/1927
Abergowrie Bridge	Herbert River	16.24 m	Major	2001	4th	16.64 m 03/02/2009	17.24 m 07/02/2009
Gairloch	Herbert River	12.45 m	Major	1956	3rd	12.64 m 03/02/2011	12.64 m 03/02/2011
Ingham Pump Station	Herbert River	14.54 m	Major	1916	5th	13.95 m 03/02/2011	16.10 m 10/01/1998
Halifax	Herbert River	5.62 m	Major	1967	3rd	5.67 m 02/02/2009	5.67 m 02/02/2009
Giru	Haughton River	2.55 m	Major	1978	38th	2.54 m 30/01/2010	3.09 m 03/02/2011
Bowen Pump Station	Don River	5.3 m	Moderate	1970	10th	6.5 m 12/02/2008	7.25 m 19/01/1970

3.2 Rainfall maps

The highest rainfall total recorded for this event was 860 mm at Bellenden Ker Top in the Mulgrave Russell catchment which fell in the period in the 48 hour period to 9 am on 13 April.

The rainfall amounts in Figures 3.2.1 to 3.2.4 are all given in millimetres. Refer to www.bom.gov.au/qld/flood/brochures/river_maps.shtml for the station names of the rainfall locations used in Figures 3.2.1 to 3.2.4. For a complete list of daily rainfalls please refer to [Appendix 2: Rainfall tables](#).

Figure 3.2.1 Rainfall map of the Far North Queensland River catchments 10-15 April 2014

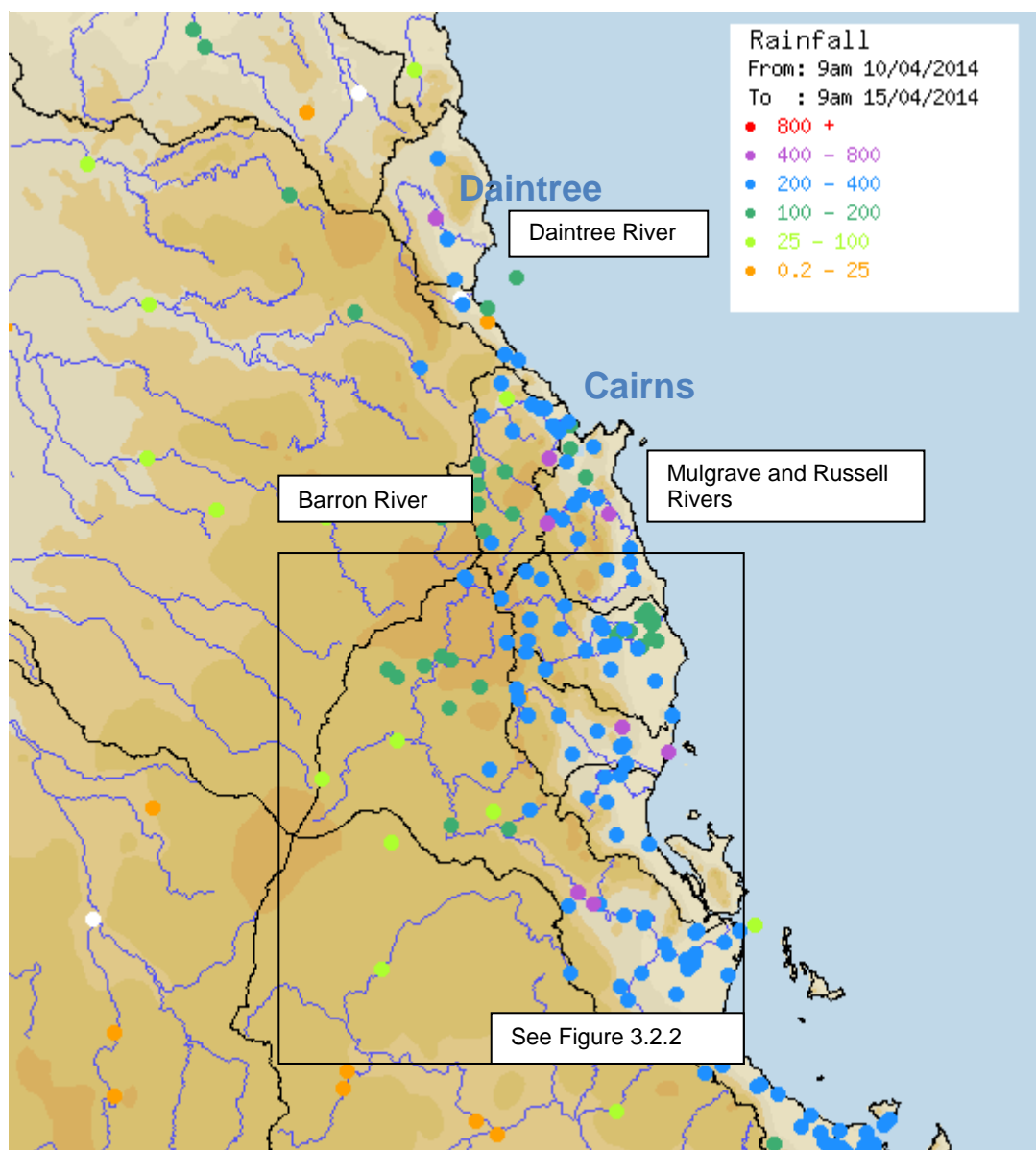


Figure 3.2.2 Rainfall map of the Herbert, Johnstone, Tully and Murray River catchments 10-15 April 2014

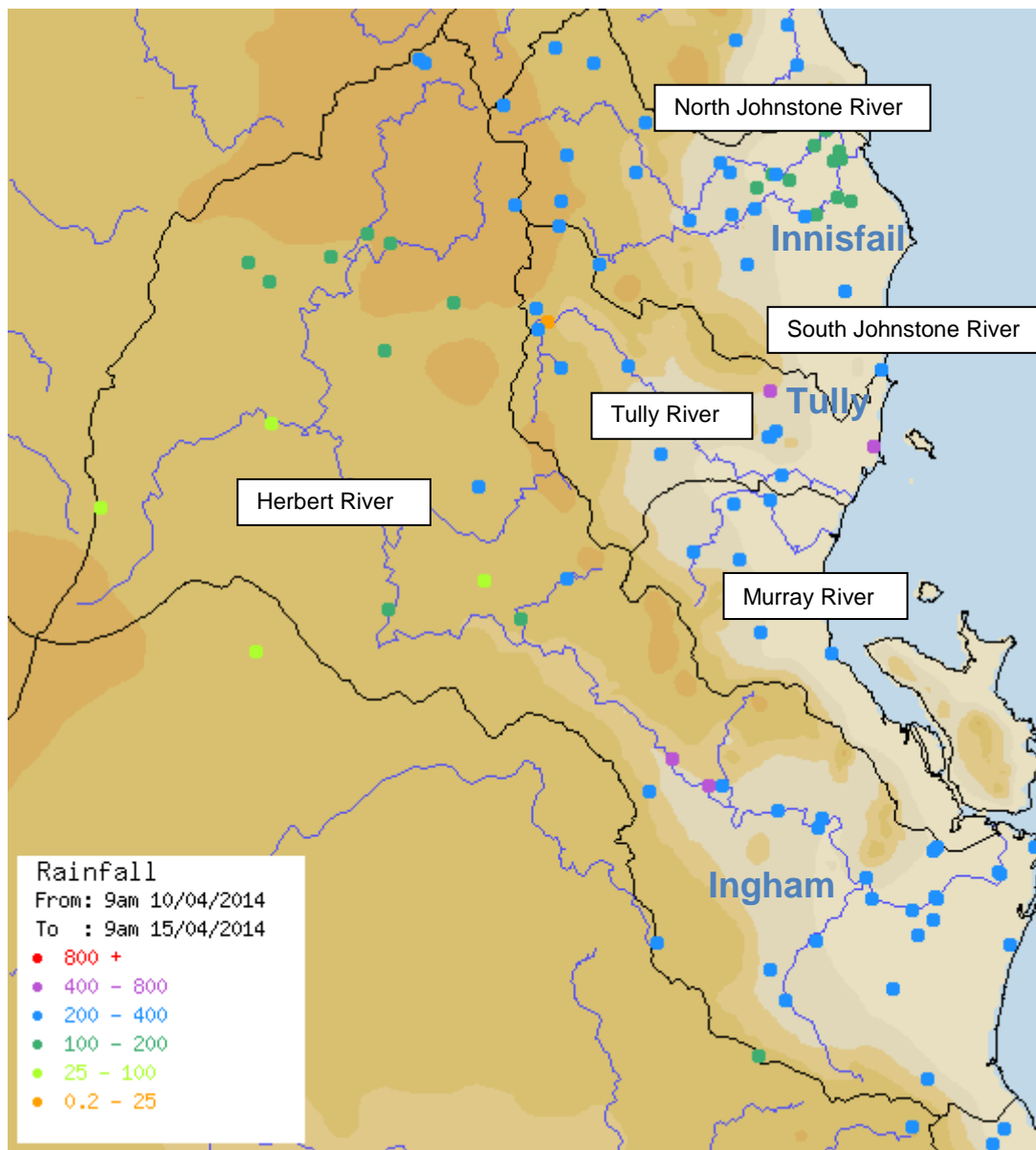


Figure 3.2.3 Rainfall map of the Ross and Haughton River catchments 10-15 April 2014

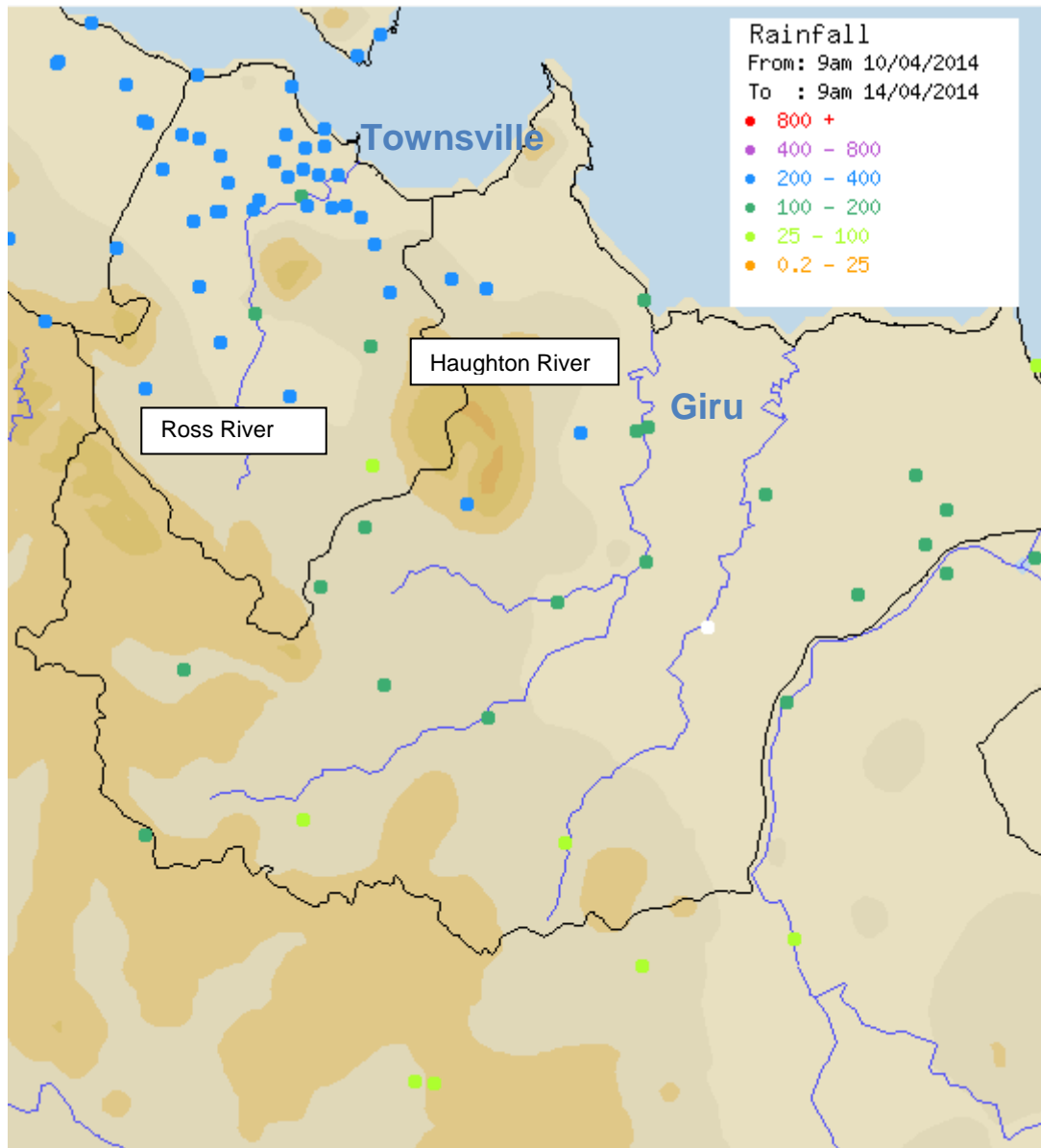
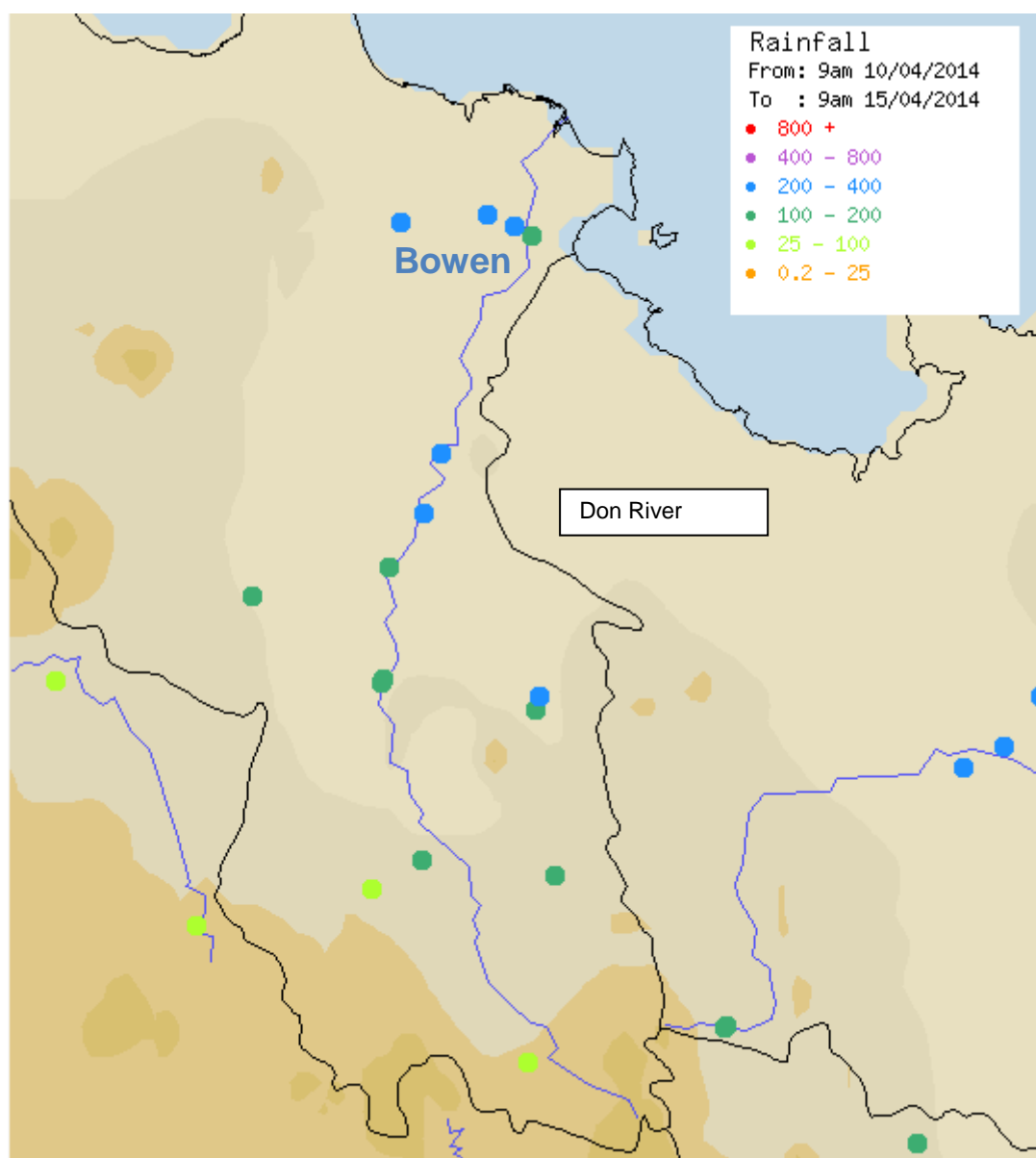


Figure 3.2.4 Rainfall map of the Don River catchment 10-15 April 2014



3.3 Rainfall intensity

Hourly hyetographs and an analysis of the duration and intensity of the most significant rainfall totals following tropical cyclone *Ita* are presented in Figures 3.3.1 and 3.3.2 and Tables 3.3.1 and 3.3.2 respectively. The selected sites include Bairds telemetry in the Daintree River catchment, Boar Pocket Alert in the Barron River catchment, Copperlode Dam Alert on Freshwater Creek in the Barron River catchment, Nash's Crossing Alert in the Herbert River catchment and Reeves Alert and Bowen Pump Station Alert in the Don River catchment.

Short duration rainfall intensities (less than 1 hour) for all locations were typically insignificant, with at least a 10 per cent chance of being exceeded in any one year.

The highest rainfall total recorded at an automatic station was 484 mm at Bairds telemetry ; however, the highest intensities recorded at Bairds were 296 mm in 12 hours and 403 mm in 24 hours. Both intensities had a 5-10 per cent chance of being exceeded in any one year. The highest intensity rainfalls recorded during this event were at Boar Pocket Alert, Reeve Alert and Bowen Pump Station Alert, all of which exceeded the 1 per cent Annual Exceedance Probability (AEP).

Refer to www.bom.gov.au/qld/flood/brochures/river_maps.shtml for the location of rainfall stations used in Figures 3.3.1 and 3.3.2.

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

Figure 3.3.1 Hourly hyetographs for Bairds Telemetry and Boar Pocket Alert

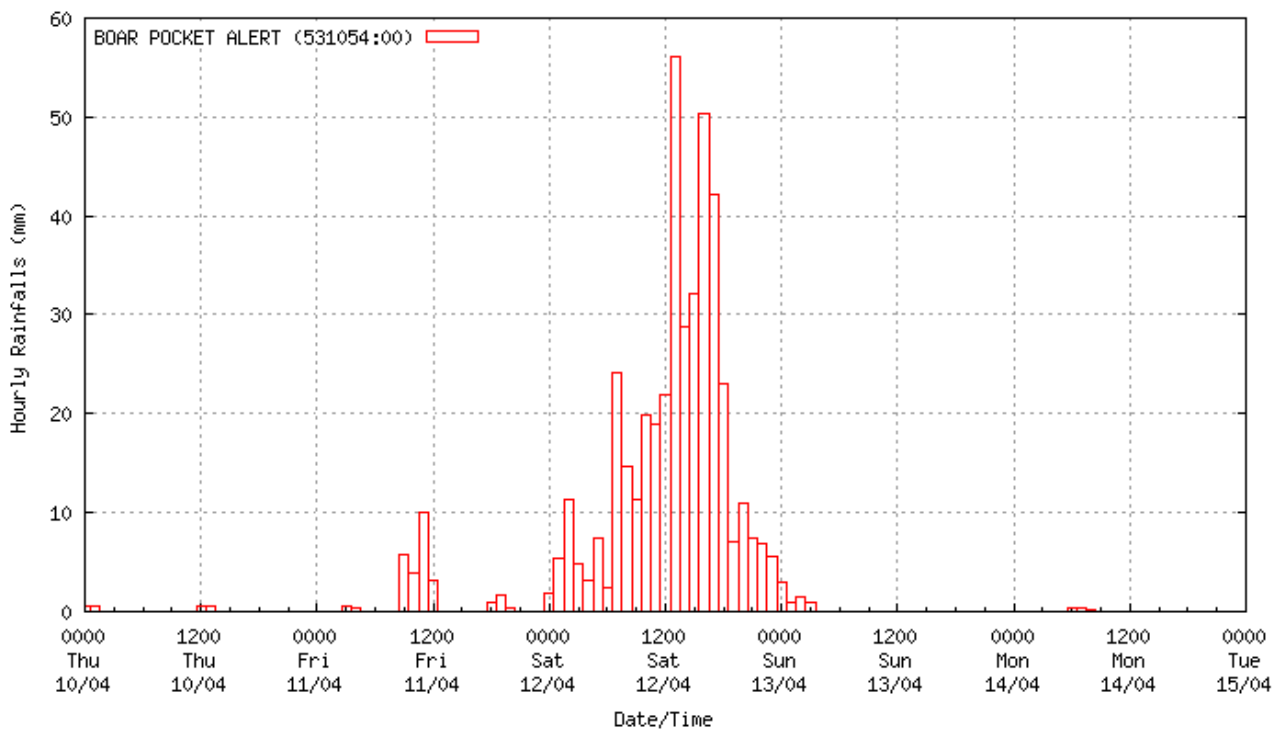
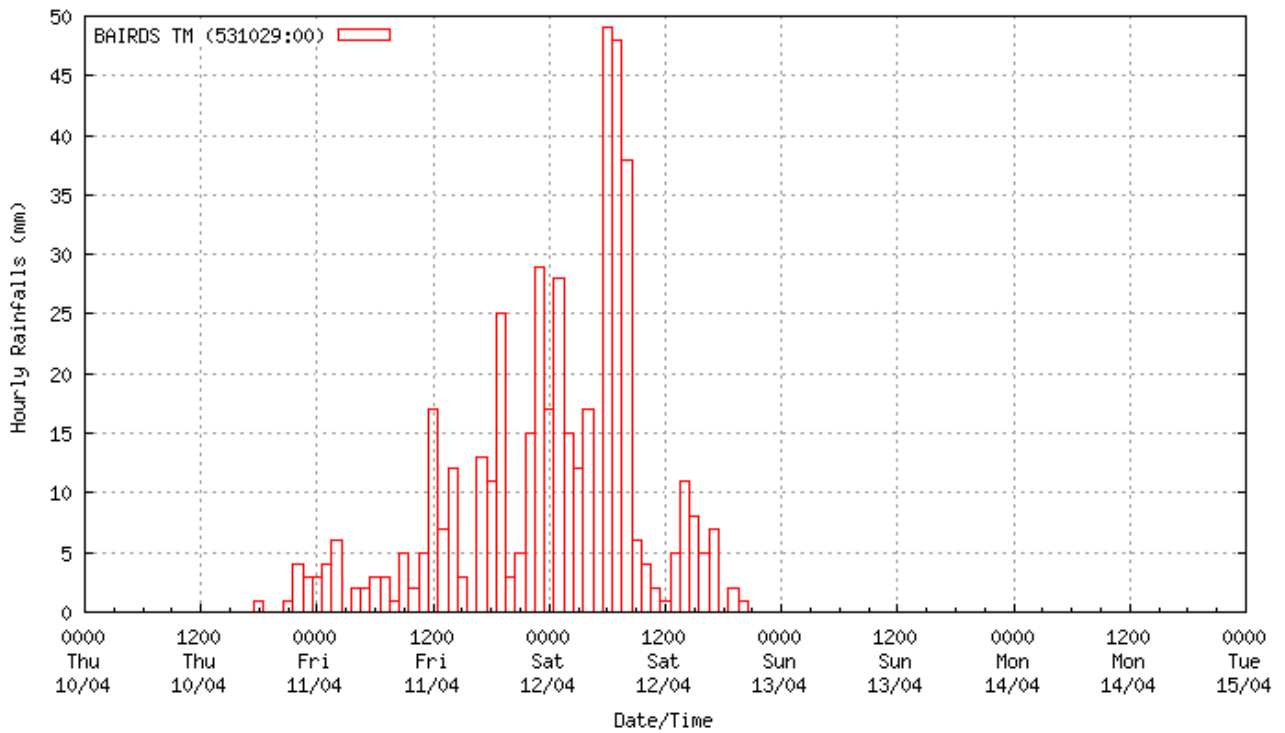
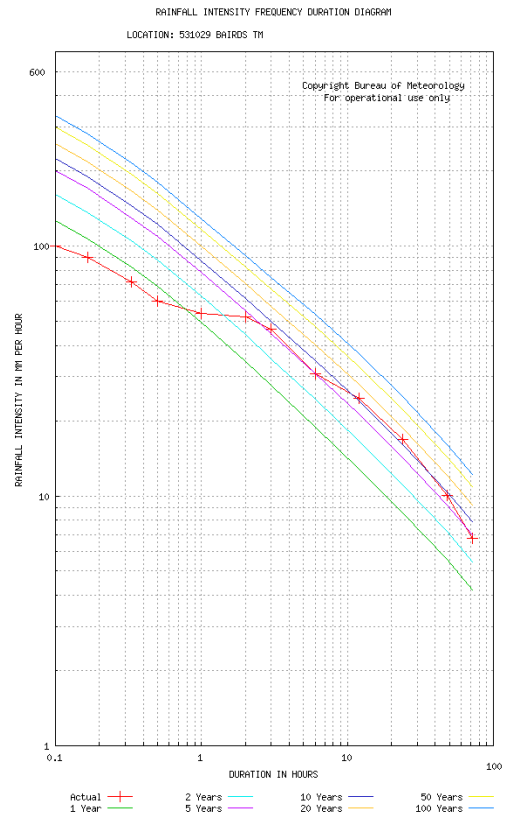


Table 3.3.1 Intensity–Frequency–Duration rainfall analyses for Bairds telemetry and Boar Pocket Alert

Rainfall Intensity–Frequency–Duration Analysis Location: 531029 Bairds telemetry Analysis of the rainfall for the 136 hours to 16:00 Tuesday 15 April 2014		
Rainfall (mm)	Period Ending	ARI (years)
9	5 mins ending at 07:10:00 12/04/2014	< 1
10	6 mins ending at 07:11:00 12/04/2014	< 1
15	10 mins ending at 07:15:00 12/04/2014	< 1
24	20 mins ending at 07:15:00 12/04/2014	< 1
30	30 mins ending at 07:25:00 12/04/2014	< 1
54	60 mins ending at 06:20:00 12/04/2014	1-2
104	2 hours ending at 07:10:00 12/04/2014	2-5
139	3 hours ending at 07:35:00 12/04/2014	5-10
185	6 hours ending at 07:50:00 12/04/2014	5
296	12 hours ending at 08:20:00 12/04/2014	10-20
403	24 hours ending at 10:05:00 12/04/2014	10-20
484	48 hours ending at 19:40:00 12/04/2014	5-10
486	72 hours ending at 00:00:00 13/04/2014	2-5



Rainfall Intensity–Frequency–Duration Analysis Location: 531054 Boar Pocket Alert Analysis of the rainfall for the 136 hours to 16:00 Tuesday 15 April 2014		
Rainfall (mm)	Period Ending	ARI (years)
9	5 mins ending at 07:10:00 12/04/2014	< 1
10	6 mins ending at 07:11:00 12/04/2014	< 1
15	10 mins ending at 07:15:00 12/04/2014	< 1
24	20 mins ending at 07:15:00 12/04/2014	< 1
30	30 mins ending at 07:25:00 12/04/2014	< 1
54	60 mins ending at 06:20:00 12/04/2014	1-2
104	2 hours ending at 07:10:00 12/04/2014	2-5
139	3 hours ending at 07:35:00 12/04/2014	5-10
185	6 hours ending at 07:50:00 12/04/2014	5
296	12 hours ending at 08:20:00 12/04/2014	10-20
403	24 hours ending at 10:05:00 12/04/2014	10-20
484	48 hours ending at 19:40:00 12/04/2014	5-10
486	72 hours ending at 00:00:00 13/04/2014	2-5

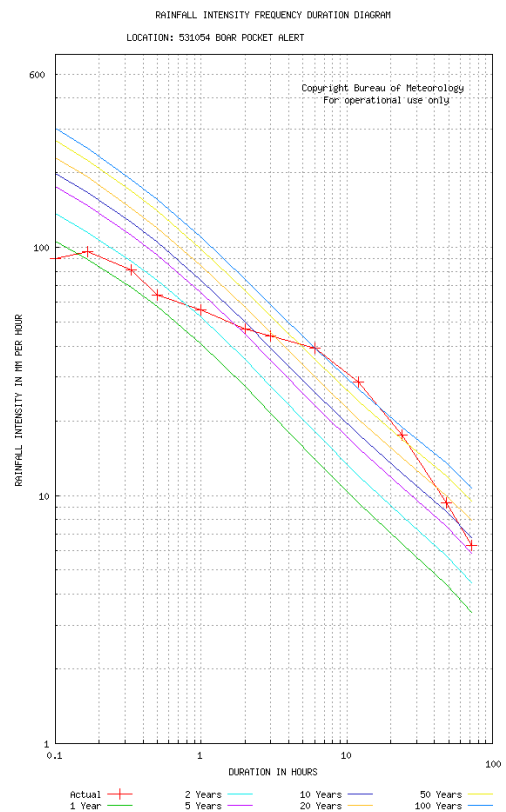


Figure 3.3.2 Hourly hyetographs for Copperlode Dam Alert and Nash's Crossing Alert

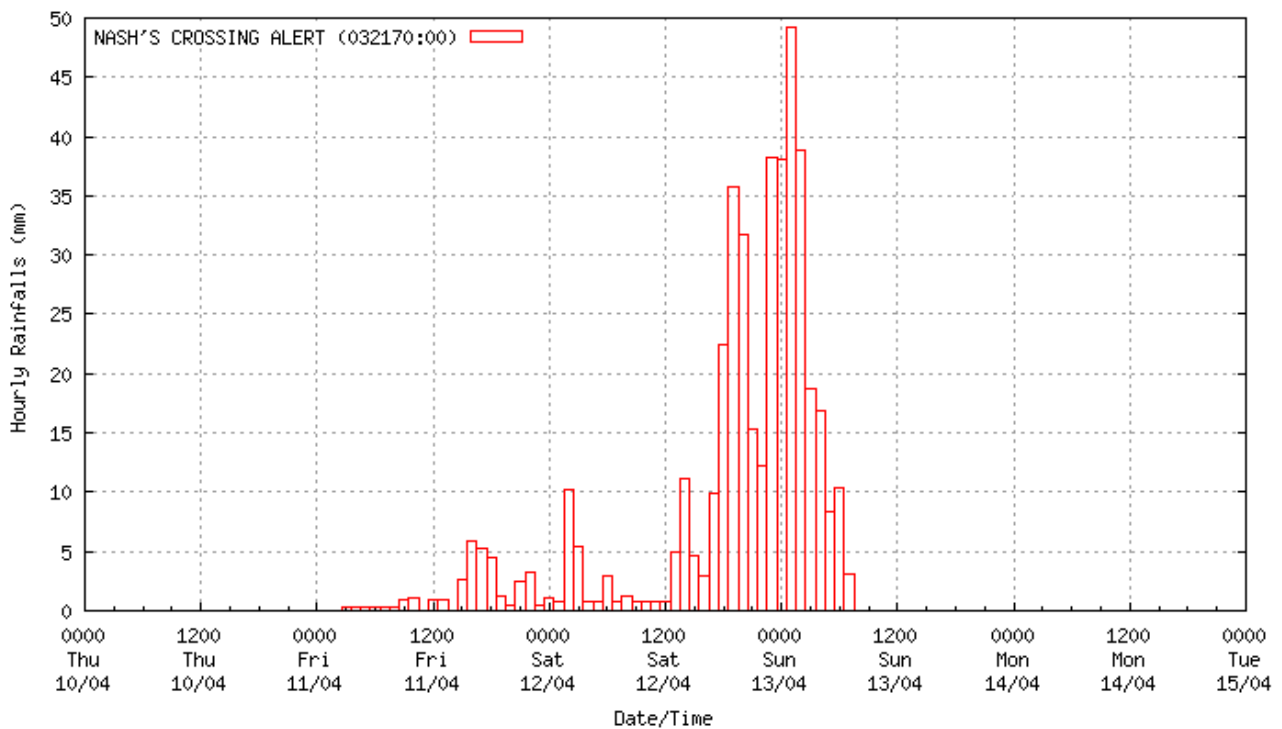
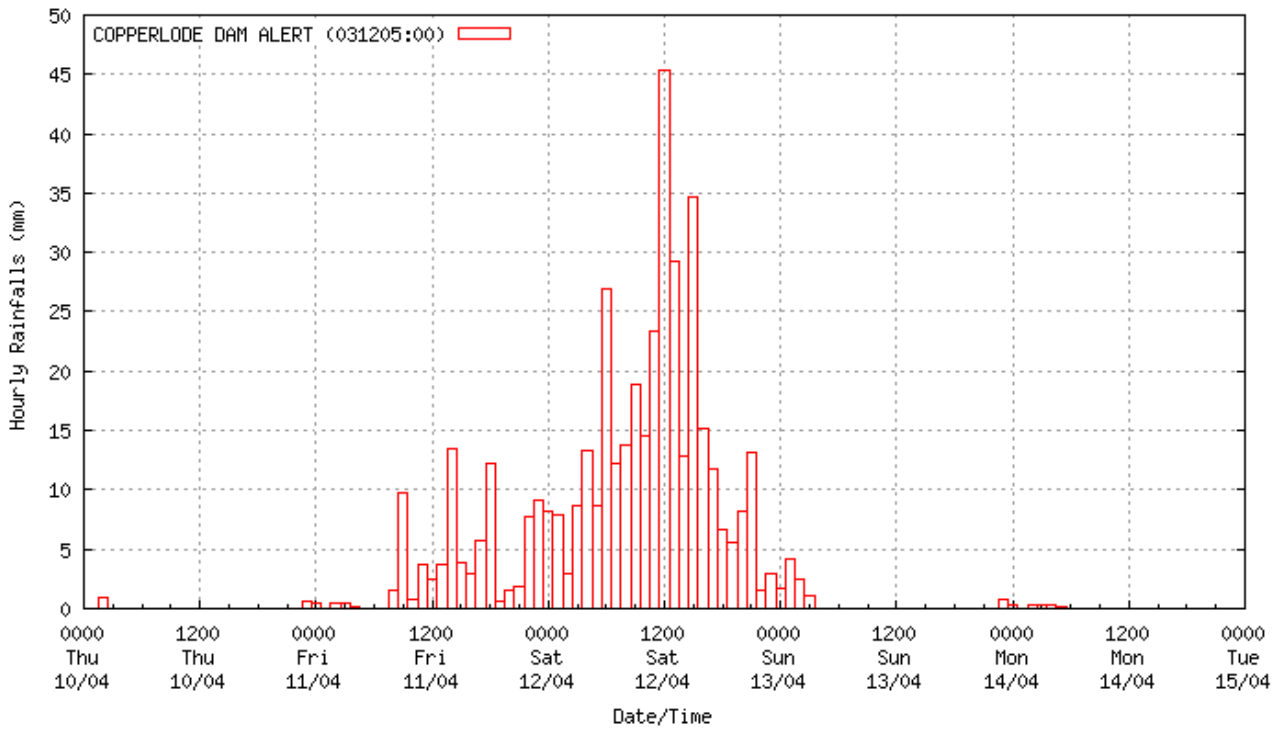
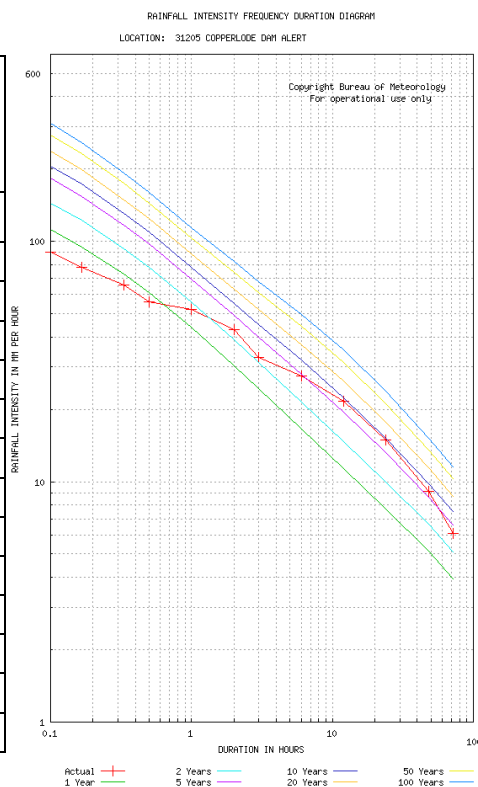


Table 3.3.2 Intensity–Frequency–Duration rainfall analyses for Copperlode Dam Alert and Nash’s Crossing Alert

Rainfall Intensity–Frequency–Duration Analysis Location: 031205 Copperlode Dam Alert Analysis of the rainfall for the 136 hours to 16:00 Tuesday 15 April 2014		
Rainfall (mm)	Period Ending	ARI (years)
9	5 mins ending at 12:05:00 12/04/2014	1
9	6 mins ending at 12:06:00 12/04/2014	< 1
13	10 mins ending at 14:10:00 12/04/2014	< 1
22	20 mins ending at 12:05:00 12/04/2014	< 1
28	30 mins ending at 12:05:00 12/04/2014	< 1
52	60 mins ending at 12:10:00 12/04/2014	1-2
86	2 hours ending at 12:40:00 12/04/2014	2-5
99	3 hours ending at 12:45:00 12/04/2014	2-5
165	6 hours ending at 15:30:00 12/04/2014	2-5
259	12 hours ending at 16:50:00 12/04/2014	5-10
359	24 hours ending at 21:00:00 12/04/2014	5-10
437	48 hours ending at 02:20:00 13/04/2014	5-10
439	72 hours ending at 23:20:00 13/04/2014	2-5



Rainfall Intensity–Frequency–Duration Analysis Location: 032170 Nash's Crossing Alert Analysis of the rainfall for the 136 hours to 16:00 Tuesday 15 April 2014		
Rainfall (mm)	Period Ending	ARI (years)
5	5 mins ending at 23:35:00 12/04/2014	< 1
6	6 mins ending at 19:41:00 12/04/2014	< 1
9	10 mins ending at 22:45:00 12/04/2014	< 1
18	20 mins ending at 00:35:00 13/04/2014	< 1
26	30 mins ending at 00:45:00 13/04/2014	< 1
50	60 mins ending at 01:10:00 13/04/2014	1-2
88	2 hours ending at 01:10:00 13/04/2014	2-5
130	3 hours ending at 01:35:00 13/04/2014	5-10
203	6 hours ending at 03:40:00 13/04/2014	10-20
328	12 hours ending at 04:50:00 13/04/2014	20-50
377	24 hours ending at 06:55:00 13/04/2014	10-20
430	48 hours ending at 06:55:00 13/04/2014	5-10
432	72 hours ending at 06:55:00 13/04/2014	5-10

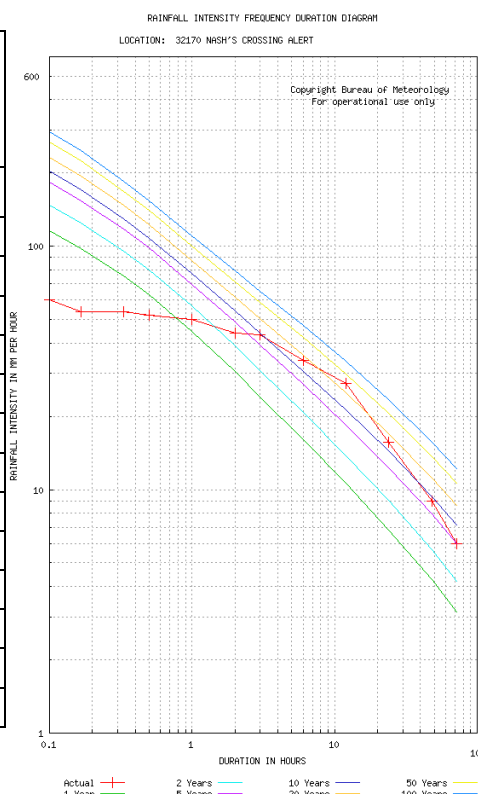


Figure 3.3.3 Hourly hyetographs for Reeves Alert and Bowen Pump Station Alert

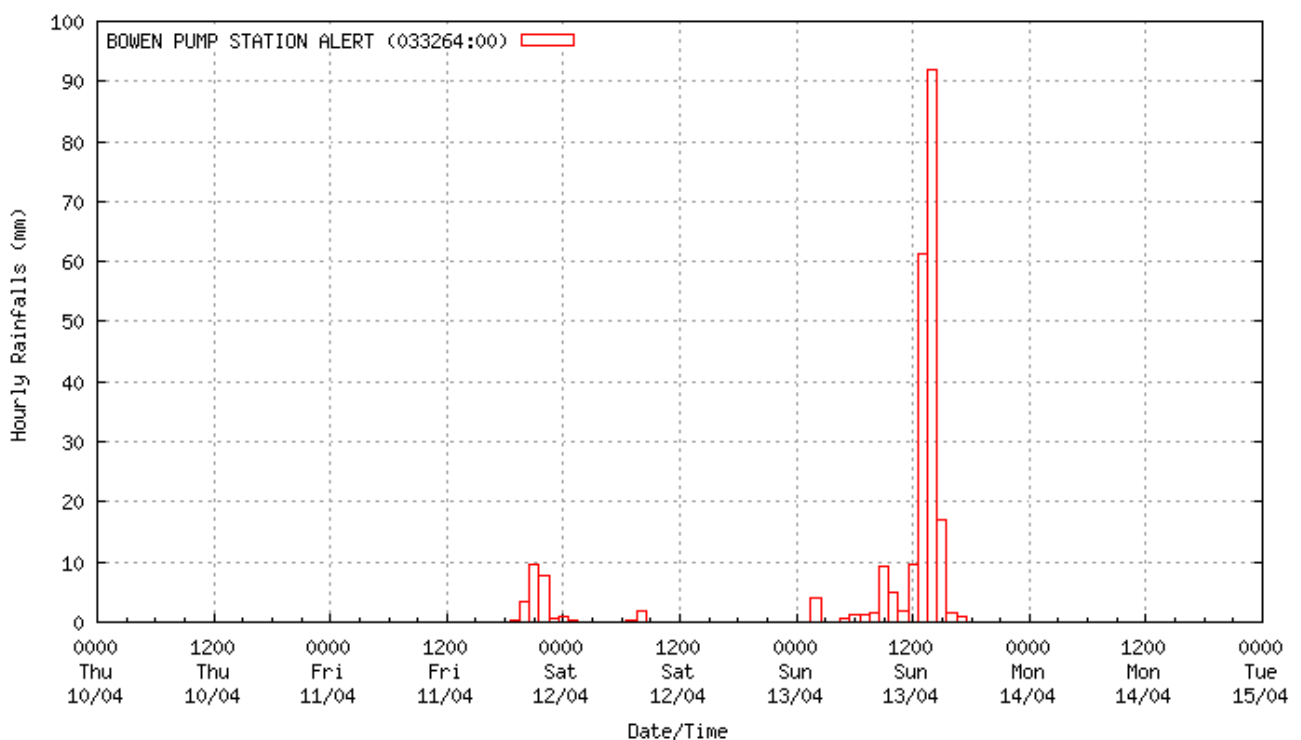
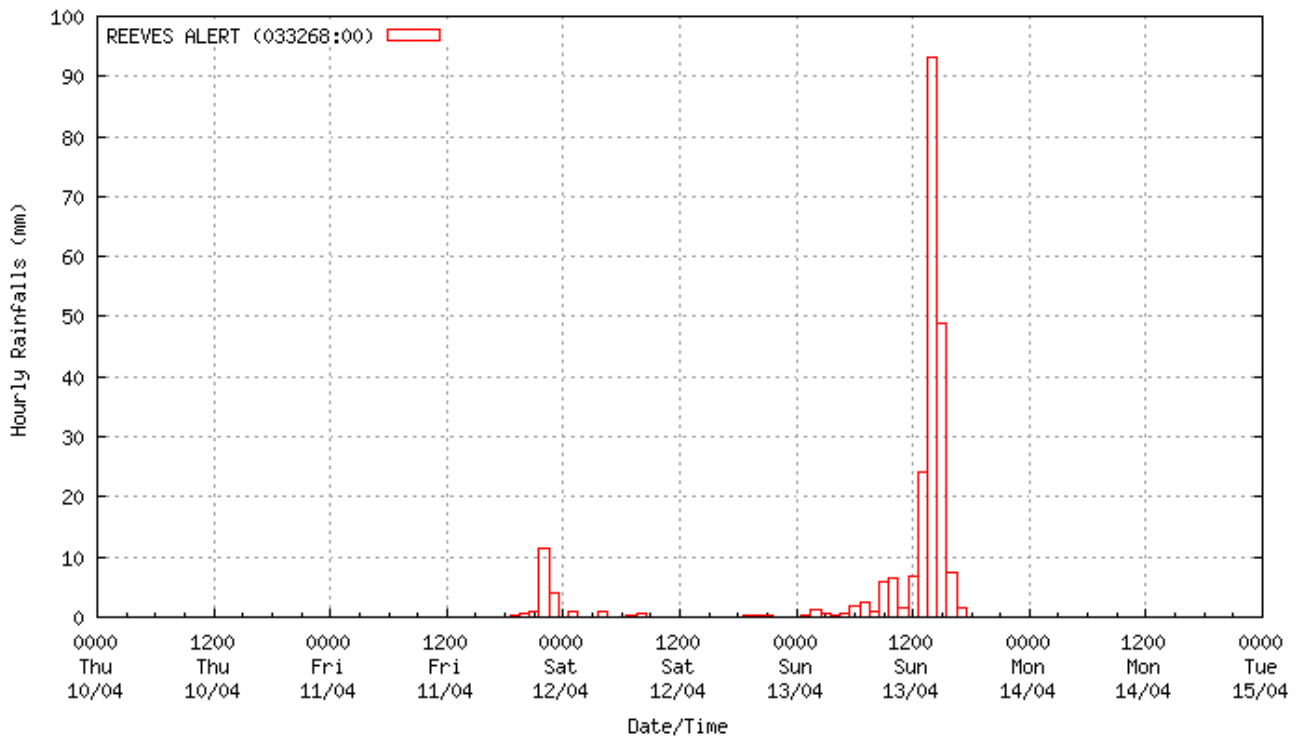
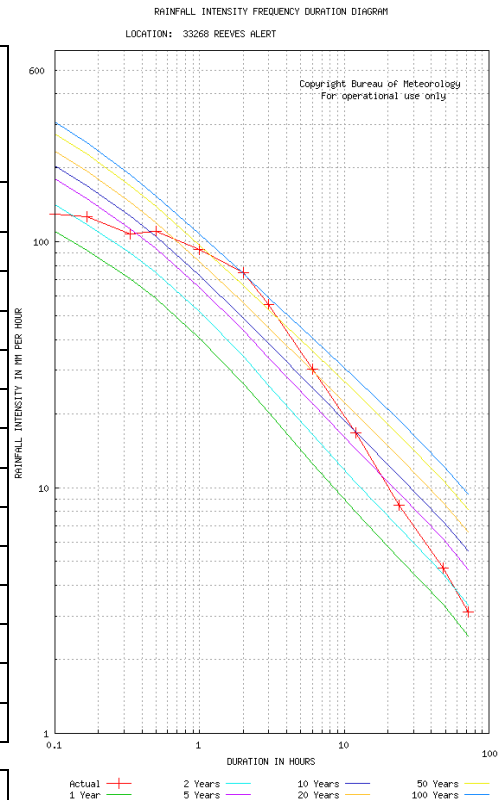
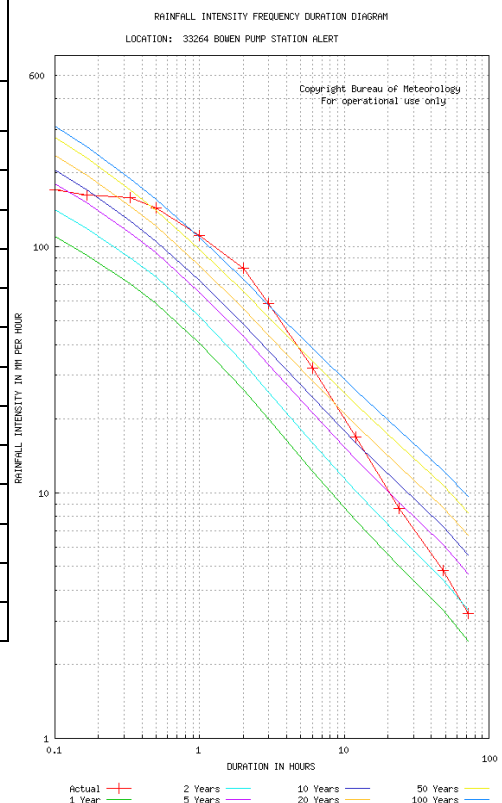


Table 3.3.3 for Intensity–Frequency–Duration rainfall analyses for Reeves Alert and Bowen Pump Station Alert

Rainfall Intensity–Frequency–Duration Analysis Location: 033268 Reeves Alert Analysis of the rainfall for the 136 hours to 16:00 Tuesday 15 April 2014		
Rainfall (mm)	Period Ending	ARI (years)
11	5 mins ending at 13:45:00 13/04/2014	1-2
13	6 mins ending at 13:46:00 13/04/2014	1-2
21	10 mins ending at 13:50:00 13/04/2014	2-5
36	20 mins ending at 13:55:00 13/04/2014	2-5
55	30 mins ending at 13:50:00 13/04/2014	10-20
93	60 mins ending at 14:00:00 13/04/2014	20-50
150	2 hours ending at 14:45:00 13/04/2014	> 100
166	3 hours ending at 15:05:00 13/04/2014	50-100
182	6 hours ending at 16:20:00 13/04/2014	20-50
201	12 hours ending at 16:25:00 13/04/2014	10
204	24 hours ending at 16:25:00 13/04/2014	2-5
225	48 hours ending at 16:25:00 13/04/2014	2-5
225	72 hours ending at 16:25:00 13/04/2014	1-2



Rainfall Intensity–Frequency–Duration Analysis Location: 033264 Bowen Pump Station Alert Analysis of the rainfall for the 136 hours to 16:00 Tuesday 15 April 2014		
Rainfall (mm)	Period Ending	ARI (years)
16	5 mins ending at 13:15:00 13/04/2014	5
17	6 mins ending at 13:16:00 13/04/2014	2-5
27	10 mins ending at 13:05:00 13/04/2014	5-10
53	20 mins ending at 13:15:00 13/04/2014	20-50
72	30 mins ending at 13:15:00 13/04/2014	50-100
111	60 mins ending at 13:40:00 13/04/2014	> 100
163	2 hours ending at 14:15:00 13/04/2014	> 100
177	3 hours ending at 14:20:00 13/04/2014	> 100
193	6 hours ending at 14:20:00 13/04/2014	20-50
202	12 hours ending at 16:40:00 13/04/2014	10-20
206	24 hours ending at 16:40:00 13/04/2014	2-5
232	48 hours ending at 16:40:00 13/04/2014	2-5
232	72 hours ending at 16:40:00 13/04/2014	1-2



3.4 Flood warning services

During tropical cyclone *Ita* a total of 120 flood warnings were issued during 10-16 April 2014. The number of flood warnings issued for each river basin or region and the date for the first and final warning is outlined in Table 3.4.1.

Table 3.4.1 Number of flood warnings issued for each catchment during tropical cyclone *Ita*

Catchment	First warning	Last warning	Number of warnings issued
Coastal rivers - North	11:25 am 10 April 2014	10:01 am 13 April 2014	14
Daintree River	11:10 pm 11 April 2014	11:40 am 13 April 2014	12
Barron River	10:28 am 12 April 2014	10:51 am 13 April 2014	6
Mulgrave & Russell rivers	4:35 am 12 April 2014	3:09 pm 13 April 2014	10
Johnstone River	5:55 pm 12 April 2014	3:46 am 13 April 2014	4
Tully River	3:23 am 12 April 2014	8:50 am 16 April 2014	16
Herbert River	9:24 pm 12 April 2014	8:41 am 16 April 2014	19
Bohle River	5:44 am 13 April 2014	11:42 am 14 April 2014	8
Haughton River	8:59 am 13 April 2014	11:40 am 14 April /2014	10
Don River	2:26 pm 13 April 2014	11:00 am 14 April 2014	7
Fitzroy River	9:04 am 14 April 2014	4:24 pm 18 April 2014	10

Appendix 1: Peak heights

Outlined below is a list of peak heights recorded during the tropical cyclone *Ita* event. Only stations with significant floods level are given and data used is operational only, errors may exist.

Basin	Station number	Station name	Height	Flood class	Time
Daintree River	031127	Daintree Village	10.50 m	Major	12:5512 April 2014
Barron River	531049	Cairns Airport	2.53 m	Minor	21:3512 April 2014
Barron River	531048	Kamerunga Bridge	6.64 m	Moderate	21:3012 April 2014
Mulgrave River	531051	Gordonvale	16.3 m	Major	19:0012 April 2014
Mulgrave River	531052	Peetes Bridge	9.6 m	Major	17:3012 April 2014
Johnstone River	532025	Mourilyan	7.52 m	< Minor	03:3013 April 2014
Johnstone River	532023	McAvoy Bridge	5.95 m	Minor	22:5012 April 2014
Johnstone River	032163	Innisfail Wharf	4.89 m	< Minor	23:4012 April 2014
Tully River	532059	Euramo	8.59 m	Moderate	22:4013 April 2014
Murray River	532060	Murray Flats	8.4 m	Major	03:0014 April 2014
Herbert River	532066	Gleneagle	8.15 m	Major	09:0513 April 2014
Herbert River	532028	Abergowrie Bridge	16.24 m	Major	15:1513 April 2014
Herbert River	532027	Gairloch	12.45 m	Major	16:0013 April 2014
Herbert River	532012	Ingham Pump Station	14.54 m	Major	20:2013 April 2014
Herbert River	032185	Halifax	5.62 m	Major	12:2513 April 2014
Haughton River	533051	Giru	2.55 m	Major	23:5013 April 2014
Don River	033264	Bowen Pump Station	5.3 m	Moderate	18:4013 April 2014

Appendix 2: Rainfall tables

The abbreviations used in the following tables include:

AL - ALERT Radio Telemetry, TM - Telephone Telemetry, AWS - Automatic Weather Station, SYN - Synoptic Station, ' ' - No Data, * automatic station. Red numbers show the highest totals recorded on a particular day for each catchment.

Note: Rainfall data is operational data and has not been quality controlled so errors may exist.

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Herbert								
Herberton AL *	0	0	45	144	7	6	0	202
Herberton			57	168	7	6.4		238.4
Silver Valley TM *	0	0	15	98	15	0	0	128
Ravenshoe AL *	2	3	58	160	2	12	0	237
Archers Creek TM *	0	0	8	109	20	0	0	137
Mt Garnet			15	82	38			135
Mt Garnet AL *	0	0	12	75	18	0	0	105
Wooroora TM *	4	3	36	134	7	0	0	184
Innot Hot Springs Township			13	94	30			137
Ben Avon AL *	1	0	19	105	0	0	0	125
Upper Rudd Creek AL *	0	0	6	28	2	0	0	36
Gunnawarra AL (Rudd Ck) *	1	0	18	72	0	0	0	91
Gleneagle AL *	3	0	10	120	0	0	0	133
Murray Springs AL *	0	0	2	81	0	0	0	83
Yourka AL *	2	0	46	181	0	0	0	229
Kirrama AL *	4	0	20	222	1	0	0	247
Blencoe Falls TM *	3	0	11	147	1	0	0	162
Nash's Crossing AL *	6	3	53	376	0	0	0	438
Wallaman AL *	14	8	50	325	0	0	0	397
Zattas AL *	7	5	57	346	2	0	0	417
Gowrie Creek TM *	5	2	56	335	2	0	0	400
Abergowrie AL *	6	2	57	273	4	0	0	342
Abergowrie TM *	7	1	63	323	5	0	0	399
Elphinstone Pkt	5.2	2.6	60	278				345.8
Abergowrie Bridge AL *	5	1	81	238	0	0	0	325
Hawkins Creek	15	7	44	304	0.4		0.6	371
White Crystal TM *	0	0	27	238	0	0	0	265
Michael Creek AL *	0	0	9	171	3	0	0	183
Running Creek TM *	0	0	11	232	0	0	0	243
Upper Stone	3	0.6	12	242	0.2			257.8
Peacock Siding AL *	2	2	7	195	0	0	0	206
Trebonne AL *	4	4	25	289	0	0	0	322
Poverty Hill AL *	1	1	10	200	0	0	0	212
Ingham SYN	3.3	5.2	26	245	0.8	0	Tr	280.3
Ingham Depot AL *	3	1	16	195	0	0	0	215

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Herbert								
Ingham Pump Station AL *	0	4	15	205	0	0	0	224
Ingham Pump Station TM *	0	5	18	218	0	0	0	241
Gairloch	10	3.6	18	205				236.6
Gairloch AL *	8	3	18	185	0	0	0	214
Cardwell Range	13	3	37	266	0.6			319.6
Cardwell Gap AL *	13	3	27	233	0	0	0	276
Halifax	5.5		20	210				235.5
Halifax AL *	5	0	22	200	1	0	0	228
Allingham Forrest Drive	3	5	23	256				287
Bambaroo	0.2		11	210	0.4	0.2		221.8
Victoria Sugar Mill			243 over 3 days					243
Lucinda Post Office	8.4		19	208	2			237.4
Maximum	15	8	81	376	38	12	0.6	438

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Tully								
Maalan Road AL *	8	13	94	195	3	0	1	314
Tully Weir AL *	19	6	64	164	1	0	0	254
Koombooloomba AL *	43	7	92	157	16	0	0	315
Kareeya		5	231 over 3 days			0.2	0	236.2
Koolmoon Ck TM *	15	4	94	225	1	0	0	339
Bolinda Estate AL *	43	8	110	195	0	0	1	357
Jarra Creek AL *	24	11	172	214	0	0	0	421
Davidson Creek AL *	19	2	102	169	0	0	0	292
Tully AL *	35	12	98	198	0	0	0	343
Banyan Creek TM *	24	13	84	217	0	0	0	338
Tully Sugar Mill	34	11	102	210				357
Bulgun Creek AL *	23	9	152	308	0	0	1	493
Bingil Bay	3.6	6.8	41	205	0.2		0.6	257.2
South Mission Beach AL *	7	6	50	363	0	0	0	426
Euramo AL *	31	10	73	229	0	0	0	343
Euramo TM *	28	10	67	216	0	0	0	321
Upper Murray AL *	7	1	19	233	0	0	0	260
Upper Murray TM *	6	0	17	175	0	0	0	198
Russell-Henry Rd TM *	17	1	48	215	0	0	0	281
Murray Flats AL *	37	6	48	236	0	0	1	328
Bilyana AL *	17	3	30	283	0	0	0	333
Kennedy Valley TM *	6	0	39	258	0	0	0	303
Cardwell SYN	11	0.2	23	307	1.4	0	0	342.6
Maximum	43	13	172	363	16	0.2	1	493

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Johnstone								
Malanda AL *	4	2	68	166	0	0	0	240
Glen ALLyn TM *	6	16	91	180	1	0	0	294
Mckell Road AL *	6	3	101	165	1	15	0	291
Topaz AL *	23	27	170	178	0	0	0	398
Bartle View AL *	20	22	147	145	5	0	0	339
Greenhaven	12	15	91	196	3.6	11		328.6
Greenhaven AL *	10	11	83	187	2	11	0	304
Millaa Millaa AL *	6	10	123	131	3	3	0	276
Crawfords Lookout AL *	12	14	83	142	4	0	2	257
Upper Fisher Ck TM *	10	15	89	158	2	0	1	275
Fisher Ck TM *	6	4	54	94	3	0	0	161
Rankin Creek TM *	10	24	98	144	5	0	0	281
Nerada AL *	11	17	110	144	2	0	0	284
Tung Oil AL *	6	22	60	118	6	0	0	212
Tung Oil TM *	4	22	54	108	6	0	0	194
Mcavoy Bridge AL *	4	23	38	103	9	0	0	177
Daradgee		32	62	86	6.4			186.4
Saltwater Creek AL *	0	29	29	103	1	0	0	162
Sutties Creek AL *	4	6	78	153	2	0	0	243
Menavale AL *	23	9	73	132	0	0	0	237
Corsis AL *	6	19	80	114	0	0	0	219
Central Mill AL *	4	22	56	128	0	0	0	210
Central Mill TM *	3	20	52	115	0	0	0	190
Mourilyan Mill AL *	1	30	48	105	0	0	0	184
South Johnstone AWS *	7.4	21	45	106	0	0	1.8	181.2
Mourilyan Bore TM *	4	27	31	127	1	0	0	190
Sweeney Creek U/S AL *	1	28	33	96	0	0	0	158
Marco Street AL *	5	27	49	98	2	0	0	181
Innisfail SYN	1.6	27	31	101	0.2	0	0	160.8
Innisfail Wharf AL *	2	29	27	80	1	0	0	139
Lower Liverpool TM *	8	12	40	160	0	0	0	220
Maximum	23	32	170	196	9	15	2	398

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Mulgrave/Russell								
Bellenden Ker Top	16	65	860		3.6	0	0	944.6
Goldsborough Valley AL *	1	11	117	261	0	0	0	390
The Fisheries AL *	0	8	100	203	1	0	0	312
The Fisheries TM *	0	2	98	50				150
Gillies Lookout AL *	0	6	76	249	0	0	0	331
Peetes Bridge AL *	0	10	151	182	1	0	0	344
Peetes Bridge TM *	0	9	146	177	1	0	0	333
Aloomba TM *		11	137	237				385
Gordonvale AL *	0	7	109	151	0	0	0	267
Simmonds Creek TM *	1	1	80	113	1	0	0	196
Hills Creek TM *	1	9	88	109	13			220
Mt Sophia	5	22	136	255				418
Tree House Creek	14	44	142	210	3	0.1		413.1
Bucklands TM *	3	29	57	128	6	0	0	223
The Boulders TM *	4	16	129	223	3	0	0	375
Clyde Rd AL *	15	30	101	148	4	0	0	298
Maximum	15	65	151	261	13	0.1	0	944.6

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Barron								
Atherton Solar Crescent			80	102	1.2	32		215.2
Boar Pocket AL *	1	8	107	337	1	0	0	454
Bones Knob AL *	0	2	35	101	2	8	0	148
Tinaroo Dam AL *	0	1	28	66	1	20	0	116
Walkamin DPI	0	2	33	100	8	5	0	148
Mareeba Ap AWS *	0	0.4	42	92	2.2	2.2	0.2	139
Mareeba AL *	0	0	50	82	2	1	0	135
Mareeba TM *	0	1	48	82	2	1	0	134
Emerald Crest AL *	0	1	58	90	1	0	0	150
Bilwon AL *	0	1	77	117	8	1	0	204
Bolton Road AL *	0	0	101	98	8	0	0	207
Mona Mona AL *	0	0	179	174	0	0	1	354
Myola AL *	0	0	183	191	19	1	0	394
Kuranda Railway Station			160	200				360
Kamerunga Br AL *	0	1	118	135	8	0	0	262
Saddle Mountain AL *	0	4	115	63	19	0	1	202
Copperlode Dam AL *	1	13	190	235	2	0	1	442
Brinsmead AL *	0	1	76	108	30	0	0	215
Cairns Ap AWS *	0.6	0.4	63	99	14	0	0	177
Cairns Airport AL *	0	0	77	97	29	0	0	203
Cairns Racecourse AWS *	0.2	5.6	65	115	4	0	0	189.8
Tamarind Gdns		11	141	145				297
Mossman South		4.2	183	34		21	3.2	245.4
Port Douglas Warner St			91	36		6		133
Black Mt TM *			169	169				338
Maximum	1	13	190	337	30	32	3.2	454

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Don								
Upper Don AL *	0	0	6	29	35	0	0	70
Boundary Creek AL *	0	0	5	11	55	0	0	71
Pretty Bend TM *	0	0	6	13	121	0	0	140
Emu Creek AL *	0	0	8	32	152	0	0	192
Ida Creek AL *	0	0	12	10	175	0	0	197
Ida Creek TM *	0	0	11	10	173	0	0	194
Moss Vale AL *	0	0	16	12	106	0	0	134
Mt Dangar AL *	0	0	16	10	140	0	0	166
Warden Bend			21	10	173			204
Roma Peak AL *	0	0	11	2	111	0	0	124
Reeves AL *	0	0	20	15	190	0	0	225
Telegraph Road TM *	0	0	25	18	208	0	0	251
Bowen Pump Station AL *	0	0	25	18	189	0	0	232
Bowen SYN	0	0	32	16	149	0	0	197
Koonandah TM *	0	0	22	22	163	0	0	207
Guthalungra TM *	0	0	7	25	106	0	0	138
Maximum	0	0	32	32	208	0	0	251

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Daintree/Endeavour								
White Cliff Point	0	0	130	90	0	0.2	2	222.2
Whyanbeel Valley	0	3.6	144	75	0			222.6
Bairds TM *	0	38	401	46		1	12	498
Daintree Village			260	32				292
China Camp TM *	0	11	285	23	0	1	18	338
Flaggy TM *	0	20	213	21	0	0	12	266
Cooktown Ap AWS *	0	23	161	14	0	0	46	244
Maximum	0	38	401	90	0	1	46	498

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Haughton								
Mingela			8.6	95	13			116.6
Mingela AL *	0	0	7	86	16	0	0	109
Upper Reid AL *	0	0	13	73	36	0	0	122
Cameron Hill AL *	0	0	1	83	39	0	0	123
Four Mile AL *	0	0	5	71	11	0	0	87
Mt Piccaninny AL *	0	0	1	74	33	0	0	108
Mt Piccaninny TM *	0	0	1	74	36	0	0	111
Donnington Airpark AL *	0	0	14	121	26	0	0	161
Upper Major Creek AL *	0	0	18	281	70	0	0	369
Major Creek AL *	0	0	4	116	63	0	0	183
Major Creek TM *	0	0	3	101	54	0	0	158
Powerline AL *	0	0	2	92	50	0	0	144
Powerline TM *	0	0	2	97	57	0	0	156
Giru North			9.2	165	20			194.2
Reed Beds AL *	0	0	15	175	35	0	0	225
Giru AL *	0	0	8	146	31	0	0	185
Upper Barrattas AL *	0	0	1	69	22	0	0	92
Northcote TM *	0	0	0	0	0	0	0	0
East Barrattas AL *	0	0	6	88	41	0	0	135
Maximum	0	0	18	281	70	0	0	369

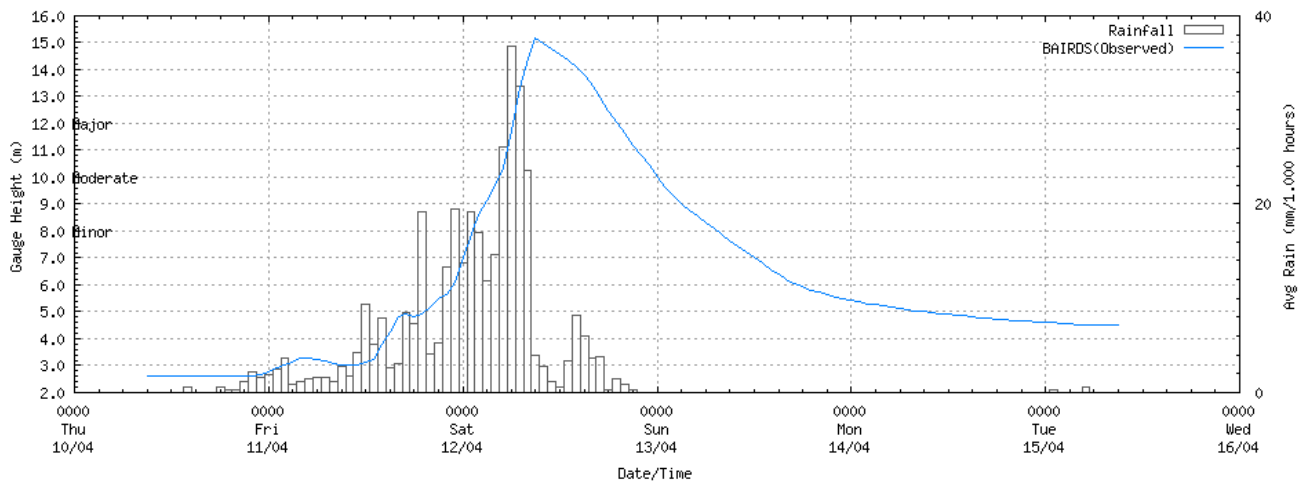
Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Black River/ Bluewater Creek								
Upper Black River AL *	0	0	19	189	5	0	0	213
Black River AL *	0	0	32	237	15	0	0	284
Black River TM *	0	0	35	230	14	0	0	279
Upper Bluewater AL *	0	0	44	136	4	0	0	184
Bluewater AL *	0	0	43	291	19	0	0	353
Toolakea AL *				276	13	0	0	289
Toomulla AL *	0	0	81	250	4	0	2	337
Bluewater TM *	0	0	44	241	10	0	0	295
Woolshed AWS *	0	0.2	23	182	20	0	0	225.2
Paradise Lagoon AL *	0	0	18	194	1	0	1	214
Rollingstone	0.2	0	31	273	0.1			304.3
Rollingstone AL *	0	0	31	274	3	0	0	308
Mutarnee Store	0		15	320	2			337
Maximum	0.2	0.2	81	320	20	0	2	353

Station name	24 hour rainfall (mm) to 9am on							Total (mm)
	April							
	10	11	12	13	14	15	16	
Ross/Bohle rivers								
Cungulla AL *				174	6	0	0	180
Whites Creek AL *	0	0	29	216	5	0	0	250
Alligator Creek AL *	0	0	21	211	6	0	0	238
Stuart AL *	0	0	26	181	4	0	0	211
Stuart Creek AL *	0	0	31	174	3	0	0	208
Upper Stuart Ck AL *	0	0	28	190	7	0	0	225
Calcium AL *	0	0	19	139	38	0	0	196
Woodlands AL *	0	0	26	167	24	0	0	217
Brabons AL *	0	0	25	154	51	0	0	230
Mcdonalds AL *	0	0	16	6	17	0	0	39
Cormacks AL *	0	0	21	148	10	0	0	179
Gleesons Mill AL *	0	0	25	161	18	0	0	204
Ross River Dam AL *	0	0	24	104	1	0	0	129
The Pinnacles AL *	0	0	28	199	22	0	0	249
Black Weir (Riverway) AL *	0	0	26	195	8	0	0	229
Kirwan AL *	0	0	23	202	7	0	0	232
Aplin Weir AL *	0	0	23	161	6	0	0	190
Annandale AL *	0	0	28	227	8	0	0	263
Gordon Creek AL *	0	0	32	196	4	0	0	232
Vincent AL *	0	0	26	213	8	0	0	247
Rooney's Bridge AL *	0	0	31	198	2	0	0	231
Mysterton AL *	0	0	26	195	3	0	0	224
Castle Hill AL *	0	0	29	208	4	0	0	241
Garbutt AL *	0	0	32	222	4	0	0	258
The Lakes AL *	0	0	26	217	5	0	0	248
Louisa Creek AL *	0	0	29	188	7	0	0	224
Cluden AL *	0	0	33	207	4	0	0	244
North Ward AL *	0	0	33	217	4	0	0	254
Pallarenda AL *	0	0	35	215	5	0	0	255
Mt Margaret AL *	0	0	25	215	25	0	0	265
Deeragun AL *	0	0	27	214	16	0	0	257
Little Bohle River AL *	0	0	25	175	20	0	0	220
Bohle River AL *	0	0	27	175	9	0	0	211
Bohle River TM *	0	0	28	188	11	0	0	227
Dalrymple Road AL *	0	0	33	201	10	0	0	244
Stony Creek AL *	0	0	31	234	12	0	0	277
Saunders Ck AL *	0	0	30	216	11	0	1	258
Mt Bohle AL *	0	0	29	211	8	0	0	248
Yabulu Qld Nickel	0	0	45	285	16			346
Townsville Airport AL *	0	0	32	205	4	0	0	241
Townsville AWS *	0	0	29	177	5.6	0	0	211.6
Bushland Beach AL *	0	0	41	257	8	0	0	306
Nelly Bay AL *	0	0	35	181	2	0	0	218
Picnic Bay AL *	0	0	46	185	2	0	0	233
Maximum	0	0	46	285	51	0	1	346

Appendix 3: Hydrographs

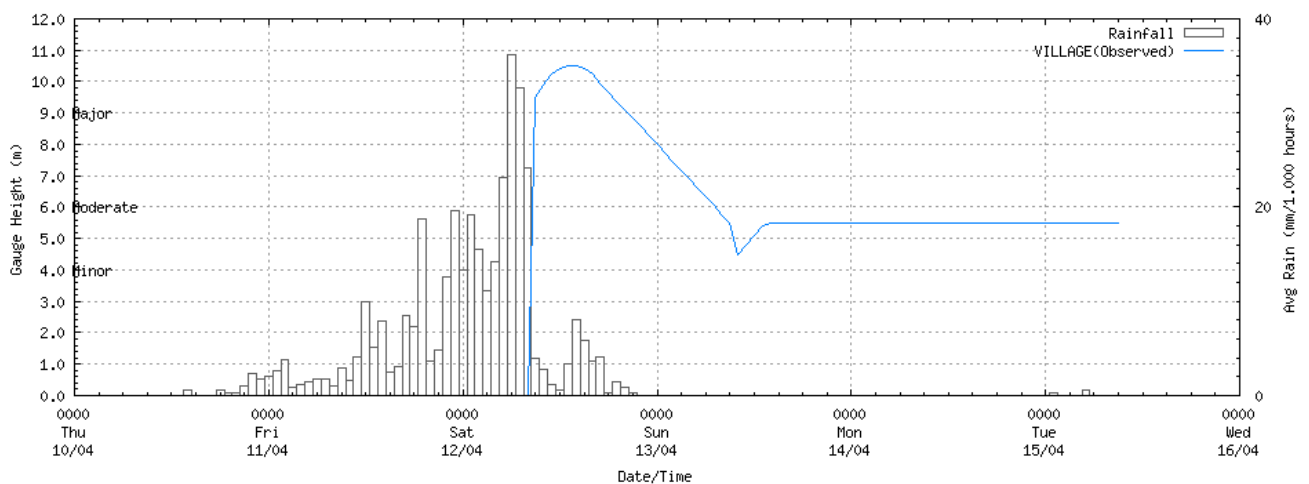
Shown below are selected hydrographs from key stations recorded during tropical cyclone *Ita*.

Daintree River at Bairds telemetry

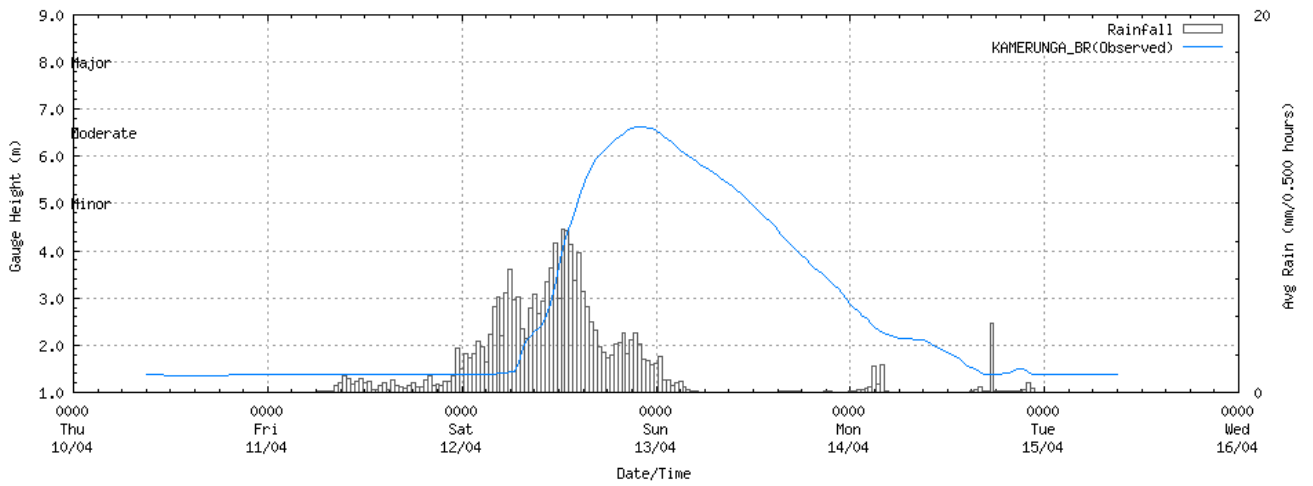


Daintree River at Daintree Village

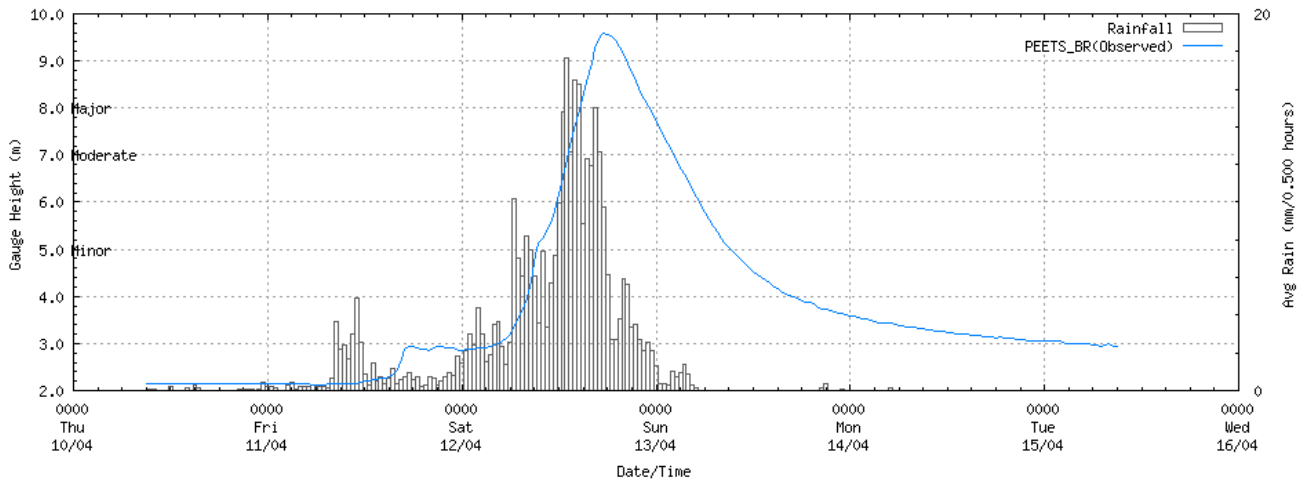
NB: the sudden rise of this station is due to manual readings not being taken until well into the event. Manual readings were only taken between 9:00 am 12 April 2014 and 1:15 pm 13 April 2014; levels outside these times are not real.



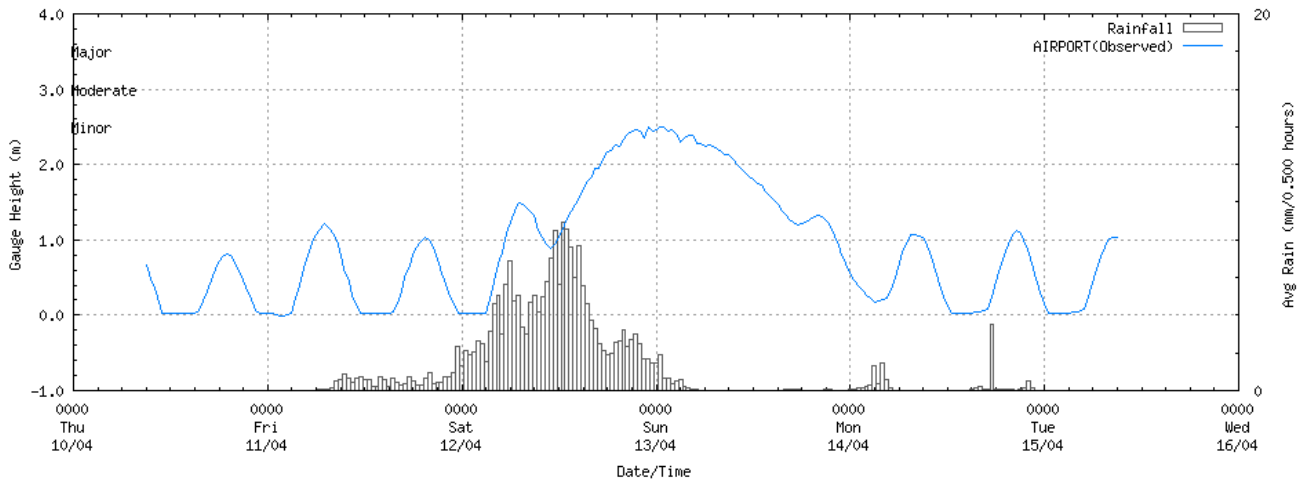
Barron River at Kamerunga Alert



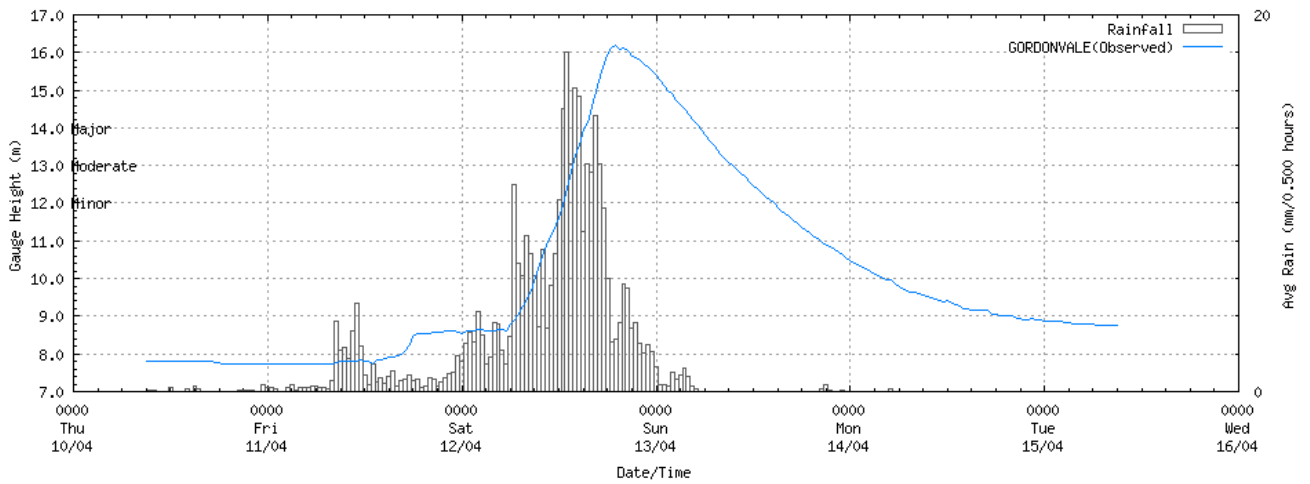
Mulgrave River at Peetes Bridge Alert



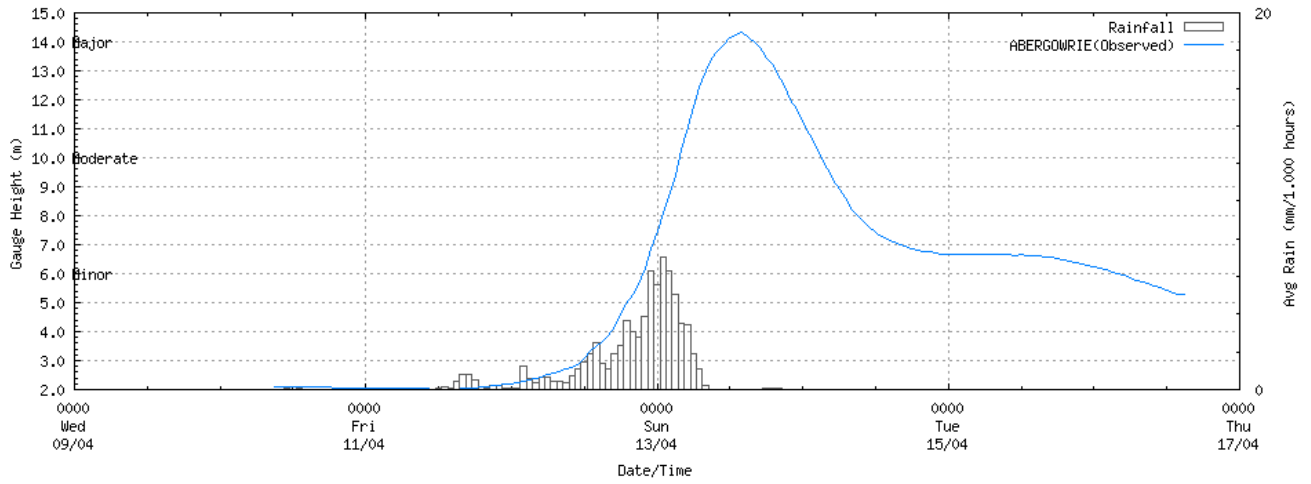
Barron River at Cairns Airport Alert



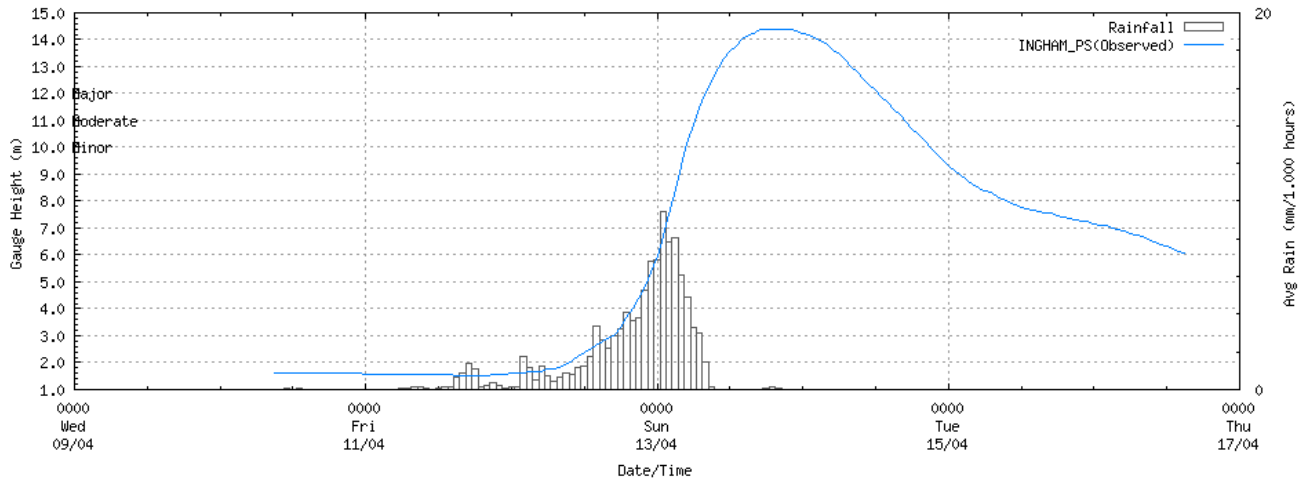
Mulgrave River at Gordonvale Alert



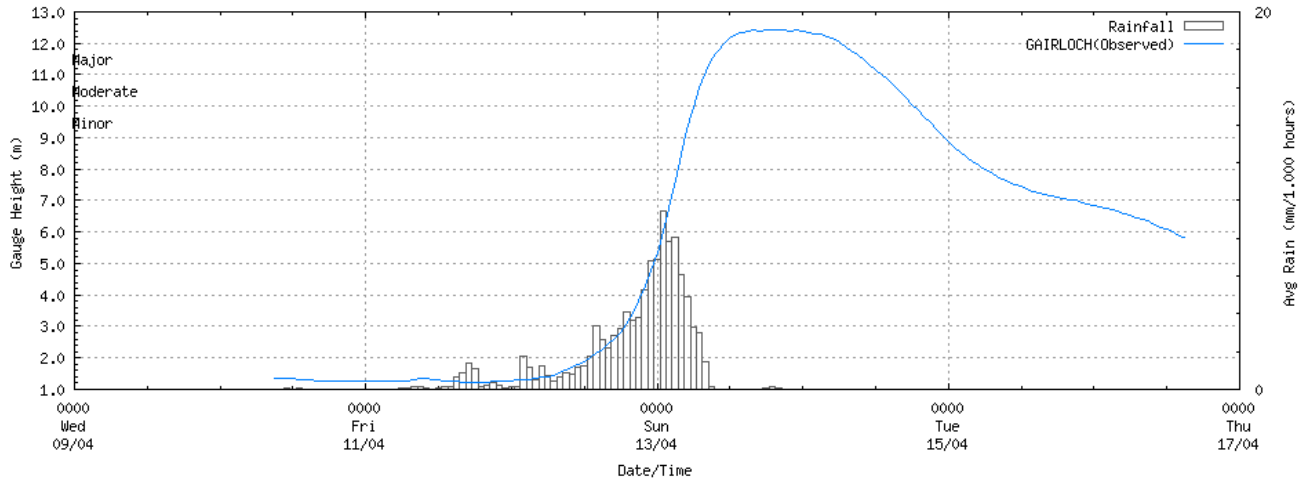
Herbert River at Abergowrie Bridge



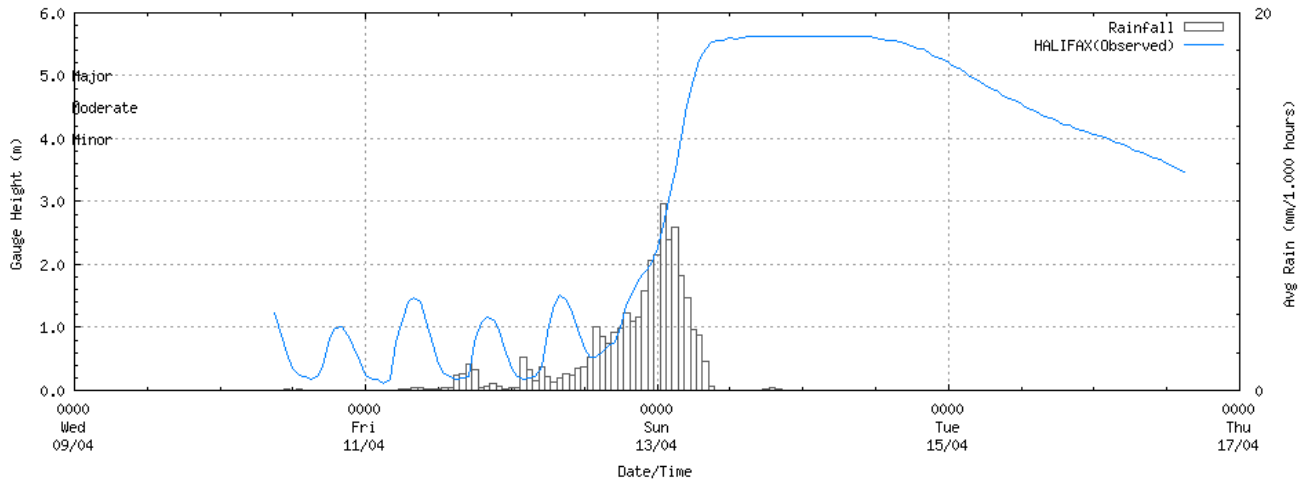
Herbert River at Ingham Pump Station Alert



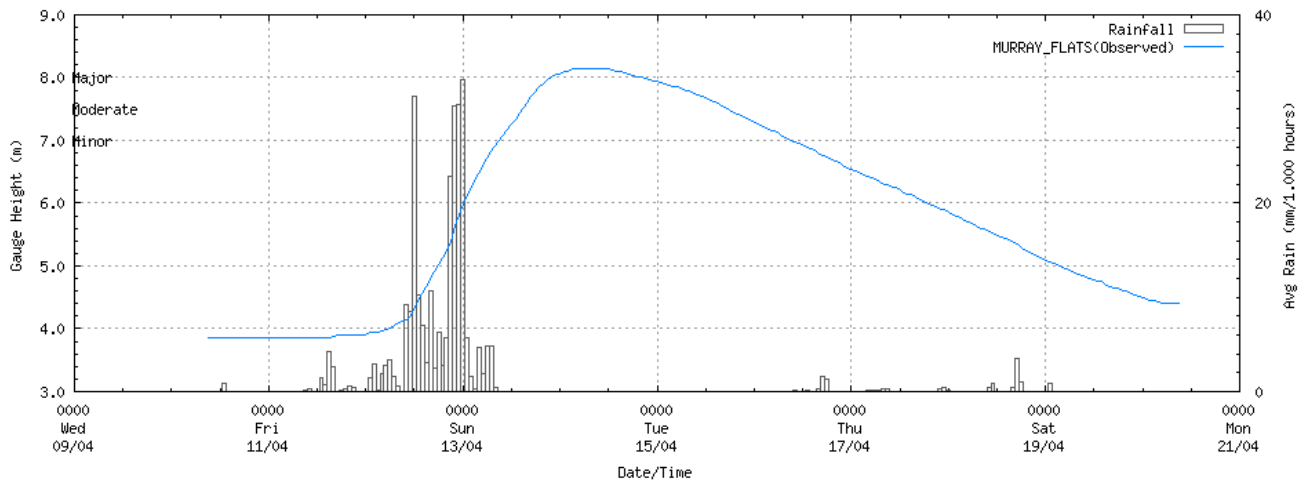
Herbert River at Gairloch Alert



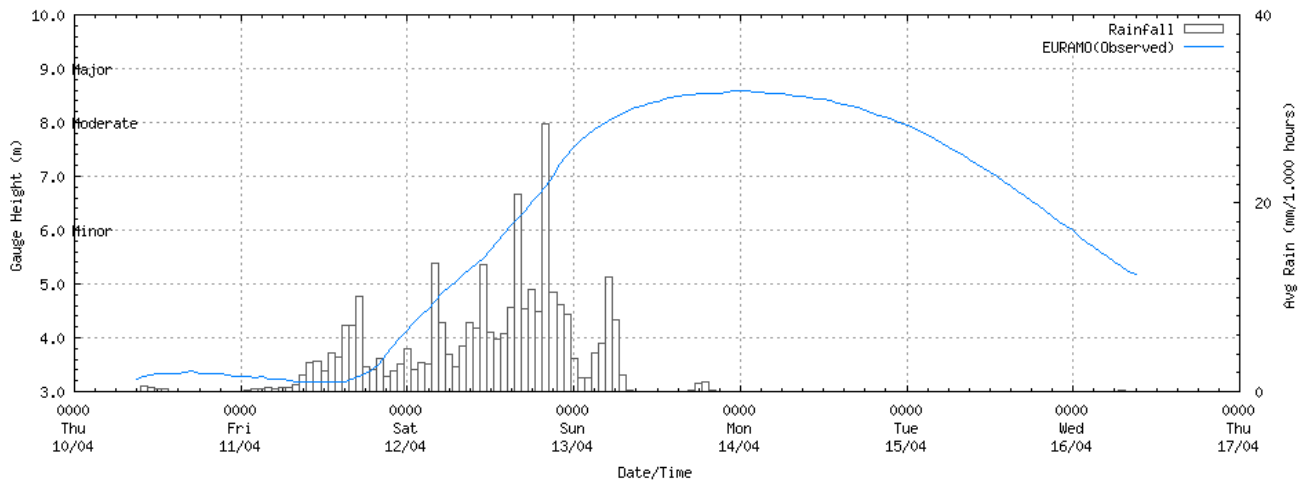
Herbert River at Halifax Alert



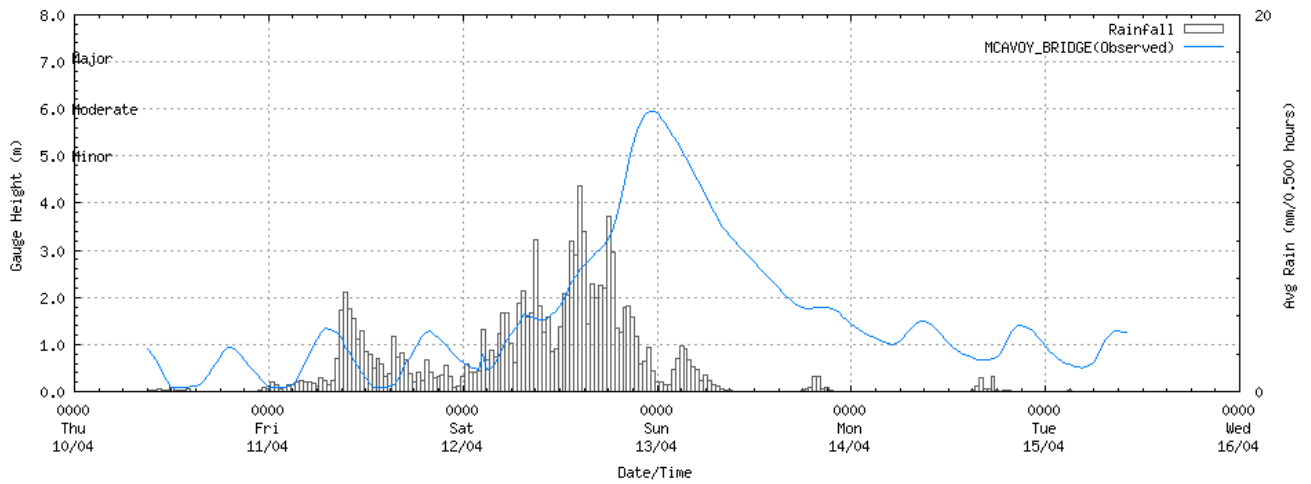
Murray River at Murray Flats Alert



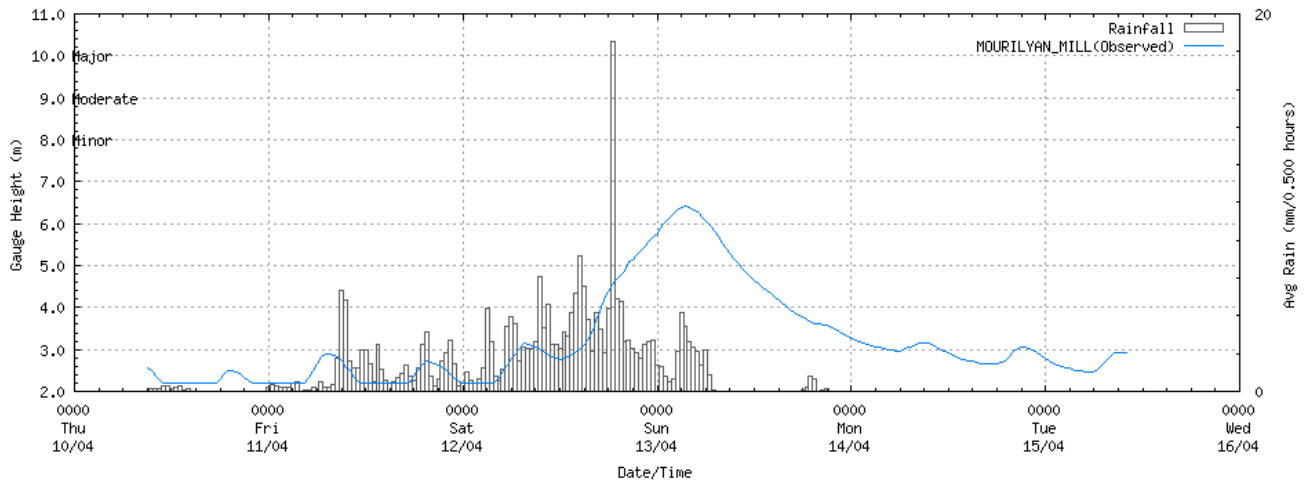
Tully River at Euramo Alert



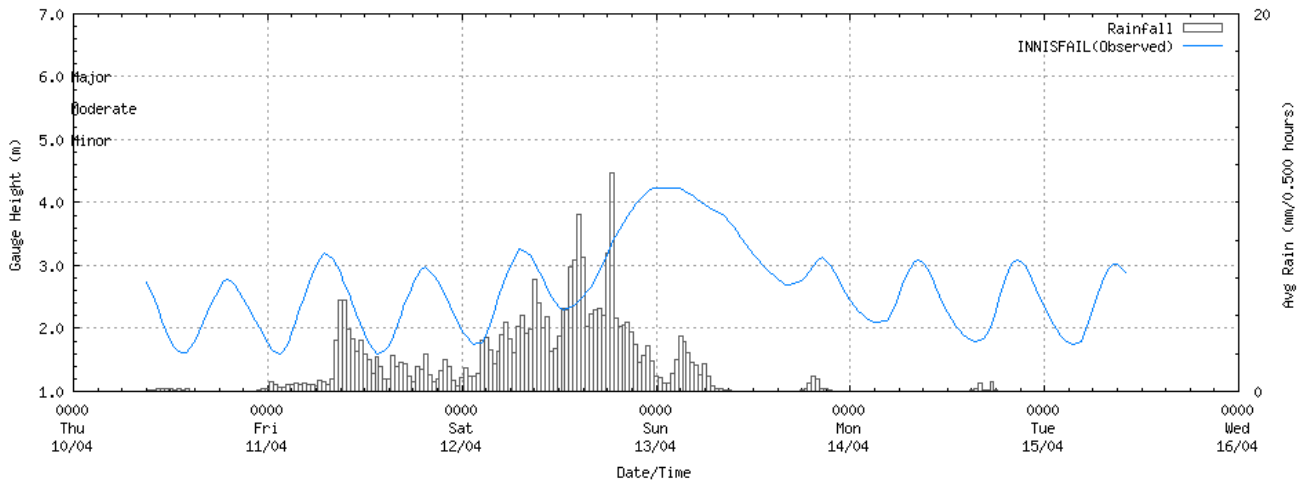
North Johnstone River at McAvoy Bridge Alert



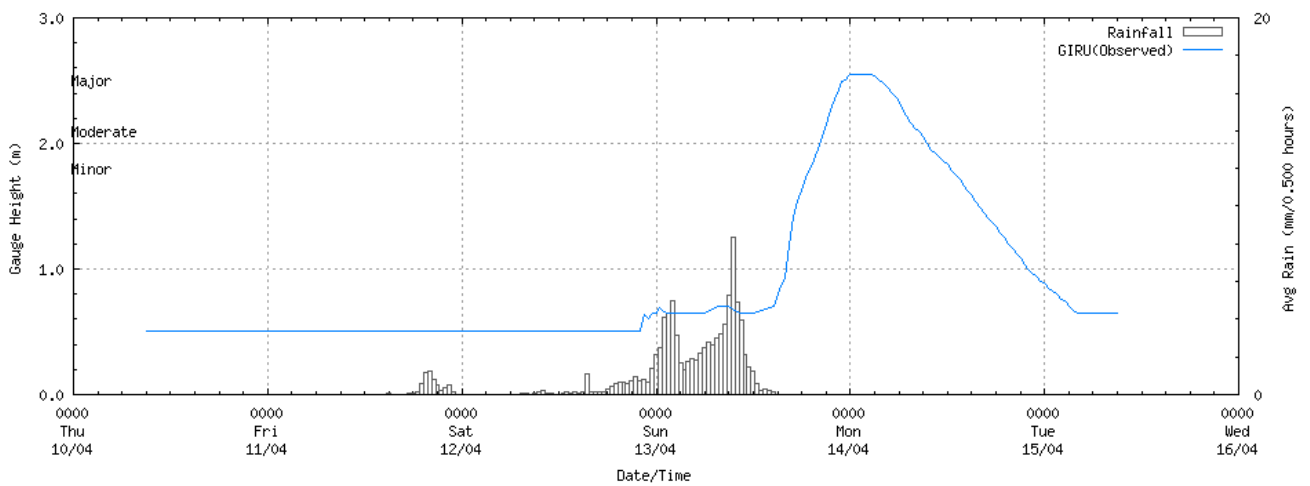
South Johnstone River at Mourilyan Mill Alert



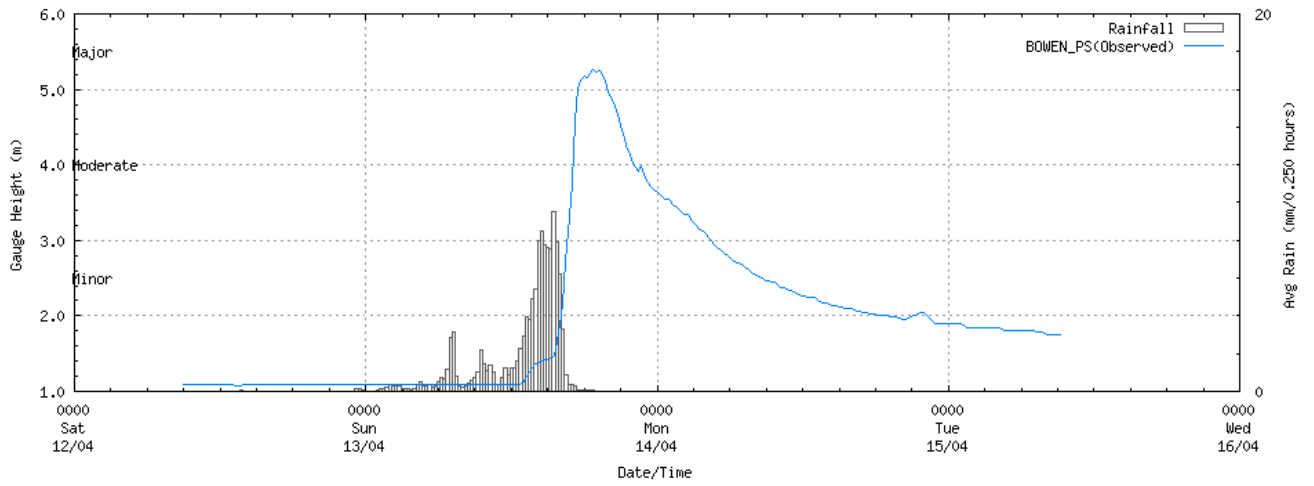
South Johnstone River at Innisfail Wharf Alert



Haughton River at Giru Alert



Don River at Bowen Pump Station Alert



Appendix 4: Department of Natural Resources and Mines Usage Agreement



Queensland Government

Department of Natural Resources and Mines

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