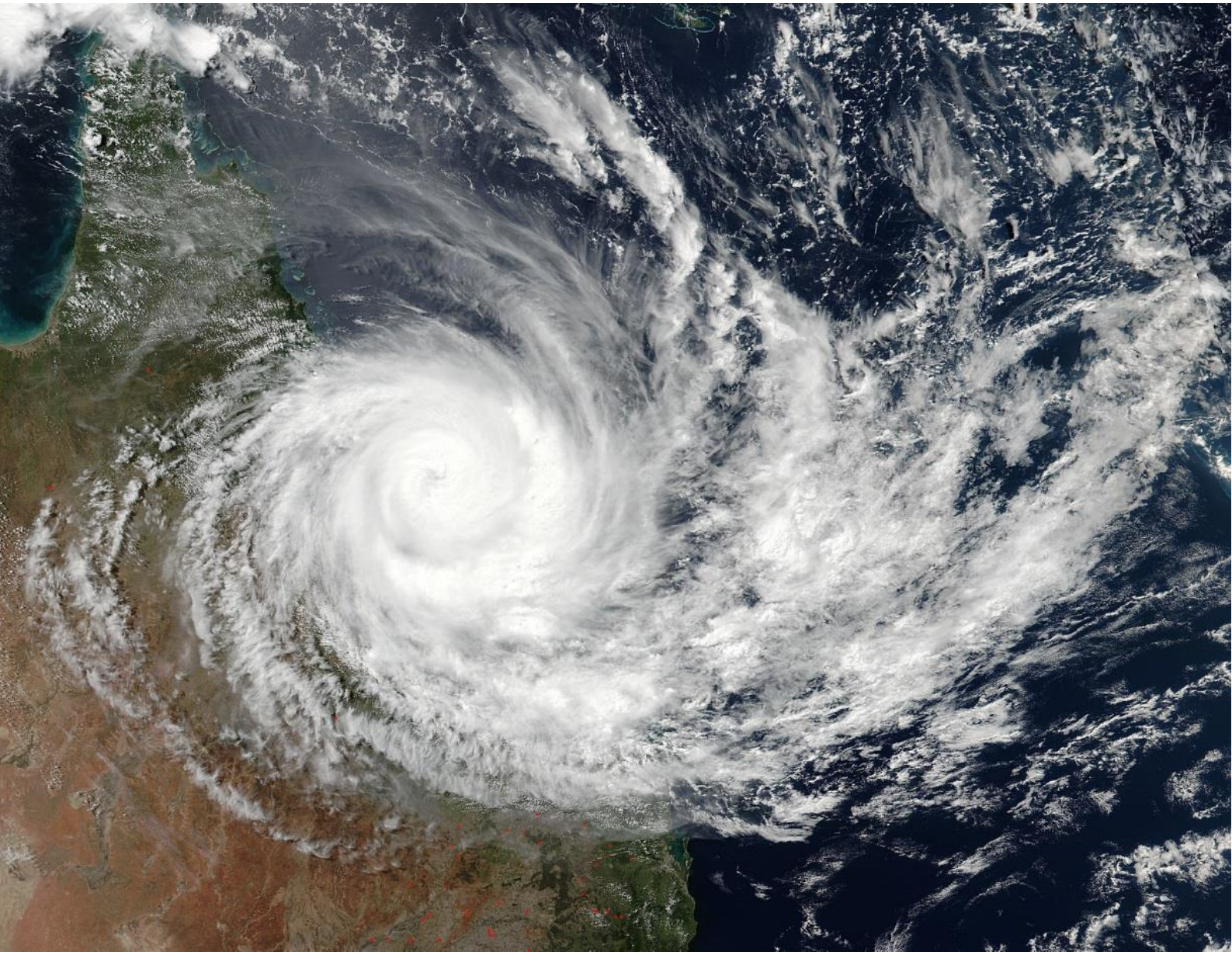
Tropical Cyclone Debbie Technical Report

A comprehensive summary of meteorological and hydrological data associated with Severe Tropical Cyclone Debbie that affected Queensland and New South Wales during March and April 2017



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Tropical Cyclone Debbie Technical Report

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1 Executive summary

Severe Tropical Cyclone Debbie *(Debbie)* made landfall near Airlie Beach on Queensland's Whitsunday coast on Tuesday 28 March 2017, after crossing the Whitsunday islands as a large and powerful Category 4 strength tropical cyclone.

The cyclone devastated resort islands in the Whitsunday group including Hamilton and Daydream islands, as well as the towns of Airlie Beach and Proserpine. Bowen also received significant damage, and further inland, the cyclone also caused damage at Collinsville. The remnant tropical low turned southeast and produced major flooding in central and southeast Queensland and northeast New South Wales during the following few days. Several lives were lost due to flooding in New South Wales and Queensland. Schools across southeast Queensland, including Brisbane, were closed on 30 March due to the risk of flash flooding and high winds[1]. Many of those schools remained closed the following day.

The tropical low that became *Debbie* was first identified and tracked southeast of Papua New Guinea on 22 March. It drifted south while developing during the next few days, and was named *Debbie* at 10am (all times AEST) on 25 March. Conditions were favourable for *Debbie* to further intensify, and it soon reached Category 2 strength and turned southwest towards the coast. Development then stalled for approximately 24 hours as upper atmospheric conditions became less favourable. Once conditions became favourable again, *Debbie* rapidly intensified from Category 2 to Category 4 strength during a 12-hour period on 27 March.

A peak wind gust of 263km/h was recorded at Hamilton Island as *Debbie* approached the coast on the morning of 28 March, which is the highest gust recorded in Queensland. The centre of the eye crossed the mainland near Airlie Beach at approximately 12.40pm. Shortly after crossing, *Debbie* slowed down to only 7km/h, and locations such as Airlie Beach and Proserpine were exposed to the very destructive winds near the cyclone's core for many hours. Proserpine Airport recorded wind gusts to 165km/h. Further inland, roofs were removed at Collinsville which experienced Category 2 strength winds.

Press conference at Queensland Fire and Emergency Services Headquarters, Brisbane.

[1] Inspector General Emergency Management (Qld), The Cyclone Debbie Review
www.igem.qld.gov.au/reports-and-publications/Documents/Cyclone%20Debbie%20Review%20Rpt1-17-18_PUBLIC_WEB.pdf

A 2.66m storm surge was recorded by the Laguna Quays storm tide gauge (south of the location the cyclone made landfall), which exceeded the highest astronomical tide by 0.91m, despite landfall occurring between low and high tide.

Debbie weakened below tropical cyclone strength around 3am on 29 March. The remnant low then turned southeast, and produced a broad swathe of damaging winds and torrential rainfall from central Queensland to the southeast. Clarke Range, west of Mackay, received 986mm in the 48 hours to 9am on 29 March and Mt Jukes, northwest of Mackay, recorded 635mm in the 24 hours to 9am on 30 March. Several locations in the Fitzroy River basin received close to 1000mm in rainfall over two days. Record flooding occurred in the Connors and Isaac Rivers and the Fitzroy River went into major flood warnings at Rockhampton during the following week.

Ex-tropical cyclone, *Debbie* tracked southeast over the Sunshine Coast and Brisbane during the afternoon and evening of 30 March. Damaging wind gusts of up to 131km/h were observed with widespread rainfall totals in excess of 150mm. Heavier falls of over 200mm occurred further south over the Gold Coast hinterland and Scenic Rim, where isolated falls of 600mm were recorded. Upper Springbrook in the Gold Coast hinterland received 602mm of rainfall in the 24 hours to 9am on 31 March. The Queensland government ordered all schools south of Agnes Water and east of Nanango to close on Thursday 30 March due to the threat of flash flooding and damaging winds. Schools from the Sunshine Coast south remained closed on Friday.

Record flooding occurred at several locations on the Logan and Albert Rivers in southeast Queensland, and on the Tweed River at Murwillumbah in northern New South Wales.

Riverine and flash flooding was recorded in a number of locations from the Mackay catchment all the way down to northern New South Wales. Around 100 people required assistance from floodwaters in the Mackay region as creeks in the Eton and Homebush areas flooded[2], and tens of thousands of people evacuated from the Lismore and Murwillumbah areas.

Record flooding also occurred in the Kolan, Burnett, Brisbane, Burdekin, South Coast Condamine-Balonne and Border Rivers.

The impacts associated with the passage of *Debbie* extended across the Tasman Sea as far as New Zealand where flooding and landslides occurred. The most notable impacts from *Debbie* were flooding, wind, waves and tides.

Wind damage was reported in a number of locations with damage to properties, uprooted trees and foliage stripped from trees in areas such as Midge Point, Proserpine, Airlie Beach and Hamilton Island.

Tide and wave impacts were also recorded between Airlie Beach and Mackay. Damage included pontoons driven ashore at Laguna Quays, boats overturned at Hamilton Island and buildings destroyed by wave action at Shute Harbour.

Queensland Reconstruction Authority estimates[3] damage to infrastructure and industry following *Debbie* will exceed $1 billion. So far, the damage to agricultural crops is estimated at almost $1 billion and loss of coal exports could exceed $1.5 billion. Queensland's tourism industry has also been severely impacted and the assessment of this cost is still underway. Within one month of the event, more than 100,000 requests for recovery assistance were

[2] Office of the Queensland Chief Scientist, 'Flooding in Sandy Creek Catchment, Mackay, following Tropical Cyclone Debbie' www.chiefscientist.qld.gov.au/images/documents/chiefscientist/pubs/reviews-audits/kinchant-dam-assessment.pdf
[3] Inspector General Emergency Management (Qld), The Cyclone Debbie Review www.igem.qld.gov.au/reports-and-publications/Documents/Cyclone%20Debbie%20Review%20Rpt1-17-18_PUBLIC_WEB.pdf

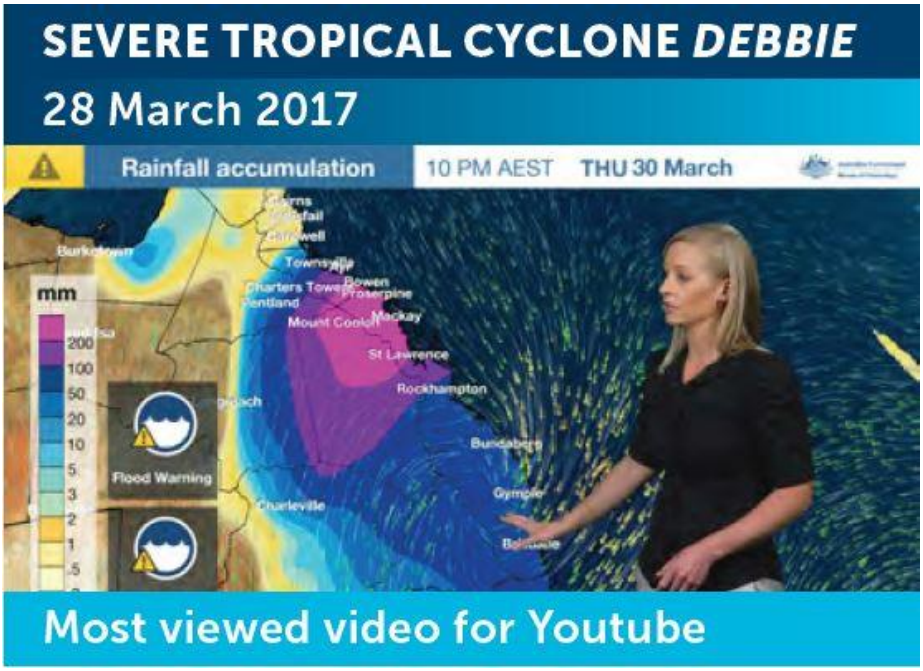
received and $25 million in recovery grants issued. More than 2300 residential properties were damaged, with almost 1000 of them declared uninhabitable.

This report includes a post-event intensity reanalysis for *Debbie*. There is also a description of how *Debbie* formed its track through Queensland and New South Wales, including a summary of significant rainfall, wind, pressure, tide, wave and river level observations.

A total of 64 Tropical Cyclone Advices were issued during this event as well as 56 Severe Weather Warnings in Queensland and New South Wales. The Standard Emergency Warning Signal (SEWS) was applied by the Bureau to Tropical Cyclone Advices for 34 hours leading up to and immediately after cyclone landfall during March 27 and 28.

Additional Severe Thunderstorm Warnings for Queensland were issued on 21 occasions, with the SEWS being applied twice; once for storms producing extremely heavy rain near Mackay on March 29, and again for storms in southeast Queensland that produced extremely heavy rain on March 30.

More than 350 Flood Watches and Flood Warnings were issued during this event, with major flooding and record flood levels recorded in many locations from Queensland's central coast to coastal catchments in northern New South Wales. The SEWS was applied to flood warnings for the Logan/Albert river catchment and Lower Brisbane (Bremer River, Lockyer/Laidley and Warrill Creeks) during the evening of March 30 and early morning of March 31.



The most viewed video was released 28 March 2017, the day *Debbie* made landfall.

The Bureau produced 12 Severe Weather videos between 24-31 March 2017. These were released on the Bureau's YouTube channel and shared broadly on social media platforms.

Each river basin impacted by *Debbie* has been analysed within this report. Each basin is described in a separate section to ensure all significant location-specific data and information can be found in one location.

The details for each basin include the dates of the Flood Warnings issued during the event, where the most significant rainfall was recorded and its significance, and also where the flooding occurred and how these flood levels rank against the flood history at these gauges.

2 Meteorology

2.1 Post-event intensity re-analysis

Based on the available data, including radar and surface observations from Bureau and non-Bureau weather stations, and the application of both subjective and objective satellite analysis techniques, it was concluded that *Debbie* affected the Whitsunday islands as a low-end Category 4 tropical cyclone before making landfall on the mainland coast, near Airlie Beach, as a high-end Category 3 tropical cyclone on 28 March 2017.

It is to be emphasised that 'landfall' constitutes the intersection of the surface centre of the tropical cyclone with the coastline. Therefore, despite the post-event analysis conclusion that *Debbie* crossed the mainland coast as a high-end Category 3 cyclone, it must be noted that it is probable that parts of the mainland coast not equipped with observations equipment may have experienced Category 4 strength winds between Airlie Beach and Cape Conway[4]. The reasoning for this statement is that parts of the eyewall extended along this area of the mainland coast while *Debbie* remained as a Category 4 cyclone as it crossed the Whitsunday Islands.

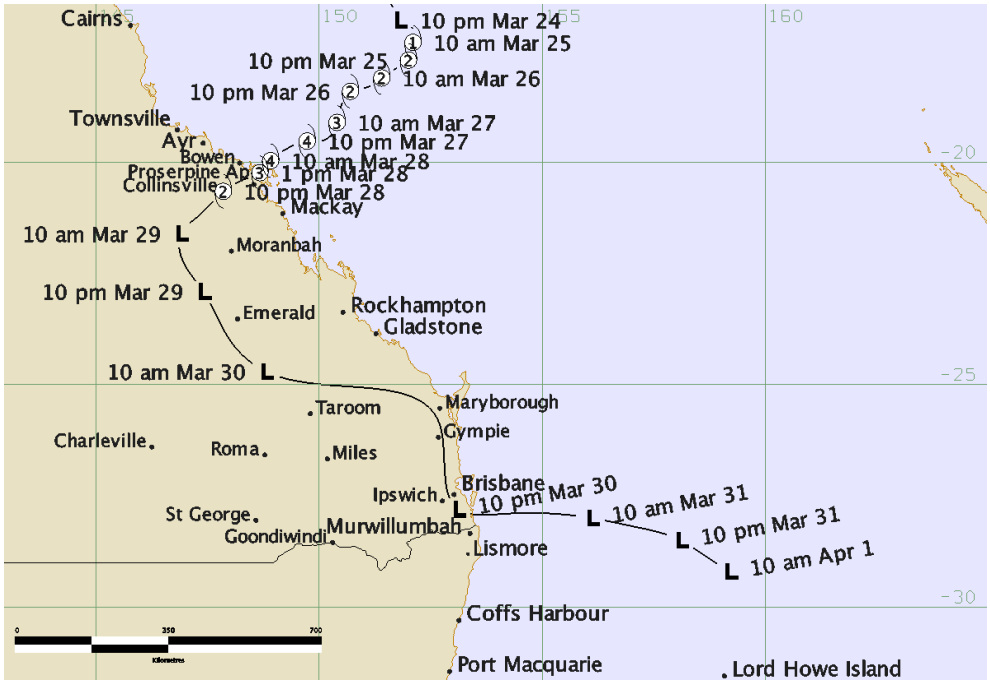
The post-event intensity estimates of *Debbie* were primarily derived using subjective (Dvorak) and objective satellite analysis techniques. Supplementary data from Bureau and non-Bureau weather stations were then analysed in order to ascertain whether any observations contradicted the intensity estimates derived from the satellite techniques.

Wind observations from the Bureau's Automatic Weather Station (AWS) at Hamilton Island during *Debbie's* approach were analysed in detail. As the Hamilton Island AWS is situated on a hill of approximately 60m altitude, standard topographical speed-up factors were applied to reverse engineer the winds to the equivalent wind at a height over 10 metres over flat terrain. The 263km/h (high Category 4) wind gust at Hamilton Island was analysed to be more indicative of a high Category 3 gust at 10m altitude over flat terrain.

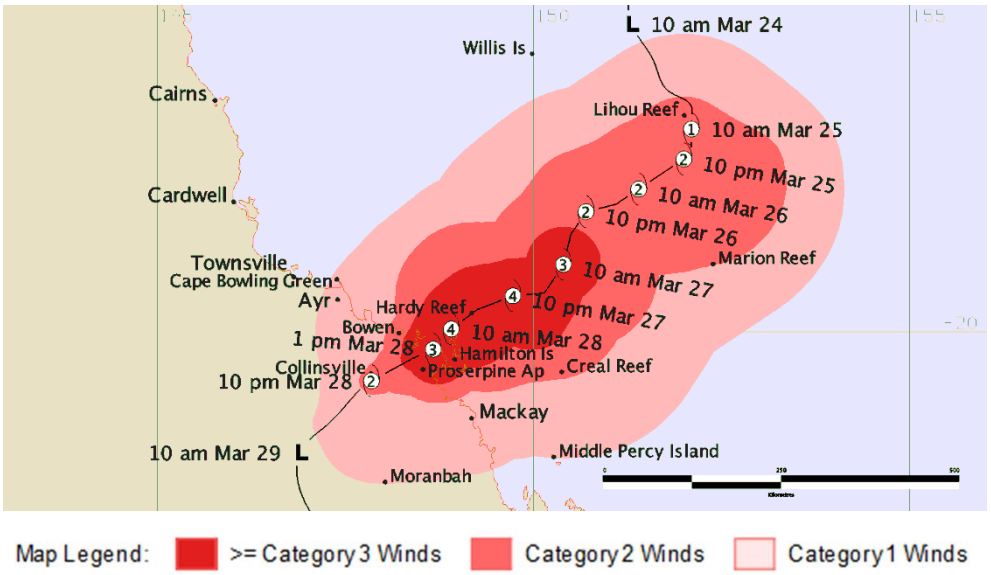
However, there is some conservatism innate to topographical speed-up factors (i.e. they may overestimate the increase in wind speed due to the hill). Due to this and the distribution of deep convection around *Debbie's* eye at the time of the maximum winds at Hamilton Island, a low Category 4 intensity (maximum 10-minute average winds of 90 knots (165km/h) was assigned to *Cyclone Debbie* in the vicinity of the Whitsunday Islands consistent with subjective Dvorak estimates.

At landfall, the Dvorak Current Intensity (CI) number had dropped to 5.0, indicating an estimated intensity of 80-85 knots (150-155km/h maximum 10-minute average wind). As described earlier, this was consistent with the SATCON estimate. It was also broadly consistent with observed land-based surface pressure measurements, and wind speeds recorded at the Proserpine Airport Automatic Weather Station, as well as wind speeds recorded by an anemometer deployed at Airlie Beach[5]. The intensity of *Debbie* at landfall was therefore assigned 80 knots (150km/h maximum 10-minute average wind). This is consistent with high Category 3 intensity.

[4] James Cook University, Cyclone Testing Station, ' Tropical Cyclone Debbie, Damage to buildings in the Whitsunday Region', CTS Technical Report No 63
www.jcu.edu.au/__data/assets/pdf_file/0009/461178/TC-Debbie-report.pdf
[5] James Cook University, as above



A post-event track map of the path *Debbie* took (all times in AEST).



A post-event track map showing areas affected by very destructive (red), destructive (dark pink) and damaging (light pink) winds produced by *Debbie* (all times in AEST).

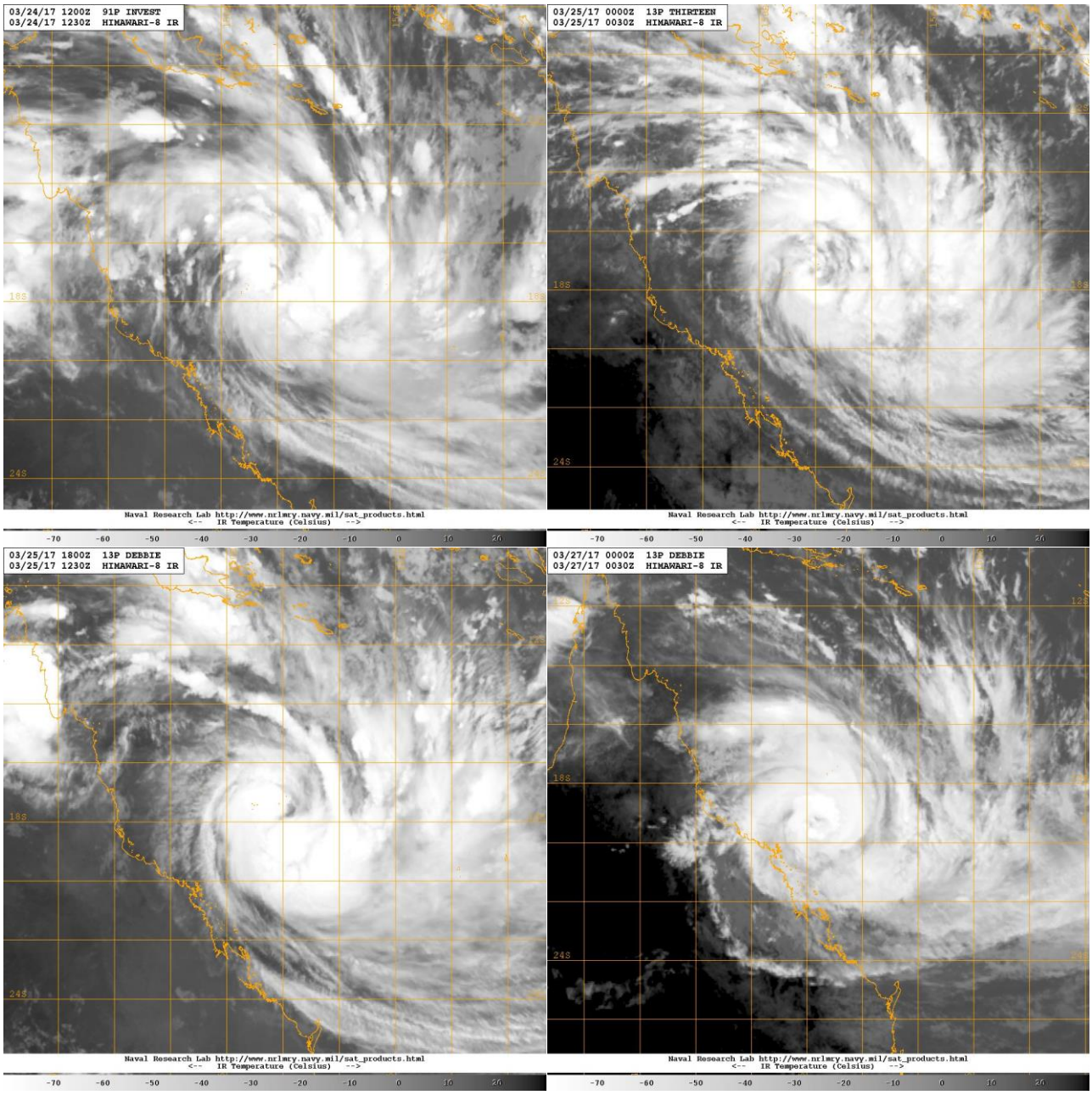
The Table below outlines some of the post-event analysis parameters from *Cyclone Debbie*.

Date	Time AEST	Latitude	Longitude	Position accuracy (nm)	10-minute mean wind (knots)	Peak 3-second wind gust (knots)	Central Pressure (hPa)
25/03/2017	4:00 AM	17.00S	152.10E	30	30	45	991
25/03/2017	10:00 AM	17.30S	152.10E	25	35	50	991
25/03/2017	4:00 PM	17.60S	152.10E	30	40	55	990
25/03/2017	10:00 PM	17.70S	152.00E	25	55	75	986
26/03/2017	4:00 AM	17.90S	151.70E	30	55	75	984
26/03/2017	10:00 AM	18.10S	151.40E	30	55	75	986
26/03/2017	4:00 PM	18.30S	151.10E	25	60	85	978
26/03/2017	10:00 PM	18.40S	150.70E	30	60	85	982
27/03/2017	4:00 AM	18.70S	150.50E	25	60	85	980
27/03/2017	10:00 AM	19.10S	150.40E	25	70	100	974
27/03/2017	4:00 PM	19.48S	150.15E	19	80	110	959
27/03/2017	10:00 PM	19.52S	149.73E	15	95	135	949
28/03/2017	4:00 AM	19.70S	149.26E	13	95	135	949
28/03/2017	10:00 AM	19.96S	148.91E	13	90	125	956
28/03/2017	12:40pm	20.23S	148.67E	10	80	110	957
28/03/2017	4:00 PM	20.35S	148.40E	12	70	100	965
28/03/2017	10:00 PM	20.65S	147.85E	15	50	70	980
29/03/2017	4:00 AM	21.20S	147.30E	15	35	50	989
29/03/2017	10:00 AM	21.60S	146.90E	15	30	45	994
29/03/2017	4:00 PM	22.10S	146.90E	20	25	45	995
29/03/2017	10:00 PM	22.90S	147.40E	20	20	45	999
30/03/2017	4:00 AM	24.00S	148.00E	20	20	45	999
30/03/2017	10:00 AM	24.70S	148.80E	25	20	45	1002
30/03/2017	4:00 PM	25.90S	152.70E	10	25	45	999
30/03/2017	10:00 PM	27.80S	153.10E	10	35	50	994

2.2 Satellite

This selection of infrared satellite images were taken between Friday 24 March, and Monday 27 March as *Debbie* developed from a tropical low to a Category 4 cyclone. The development of *Debbie* was steady from a tropical low to a Category 2 cyclone.

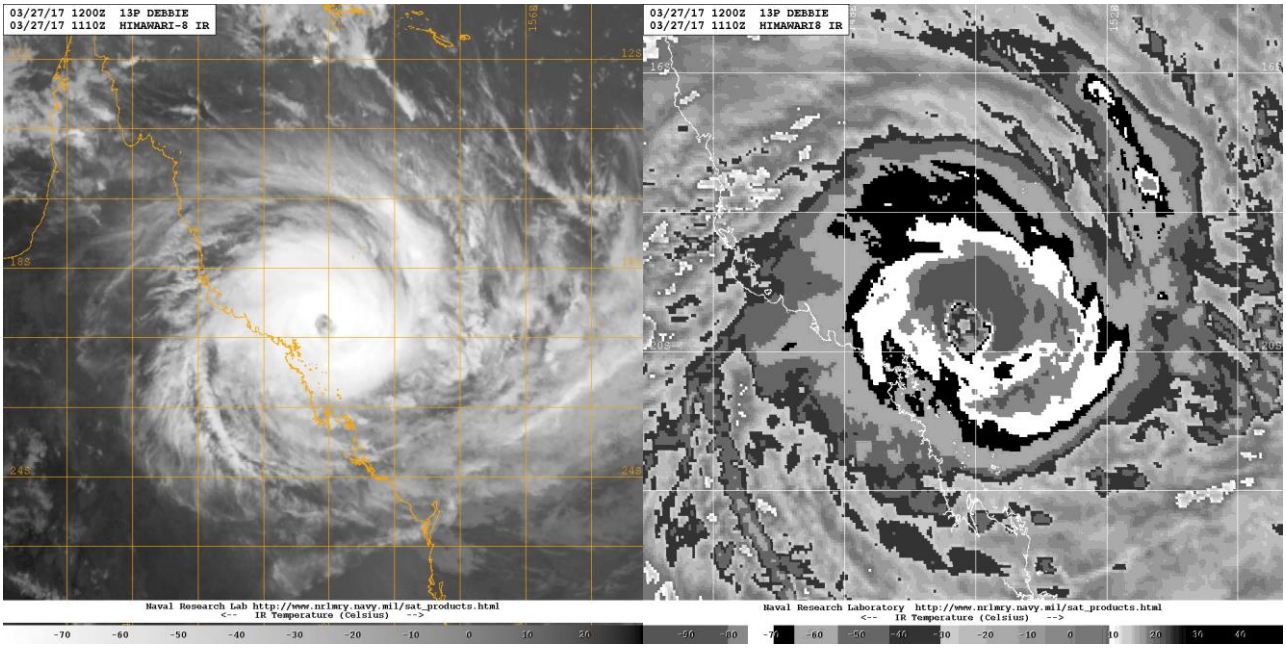
Once *Debbie* reached Category 2, development stalled for approximately 36 hours as upper atmospheric conditions became less favourable. Development resumed during the morning of Monday 27 March, at which point *Debbie* intensified rapidly from Category 2 to Category 4. Development then stalled again as *Debbie* underwent an eyewall replacement cycle leading up to landfall.



A series of infrared satellite images showing the development of *Debbie* (source: Naval Research Laboratory).

Away from land where direct observations were sparse, the subjective Dvorak technique was the primary tool used to estimate the intensity of tropical cyclone *Debbie*. The satellite image (below, left) and same image with Dvorak enhancement (below, right) shows infra-red enhancement of *Debbie* near peak intensity at 9pm AEST on 27 March.

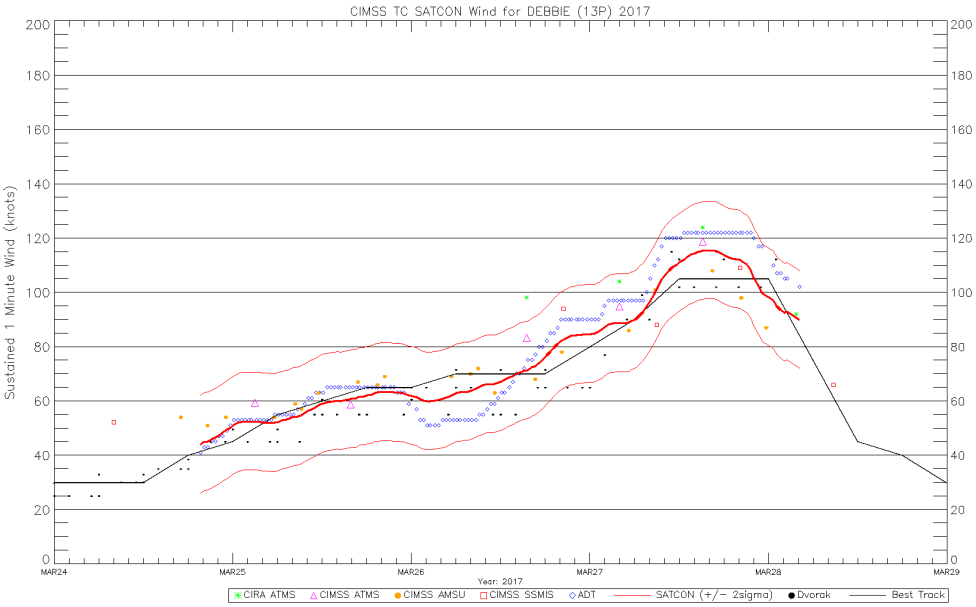
The instantaneous Dvorak T-number here is 6.0, giving an intensity estimate of high Category 4 (maximum 10-minute average wind of 100 to 105 knots (185 to 195 km/h). However, a more representative estimate of the intensity of a cyclone is obtained by averaging the T-number over 3 hours. In this case, the three-hour average T number peaked at 5.5, giving *Debbie* a maximum intensity of low Category 4 (maximum 10-minute average wind of 95 knots (175 km/h).



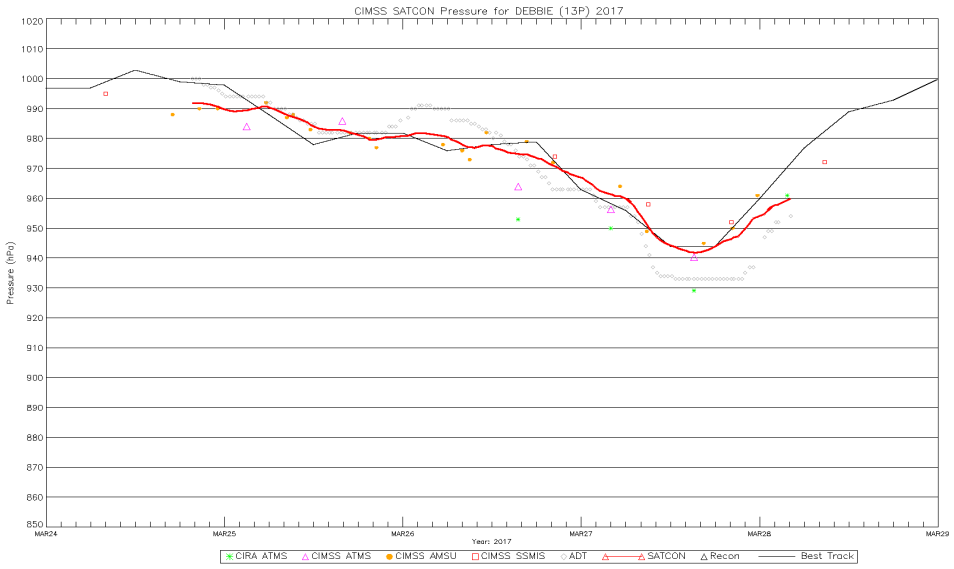
Himawari-8 infrared satellite image (left) and the same image with a Dvorak enhancement (right) of *Debbie* near peak intensity at 9:10pm AEST on 27 March (source: Naval Research Laboratory).

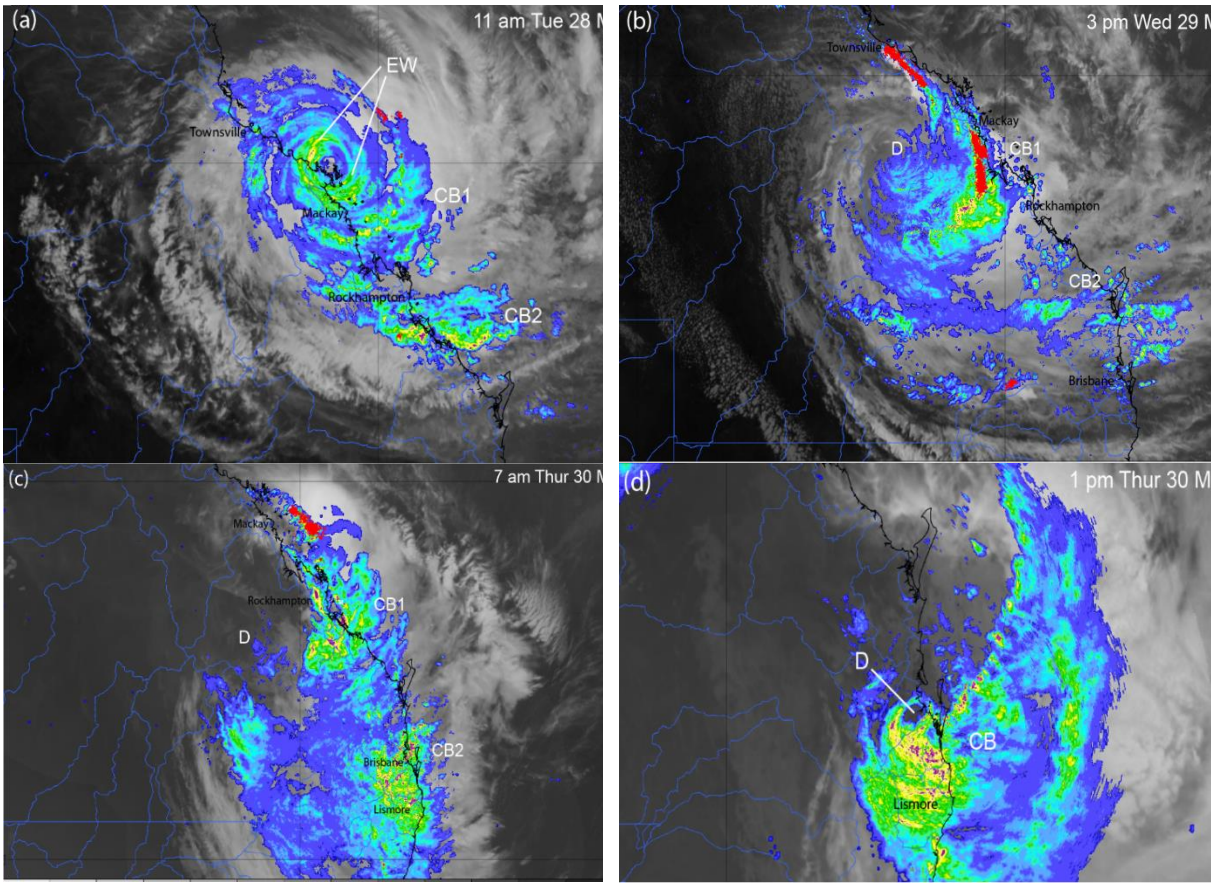
Another semi-independent estimate of the offshore intensity of *Debbie* was available through the Cooperative Institute for Meteorological Satellite Studies (CIMSS) Satellite Consensus (SATCON) algorithm (see below).

This estimates ***Debbie's*** peak intensity at approximately 105 knots (maximum 10-minute average wind), occurring around 2am AEST on 28 March. However, this figure was strongly influenced by the Objective Dvorak (ODT) T-number of 6.3, which during reanalysis was felt to be too high.



SATCON wind and pressure for Debbie (source: CIMSS).





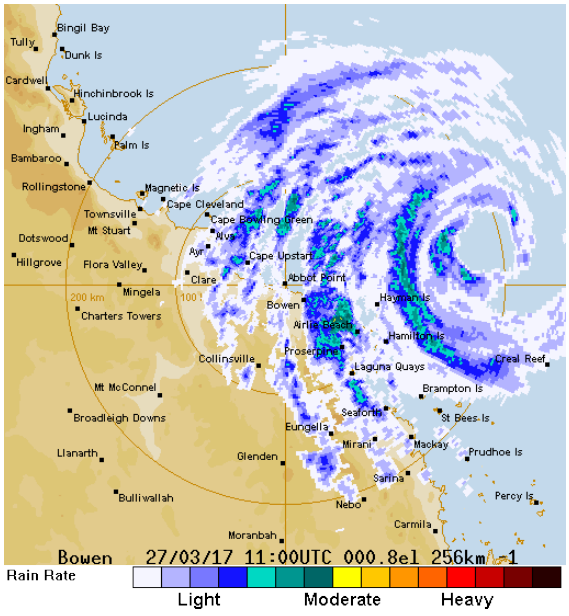
Infrared satellite imagery overlaid with merged radar reflectivity at four selected times indicated in the upper right corner of each panel above. Lightning strikes are recorded in red. Annotations mark the following features: EW is eyewall convection; CB1 and CB2 refer to convective bands 1 and 2 and D indicates the centre of the cyclone.

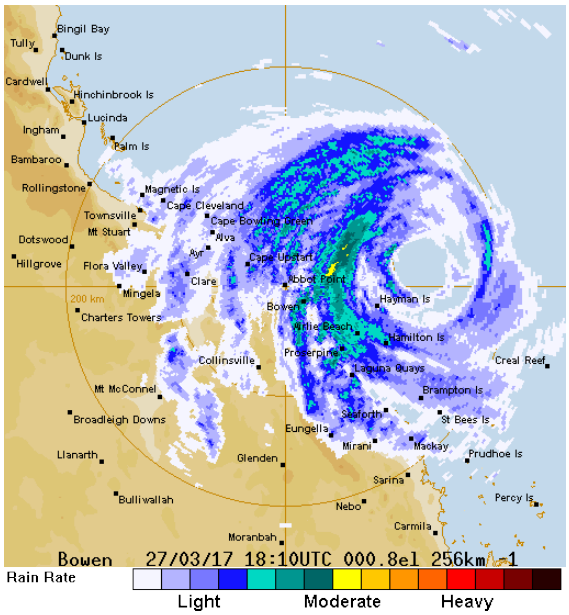
Closer to landfall, the cloud top temperatures surrounding the eye of *Debbie* warmed and in turn the 3-hourly averaged subjective Dvorak T-number reduced to 5.0 from 5am on 28 March until the system made landfall.

It is therefore likely that *Debbie* did not continue to intensify during the final 6 hours before landfall, and more likely slightly weakened. The Dvorak technique dictates that the cloud signature of a tropical cyclone will weaken some 6-12 hours before the surface wind weakens. However, the subjective Dvorak technique is known to overestimate the intensity of a tropical cyclone during an eyewall replacement phase (see 2.3). A purely subjective Dvorak estimate of ***Debbie's*** intensity in the hours leading up to landfall would yield approximately 85-90 knots (155-165km/h maximum 10-minute average wind). This is close to the Category 3 and Category 4 boundary. This intensity estimate is close to that of SATCON, which indicated a landfall intensity of approximately 80-85 knots (150-155km/h maximum 10 minute average winds), or high Category 3.

2.3 Radar imagery

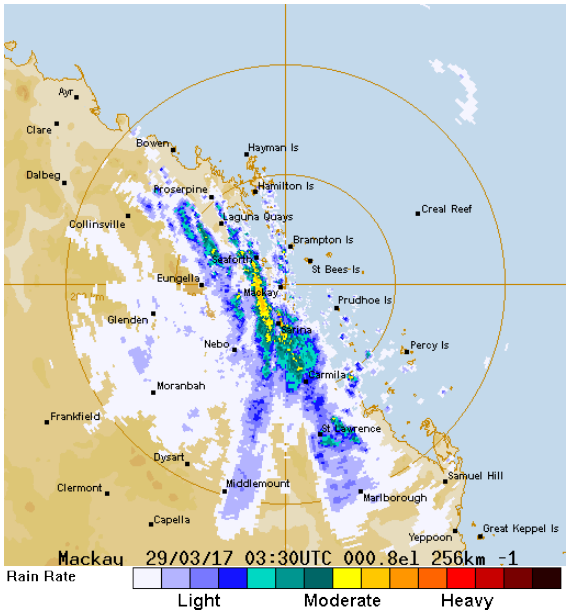
Debbie's eye first became evident on radar during the afternoon of 27 March. By the early hours of 28 March, radar imagery showed *Debbie* had developed concentric eye walls, which indicated that the cyclone was undergoing an eye-wall replacement cycle as it approached the Queensland coast. The occurrence of the eye-wall replacement cycle was closely aligned to a peaking in the intensity estimates ascertained through both the subjective and objective satellite analysis techniques described earlier. This inferred peak in intensity closely aligns to research that has found that tropical cyclones undergo a weakening trend while such a signature exists[6]. The concentric eye walls remained evident on radar until *Debbie* made landfall later on 28 March (see below).



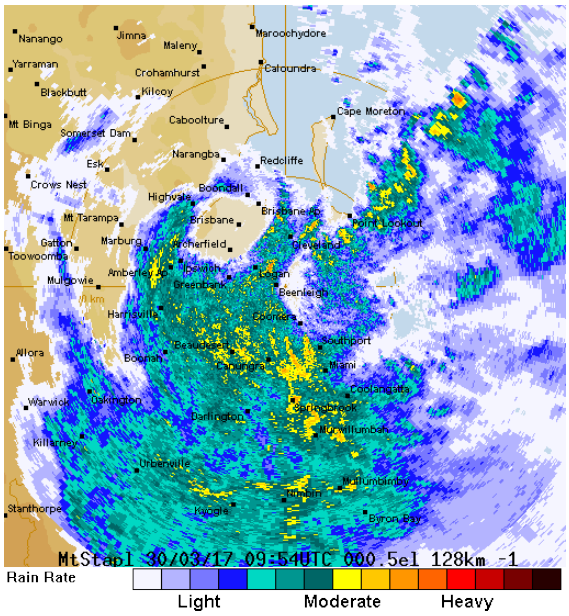


[6] Sitkowski, M., Kossin, J.P. and Rozoff, C.M., 2011: Intensity and Structure Changes during Hurricane Eyewall Replacement Cycles. *Monthly Weather Review*, 139, 3829-3847.

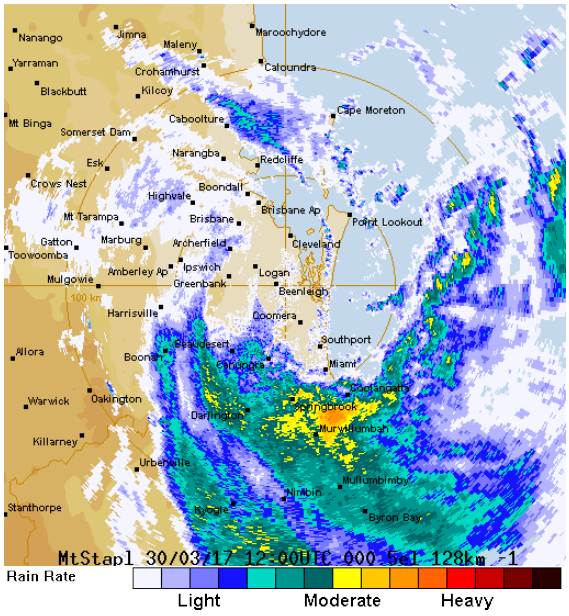
After *Debbie* made landfall and moved across the central interior of Queensland, a band of slow-moving thunderstorms developed inland of the Mackay coast and produced heavy rainfall on 29 March. The radar images below show the line of thunderstorms that became orientated north-south along terrain inland from the coast (see below).



During 30 March, the remnants of *Debbie* entered southeast Queensland and the ex-tropical cyclone underwent extra-tropical transition. Wind and pressure observations from across southeast Queensland indicated that the ex-tropical cyclone *Debbie* re-intensified while undergoing this transition, further evidenced on radar by a closed circulation crossing Brisbane during the evening of 30 March (see below).



Very heavy rainfall occurred over northern New South Wales late on 30 March as the ex-tropical cyclone moved off the southeast Queensland coast. Radar imagery shows the heaviest rainfall was on the southern flank of the low, which is a common trait of extra-tropical cyclones (see below).



2.4 Surface wind and barometric pressure observations

The surface observations used in post-event analysis were obtained from a range of sources, including:

- The Bureau's Automatic Weather Station (AWS) network[7]
- James Cook University, Cyclone Testing Station, Surface Weather Relay and Logging Network (SWIRLnet)[8] weather stations
- Oz Cyclone Chasers[9] weather station
- Australian Institute of Marine Science (AIMS) weather stations[10]
- Department of Science, Information Technology and Innovation (DSITI), Coastal Impacts Unit, storm tide monitoring network[11], and
- Ship reports.

The AIMS weather station at Hardy Reef[12] experienced the eye of *Debbie* as it approached the Queensland coast, and recorded the following observations:

- Lowest pressure of 951.4hPa at 3:50am AEST on 28th March
- Sustained 10-minute mean wind of 107km/h at 10:40pm on 27th March
- Peak 3-second wind gust of 161km/h at 11.30pm AEST on 27th March

Debbie's southern eye wall passed over the Bureau's Automatic Weather Station at Hamilton Island Airport on 28 March and recorded the following observations:

- Lowest pressure of 959.8hPa at 10.58am AEST
- Sustained 10-minute mean wind of 191km/h at 9:30am AEST.
- Peak 3-second wind gust of 263km/h at 10:25am AEST.

The DSITI storm tide gauges[13] also record barometric pressure. The lowest pressures observed by these sensors during the event were:

- Shute Harbour: 958.5hPa at 1.00pm on 28th March
- Bowen: 969.1hPa at 1.59pm on 28th March
- Laguna Quays: 974.1hPa at 2.49pm on 28th March

[7] www.bom.gov.au/qld/observations/map.shtml

[8] www.jcu.edu.au/cyclone-testing-station/swirlnet

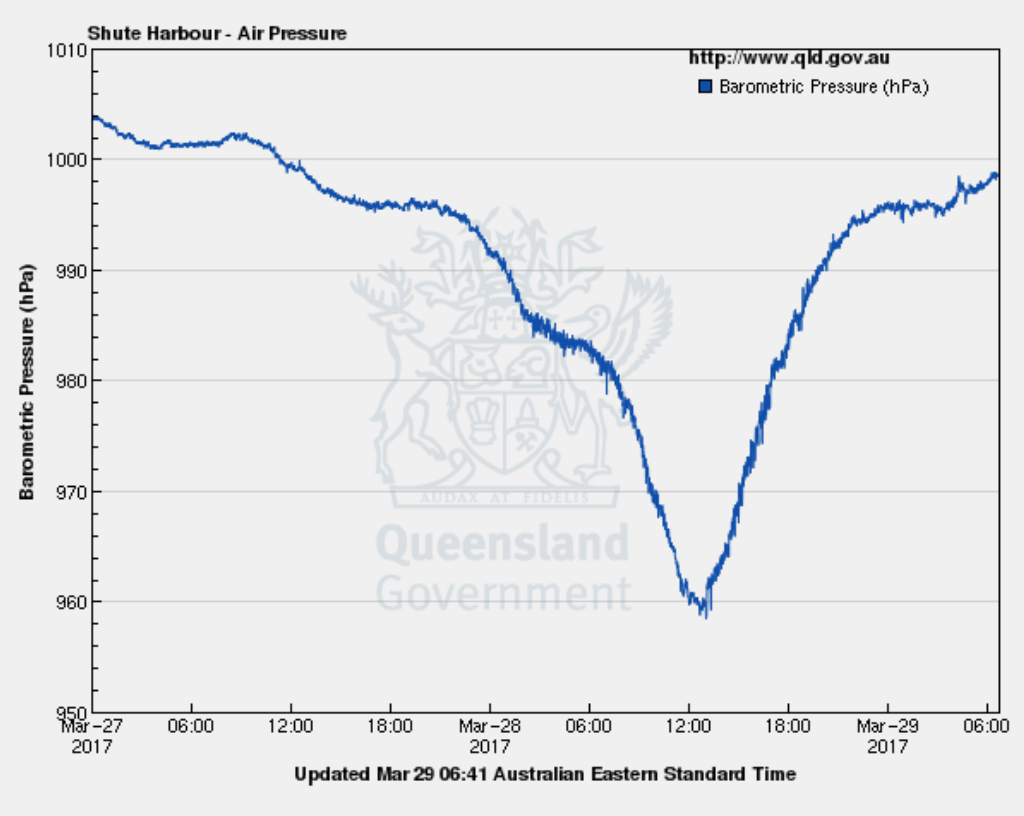
[9] www.ozcyclonechasers.com.au/index.php?option=com_content&view=article&id=118&Itemid=1285

[10] www.aims.gov.au/docs/research/monitoring/weather/weather.html

[11] www.qld.gov.au/environment/coasts-waterways/beach/storm-sites

[12] The AIMS weather station at Hardy Reef was situated on a floating pontoon that sustained damage during the passage of TC Debbie. AIMS webcam data (available in daylight only) from the pontoon reveal that its mast changed orientation to be around 45 degrees from the vertical sometime during the evening of the 27/28th March. The magnitude and direction of the wind measurements from the weather station may have been adversely affected as a result of structural damage to the pontoon.

[13] www.qld.gov.au/environment/coasts-waterways/beach/storm-sites



Barometric pressure at Shute Harbour between 27 to 29 March 2017 (source: DSITI).

The eye, southern eye wall and eastern eye wall passed across Airlie Beach at the time of landfall on the Whitsunday coast on 28 March. The Oz Cyclone Chasers recorded the following at a weather station they deployed at Airlie Beach during the event:

- Lowest pressure of 959.0hPa at 12.41pm AEST.
- Sustained 10-minute mean wind of 88km/h at 9.50am AEST.
- Peak 3-second wind gust of 182km/h at 9.43am AEST.

Lowest pressures and peak wind measurements at Cyclone Testing Station SWIRLnet weather stations during the event:

Weather station	Location	Lowest MSL pressure	Peak 3 second gust
SWIRLnet Tower 1	North Ayr	992hPa	59.4km/h
SWIRLnet Tower 2	North Bowen	972hPa	109.1km/h
SWIRLnet Tower 3	South Ayr	992hPa	55.4km/h
SWIRLnet Tower 4	Home Hill	990hPa	63.7km/h
SWIRLnet Tower 5	South Bowen	971hPa	125.6km/h
SWIRLnet Tower 6	Proserpine	962hPa	97.2km/h

It should be noted that the Oz Cyclone Chasers and SWIRLnet wind observations were taken from weather stations with anemometer masts with heights of around 3 metres. Researchers at the University of Queensland[14] have analysed the wind observations from these stations, and calculated adjusted values to be consistent with standard Bureau anemometer mast height (10m), and make allowance for the nearby terrain. The same technique was also applied to the BoM Hamilton Island Airport AWS, which is situated on a hill at 58m above mean sea level.

The wind speeds from the SWIRLnet, Oz Cyclone Chasers and BoM Hamilton Island Airport AWS, after adjustment were determined to be:

Weather station	Location	Adjusted Peak 3 second wind gust @ 10m height over flat terrain
SWIRLnet Tower 1	North Ayr	72.7km/h
SWIRLnet Tower 2	North Bowen	132.5km/h
SWIRLnet Tower 3	South Ayr	69.1km/h
SWIRLnet Tower 4	Home Hill	75.6km/h
SWIRLnet Tower 5	South Bowen	148.7km/h
SWIRLnet Tower 6	Proserpine	126.7km/h
BoM	Hamilton Island Airport	193.0km/h
Oz Cyclone Chasers	Airlie Beach	220.0km/h

Time series plots of Bureau observations of wind speed and barometric pressure can be found in sections 4.3 and 4.4.

[14] Mason, M.S., 2017: Tropical Cyclone Debbie (2017): Conversion of measured wind speeds. *Technical Note 201701*, Wind Research Laboratory, The University of Queensland.

2.5 Track and structure

The tropical low that would eventually develop into tropical cyclone *Debbie* was first identified off the southeast tip of Papua New Guinea on 22 March 2017. The low initially drifted to the south into the central Coral Sea, which at the time was characterised by very warm sea surface temperatures (close to or slightly above 30°C) beneath a broad area of atmospheric conditions that were identified as favourable for tropical cyclone development and intensification. The circulation associated with the low was very large in terms of spatial dimensions, and an area of weakly organised deep convection associated with this circulation developed over an area with a diameter of around 1400km, encompassing much of the northern half of the Coral Sea. Over the following few days the tropical low gradually intensified, and by 10am on 25 March, the low was analysed to be of tropical cyclone strength and was named *Debbie*, located about 500km northeast of Bowen and moving slowly to the south-southeast.

At about this time, a rearrangement of steering influences in the surrounding environment was also taking place. A weak ridge to the east of the cyclone and an upper trough well to the south both weakened and moved away to the east, allowing a new middle level ridge to build over central-eastern Australia, to the southwest of *Debbie*. This new pattern was responsible for the abrupt change to a south-westerly track on Saturday afternoon, taking the cyclone towards the central Queensland coast, and its persistence over the following few days ensured that the cyclone would make landfall and move into eastern inland Queensland.

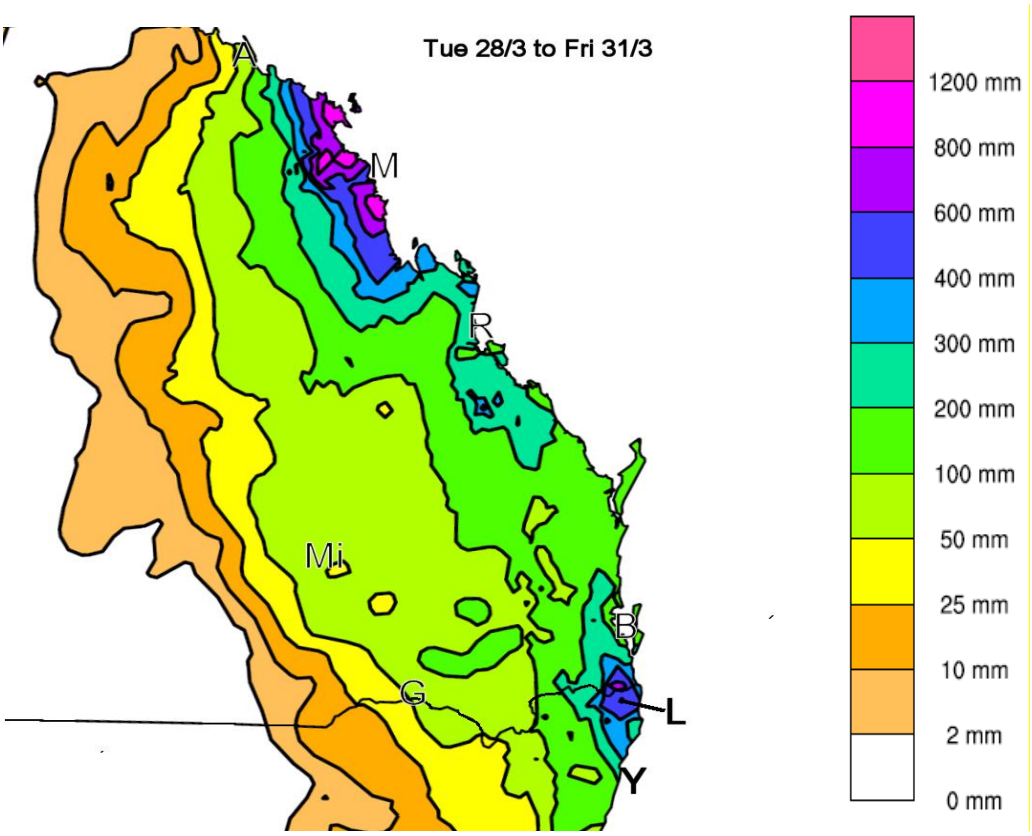
Conditions remained very favourable for further development of *Debbie* as it moved slowly towards the coast, and from afternoon of 27 March, the cyclone rapidly intensified from Category 2 to 4 strength during a 12-hour period into the evening. Severe Tropical Cyclone *Debbie* made landfall near Airlie Beach on Queensland's Whitsunday coast around midday on 28 March, and produced widespread damage over the resort islands in the Whitsunday group including Hamilton and Daydream Islands, as well as the towns of Airlie Beach, Bowen and Proserpine.

Debbie continued on its slow south-westerly track through the remainder of 28 March and into 29 March, taking it gradually further inland, with the inner core steadily weakening, and the cyclone was declared an ex-tropical cyclone *Debbie* at 3am on 29 March, with the centre located about 180km west of Mackay. At this time, a large upper level trough was developing and moving eastwards through the Great Australian Bight area, and this feature began to influence ex-tropical cyclone *Debbie*, leading to a gradual curve onto a more southerly track over inland Queensland. During the overnight period 29 March into 30 March, the interaction with the upper trough strengthened significantly, with the ex-tropical cyclone accelerating onto a south-easterly track in response, taking it towards southeast Queensland.

As ex-tropical cyclone *Debbie* tracked into southeast Queensland, the interaction with the upper trough produced a re-intensification as extra-tropical transition was completed. Convective bands redeveloped near the low's centre, particularly over the southern flank, and the system slowed in its forward motion and shifted southwards for a brief period. The centre of ex-tropical cyclone *Debbie* moved over the Brisbane and Gold Coast area and off the east coast overnight into early Friday morning, with the heavy rainfall clearing offshore from southeast Queensland and northern New South Wales by 2am on Friday 31 March. (A best track of *Debbie* is provided on page 8.)

2.6 Convection and rainfall

Debbie produced very large rainfall accumulations over much of eastern Queensland and northern NSW during the four-day period from Tuesday 28 to Friday 31 March (see below).



Four-day total rainfall totals between 28 -31 March. Locations indicated are: A (Ayr), M (Mackay), R (Rockhampton), Mi (Mitchell), G (Goondiwindi), B (Brisbane), L (Lismore), Y (Yamba).

This occurred roughly east of a line through Ayr, Mitchell, Goondiwindi and Yamba. Virtually all locations within the eastern half of this area received over 100mm for the event, while those in the west generally recorded totals in the 50 to 100mm range.

The highest rainfall totals occurred near the east coast, particularly the Clarke, Connors and other coastal ranges of central Queensland; and also the southeast Queensland and northern NSW, where many locations recorded between 500 and 1000mm.

Debbie produced these large rainfall accumulations mainly due to the very moist airmass that was in place over much of the western Coral Sea prior to its development, and the large spatial size of its circulation, which was able to access this rich moisture and bring it ashore. Additionally, in the period up until around 24 hours after landfall, the cyclone was slow-moving, and this exposed the Queensland coastal area from Bowen to St Lawrence to its inner convective bands of heavy rainfall for an extended period of time.

Over southeast Queensland and northern NSW, two quite distinct periods of heavy rainfall were observed. Firstly, during Wednesday into Thursday morning, the outer convective bands on the periphery of the ex-tropical cyclone's circulation affected the area; and then the reinvigorated centre of ex-tropical cyclone *Debbie* passed over, leading to a second round of heavy rainfall through Thursday evening into early Friday morning, with the heaviest falls to the south and southwest of the centre.

The outer convective bands of the developing cyclone began to affect the Queensland coastal area during Monday 27 March, leading to a significant increase in rainfall rates between Proserpine and Mackay. During Tuesday morning, these convective bands slowly spread further west, with the eyewall beginning to make landfall over the Whitsundays. In the 24 hours to 9am Tuesday, falls in the 100 to 150mm range were common, with peak totals reaching 300 to 450mm over the western part of the Pioneer catchment.

During Tuesday afternoon and evening, the centre of Cyclone *Debbie* moved slowly further inland, with the eyewall convection weakening rapidly, and rainfall rates reducing markedly to only 5 to 10mm per hour within about 100km of the centre. However, the inner convective bands on the eastern flank continued to produce heavy rainfall about the coast and near coastal ranges between Bowen and St Lawrence. Rainfall accumulations in the 24 hours to 9am Wednesday 29 March were mostly in the 150 to 300mm range in this area, reaching into the 400 to 600mm range over the higher terrain. Much further south, outer convective bands on the periphery of the cyclone's circulation began to affect the southern Capricornia coast and nearby inland. Rainfall totals of 60 to 100mm in the 24 hours to 9am Wednesday were recorded in this area.

During the latter part of Wednesday and into Thursday, the cyclone continued to become more asymmetric with deep convection confined to its eastern flank, due to the dual effects of increasing westerly vertical wind shear over the system and a drier air mass developing on the western flank. Stronger instability over the eastern flank led to much stronger and deeper updraughts in the inner convective bands over the coastal lowlands, leading to much greater lightning activity and a significant increase in rainfall intensities over accumulation periods up to six hours; isolated reports of 350 to 450mm in six hours were recorded during this period. Severe, potentially life threatening, flash flooding occurred as a result of these intense falls in and around Eton and Homebush to the southwest of Mackay, and also in a separate area further south at Lotus Creek and Clarke Creek about 150km northwest of Rockhampton.

Outside of these localised intense falls, 24 hour totals of 100 to 200mm occurred over the coastal plains and ranges between Ayr and St Lawrence, extending into the Connors River catchment. Over southern Queensland, the outer convective bands, marked, shifted further southwards, extending into southeast Queensland and northern NSW by Wednesday evening into Thursday morning. Rainfall totals in the 24 hours to 9am Thursday were generally in the 100 to 150mm range over the part of this area east of the Great Dividing Range, but reached 150 to 200mm over the Sunshine and Gold Coast hinterlands and 150 to 300mm over the upper Tweed River catchment in New South Wales.

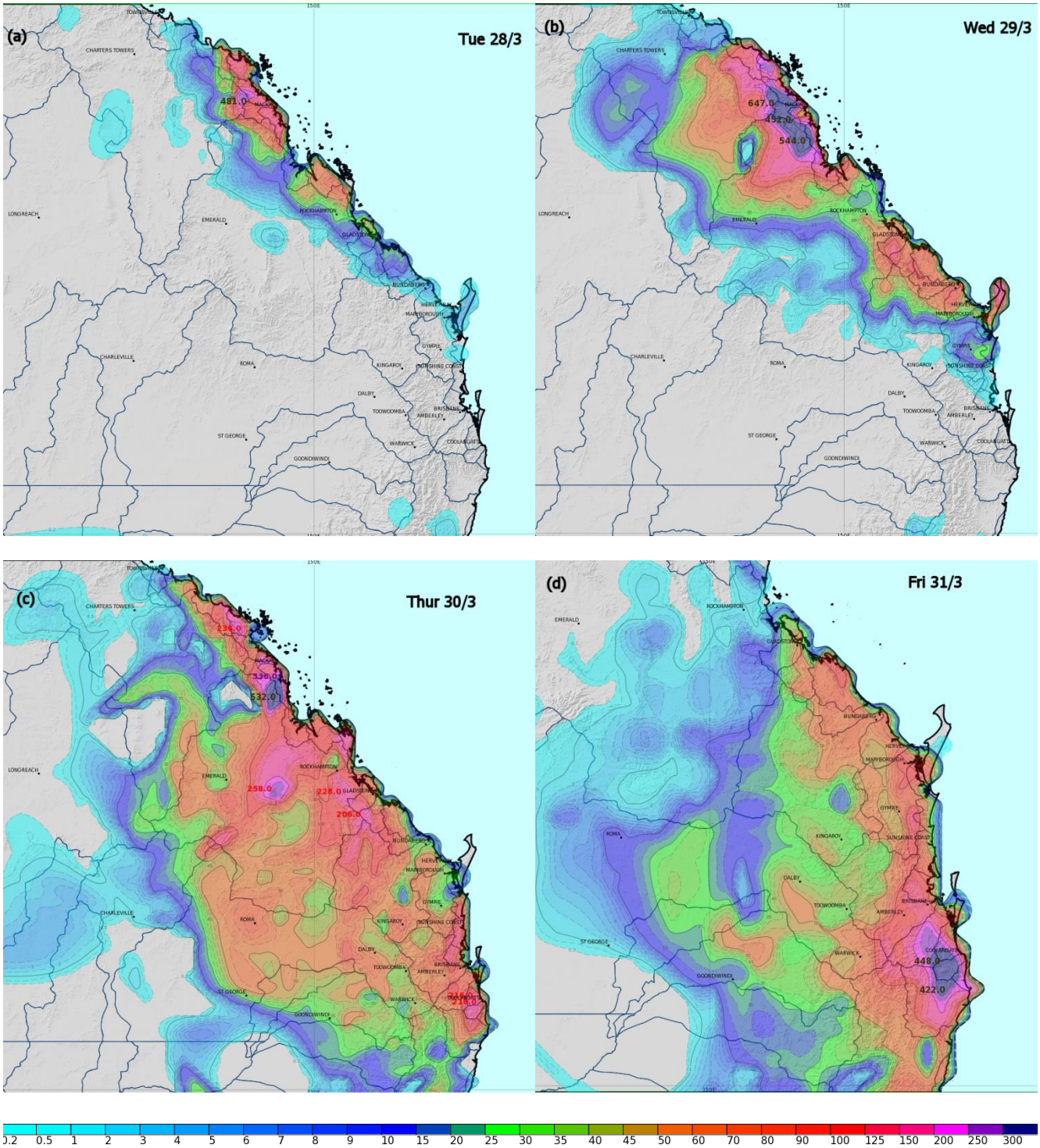
During Thursday afternoon and evening, the centre of ex-tropical cyclone *Debbie* moved into southeast Queensland and deepened under the influence of the upper trough to the west which led to the redevelopment of deep convection near its eastern and southern flank, with an eye-like feature developing during the passage over the Brisbane area. This redevelopment, combined with orographic enhancement, led to a second round of heavy rainfall developing over far southeast Queensland and northern New South Wales. In the 18 hours from 9am Thursday rainfall totals were generally in the 150 to 250mm range south of Brisbane, reaching 300 to 500mm over the higher terrain near the Queensland-NSW border and extending south over much of the Tweed, Brunswick and northern parts of the Richmond River catchments in New South Wales. This final band of heavy rainfall contracted eastwards during Thursday evening, and had cleared offshore by 2am on Friday 31 March.

24 hour rainfall totals in Queensland during the event:

Rainfall	Station	24 hour rainfall to 9am AEST on	Highest March daily rainfall record
646mm	Clarke Range	29 March	
638mm	Crediton	29 March	
635mm	Mt Jukes	30 March	
602mm	Upper Springbrook	31 March	
568mm	Mt William	29 March	
565mm	Mt Jukes	29 March	Yes – 73 years of data
544mm	Undercliff	29 March	
535mm	Clarke Range (2)	29 March	
532mm	Undercliff	30 March	
500mm	Koumala Hatfields Road	30 March	
500mm	Springbrook Road	31 March	
470mm	Mt William	28 March	
355.5mm	Plane Creek Sugar Mill	30 March	Yes – 104 years of data
285mm	Canungra Finch Road	31 March	Yes – 100 years of data

24 hour rainfall totals in New South Wales during the event:

Rainfall	Station	24 hour rainfall to 9am AEST on	Highest March daily rainfall record
507mm	Coucy Creek	31 March	
450mm	Numinbah	31 March	
384mm	Nimbin Post Office	31 March	Yes – 96 years of data
362mm	Mullumbimby	31 March	Yes – 119 years of data
325mm	Lismore Airport	31 March	
311.8mm	Coraki	31 March	Yes – 122 years of data
153.6mm	Old Koreelah	31 March	Yes – 105 years of data



Daily rainfall totals (in mm) in the 24 hours to 9 am AEST on the date shown in each panel. Numbers denote extreme observed values.

2.7 Warning summary

Tropical Cyclone Advice	
First issue	24 March 2017
Last issue	29 March 2017
Total issued	64*
First requesting the use of SEWS	1:52pm on 27 March 2017
Issue ceasing use of SEWS	11:58pm on 28 March 2017
Severe Weather Warnings – Queensland	
First issue	27 March 2017
Last issue	31 March 2017
Total issued	36*
Severe Weather Warnings – New South Wales and Lord Howe Island	
First issue	29 March 2017
Last issue	1 April 2017
Total issued	20*
Severe Thunderstorm Warnings, Queensland	
Total issued	21
Total requesting SEWS	5 (on 29 and 30 March)

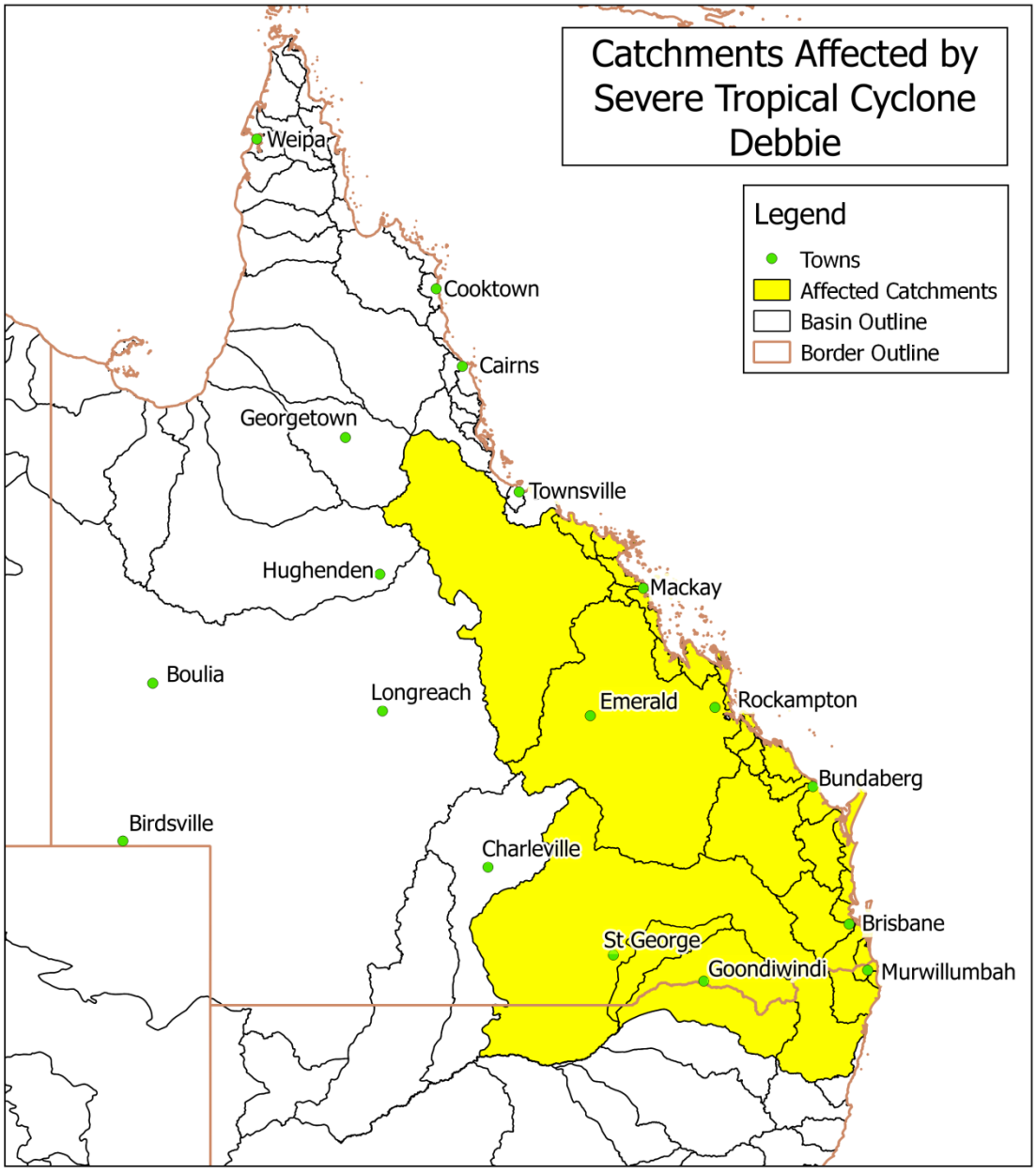
Flood Watches, Queensland	
First issue	24 March 2017
Last issue	31 March 2017
Total issued	9
Flood Warnings, Queensland	
First issue	25 March 2017
Last issue	8 April 2017
Number of basins with Flood Warnings	15
Total issued	240
Total requesting SEWS:	6 (on 30 and 31 March)
Flood Watches, New South Wales	
First issue	28 March 2017
Last issue	30 March 2017
Total issued	3
Flood Warnings, New South Wales	
First issue	28 March 2017
Last issue	6 April 2017
Number of basins with Flood Warnings	6
Total issued	123

*Figure quoted includes updated and revised warnings.

3 Hydrology

After making landfall *Debbie* caused immediate flooding in Queensland's central coast, before impacting south-eastern Queensland catchments extending south into northern New South Wales an ex-tropical cyclone. A total of 27 catchments were affected (below).

Very large rainfall accumulations were observed over the four-day period from 28 to 31 March which resulted in major flooding for many catchments with majority in the Fitzroy, Kolan, Lower Brisbane and Logan-Albert catchments in Queensland, and also in the Tweed catchment in northern New South Wales.



3.1 Record flooding

Severe Tropical Cyclone Debbie produced major flooding at a large number of locations in both Queensland and New South Wales. In Queensland, seven forecast locations had record flooding, which is the highest recorded river level in the history of that station. In addition to this, a large number of locations also had record flood levels. All of these stations are listed in the table below.

Station	Basin	State	Type	Years
Yatton	Fitzroy	QLD	Forecast	29
Tartrus	Fitzroy	QLD	Forecast	29
Kalbar	Brisbane	QLD	Forecast	59
Essendean Bridge ALERT	Baffle	QLD	Forecast	6
Maclean Bridge ALERT	Logan-Albert	QLD	Forecast	15
Beaudesert ALERT	Logan-Albert	QLD	Forecast	15
Waterford ALERT	Logan-Albert	QLD	Forecast	24
Murwillumbah	Tweed	NSW	Forecast	89
Finch Hatton TM	Pioneer	QLD	Information	13
Mirani Weir ALERT	Pioneer	QLD	Information	22
Mirani Weir HW TM	Pioneer	QLD	Information	17
Dumbleton Rocks ALERT	Pioneer	QLD	Information	12
Sarich's ALERT	Pioneer	QLD	Information	22
Whiteford ALERT	Pioneer	QLD	Information	22
Gin Gin Creek ALERT	Kolan	QLD	Information	6
Gooburrum PS ALERT	Kolan	QLD	Information	3

Station	Basin	State	Type	Years
Moolboolaman ALERT	Kolan	QLD	Information	3
Springfield ALERT	Kolan	QLD	Information	6
Brovinia ALERT	Burnett	QLD	Information	3
Marriages ALERT	Burnett	QLD	Information	3
Churchbank Weir ALERT	Brisbane	QLD	Information	15
Brisbane Road ALERT	Brisbane	QLD	Information	25
Churchill ALERT	Brisbane	QLD	Information	19
Harding Street ALERT	Brisbane	QLD	Information	26
Mulgowie ALERT	Brisbane	QLD	Information	6
New Beith TM	Brisbane	QLD	Information	41
Oxley Creek ALERT	Brisbane	QLD	Information	4
Showground Weir HW TM	Brisbane	QLD	Information	33
Warrego Highway ALERT	Brisbane	QLD	Information	6
Bahrs Scrub ALERT	Logan-Albert	QLD	Information	5
Bayes Road ALERT	Logan-Albert	QLD	Information	3
Benobble ALERT	Logan-Albert	QLD	Information	15
Bromfleet ALERT	Logan-Albert	QLD	Information	15
Croftby ALERT	Logan-Albert	QLD	Information	15
Croftby TM	Logan-Albert	QLD	Information	51
Flagstone Creek (Jimbooba) ALERT	Logan-Albert	QLD	Information	3

Station	Basin	State	Type	Years
Logan Village ALERT	Logan-Albert	QLD	Information	5
Lower Quinzeh ALERT	Logan-Albert	QLD	Information	3
Lumeah ALERT	Logan-Albert	QLD	Information	15
Parklands ALERT	Logan-Albert	QLD	Information	4
Rathdowney ALERT	Logan-Albert	QLD	Information	15
Round Mountain ALERT	Logan-Albert	QLD	Information	15
Rudds Lane ALERT	Logan-Albert	QLD	Information	15
Schmidts Rd ALERT	Logan-Albert	QLD	Information	3
Tamborine ALERT	Logan-Albert	QLD	Information	3
Yarrahappini ALERT	Logan-Albert	QLD	Information	15
Jacks Creek TM	Burdekin	QLD	Information	10
Jacks Creek ALERT	Burdekin	QLD	Information	25
Coplicks Bridge ALERT	South Coast	QLD	Information	16
Hinze Dam HW ALERT	South Coast	QLD	Information	26
Hinze Dam HW TM	South Coast	QLD	Information	5
Little Nerang Dam ALERT	South Coast	QLD	Information	25
Little Nerang Dam HW TM	South Coast	QLD	Information	5
Millbrook ALERT	Condamine-Balonne	QLD	Information	13
Woodspring ALERT	Border Rivers	QLD	Information	4

3.2 Catchment overviews

This section provides hydrological information related to the flooding of affected catchments in the aftermath of *Debbie* and includes a summary of record flood levels.

This is followed by a data table and summary information presented basin by basin, starting with the Burdekin catchment in the north, and moving south down the Queensland coast and over the border into northern New South Wales.

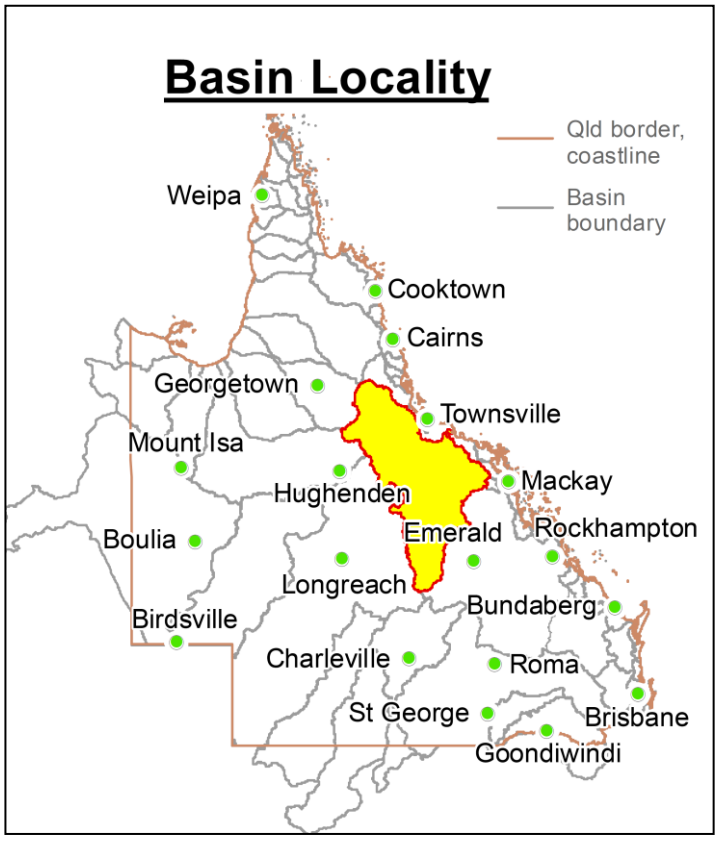
Data presented here has been taken from rainfall and river height stations in the Queensland and New South Wales Flood Warning Network.

The start and end date of the Flood Warnings issued during the flood event for the basin have been included in addition to the number of warnings issued and forecast locations affected.

An overview of where the rain fell in the basin, significant rainfall totals and significant river levels have also been described.

The daily area average rainfall over the catchment has been analysed at a grid resolution of 0.05 degrees, using all available daily grids since 1900. For some regions, particularly during the early period, poor spatial coverage of rainfall stations may result in an increased occurrence of zero rainfall totals. The catchment average rainfall has been contextualised to the overall historic daily record, as well as the historic daily March record.

Burdekin River catchment overview	
No of warnings issued	13
Date of Flood Watch	Friday 24 March 2017 (mentioned from the first issue)
Date of first Flood Warning	Tuesday 28 March 2017
Date of Final Flood Warning	Wednesday 5 April 2017
Forecast locations affected	St Anns, Dalbeg, Clare and Inkerman Bridge



Rainfall

The most significant rainfall in the Burdekin River catchment during this event was recorded between 9am, 27 March and 9am, 30 March. This rainfall was mainly confined to the eastern parts, with the higher rainfall totals falling in the Broken River, Jacks Creek and Bowen River. Event rainfall totals ranged from 50-300mm widespread across the catchment, to 400-500mm in the upper parts of the catchment. The highest 24-hour rainfall and event total rainfall were recorded at Sandy Plateau, where a value of 316mm was recorded in the 24-hours to 9am, 29 March. Extending across the event, 569mm of rainfall was recorded at the same gauge between 9am, 27 March and 9am, 30 March. Event rainfall totals of 15-80mm also fell to the south of the Burdekin River catchment, in the Belyando River and Suttor River catchments. This resulted in minor flooding at St Anns.

River levels

The rainfall resulted in significant river levels throughout the lower Burdekin, including a record flood peak at Jacks Creek river height station. Initial river level rises were recorded at Dalbeg, Clare and Inkerman Bridge during 29 March. The river peaked above the minor flood level the same day at Dalbeg and reached a minor flood peak the following day at Clare and Inkerman Bridge. The peak level for Dalbeg is unknown as the data recorded around the peak is considered incorrect.

Burdekin catchments average rainfall

The East Burdekin catchment represents the area extending from Charters Towers to Upper Bogie, coloured row(s) correspond to current event. The catchment average rainfall totals for the East Burdekin for the event was the 174th highest daily total on record and the 28th highest daily March total.

The South-East Burdekin catchment represents the area extending from Myuna to Mt William. The catchment average rainfall totals for the South-East Burdekin for the event was the 17th highest daily total on record, and the 3rd highest daily March total.

East Burdekin catchment significant rainfall observations

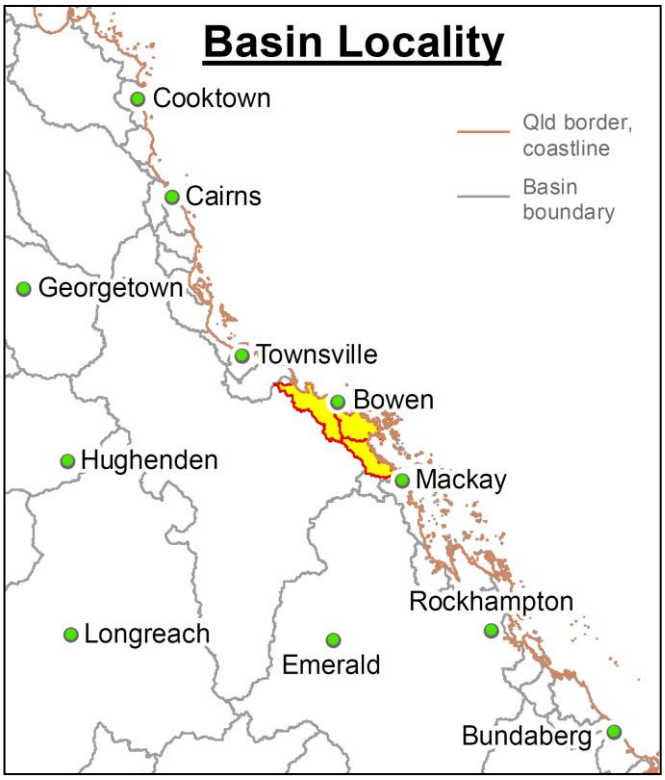
Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
8 April 1940	214.93	1	-
4 March 1946	144.73	5	1
29 March 2017	50.12	174	28

South-East Burdekin catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
8 March 1940	235.81	1	-
17 February 1959	199.01	2	-
3 April 1958	198.52	3	-
4 March 1946	192.62	4	1
1 March 1988	147.95	15	2

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
29 March 2017	146.36	17	3

Don River catchment overview	
No of warnings issued	15
Date of Flood Watch	Friday 24 March 2017 (mentioned from the first issue)
Date of first Flood Warning	Monday 27 March 2017
Date of Final Flood Warning	Thursday 30 March 2017
Forecast locations affected	Bowen Pump Station



Rainfall

The most significant rainfall in the Don catchment during this event was recorded between 9am, 27 March and 9am, 30 March. The rainfall in the Don Catchment was mostly confined to eastern coastal parts towards Bowen. Rainfall totals in the east ranged from 180-500mm across the event with the heaviest event rainfall total recorded in the upper reaches of the catchment at Roma with 542mm. Some other significant totals include Bowen with 501mm recorded across the event. Over the same period 494mm was recorded at Warden Bend, 475mm at Telegraph Road and 438mm at Mt Dangar. The highest 24-hour rainfall total was recorded at Bowen Airport with 267mm recorded to 9am, 29 March.

Bowen Airport AWS experienced rainfall intensity 5% above the Annual Exceedance Probability (AEP), meaning the chance of the rainfall rate being equalled or exceeded in any particular year are 5% or 5 in 100.

River levels

Moderate to major flood levels were recorded across the catchment. Bowen Pump Station, the single forecast location in the catchment, recorded two peaks; one at major on the 28 March and the second at the moderate flood level on 29 March. Many of the other stations in the catchment also recorded the double-peak phenomenon.

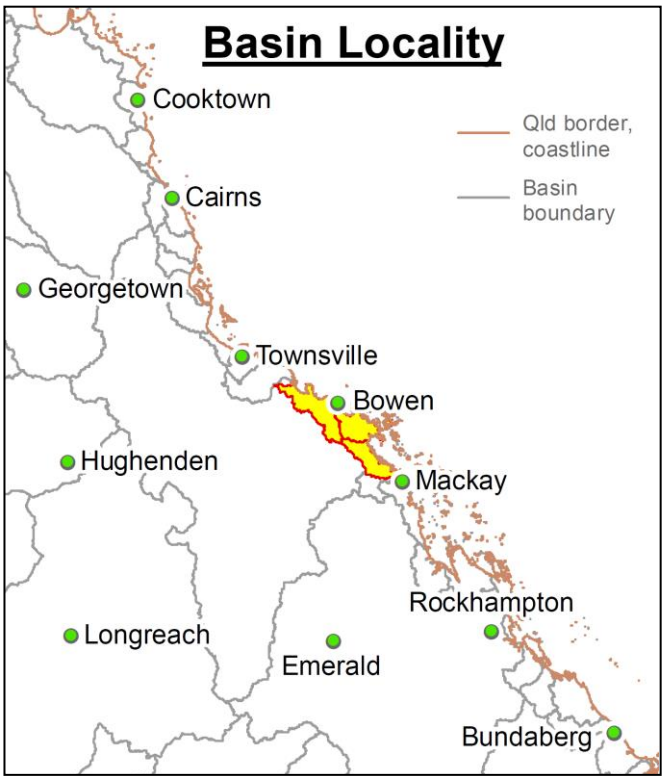
Don catchment average rainfall

The catchment average rainfall totals for the Don catchment on the 29 March 2017 were the 36th highest daily total on record and the 5th highest daily total for March.

Don catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
2 January 1970	396.26	1	-
4 March 1946	210.58	8	1
29 March 2017	133.21	36	5

Proserpine River catchment overview	
No of warnings issued	9
Date of Flood Watch	Friday 24 March 2017 (mentioned from the first issue)
Date of first Flood Warning	Tuesday 28 March 2017 (4th issue)
Date of Final Flood Warning	Wednesday 29 March 2017 (12th issue)
Forecast locations affected	No forecast locations



Rainfall

The most significant rainfall in the Proserpine River catchment during this event was recorded between 9am, 26 March and 9am, 30 March. Rainfall generally ranged from 450-620mm across the catchment during the event. The highest daily rainfall total was recorded in the 24-hours to 9am, 29 March at Lower Gregory with 300mm reported. The highest event total rainfall was recorded at Blair Rd with 621mm.

River levels

The rainfall totals resulted in some significant river level rises, but no flooding. There are no forecast locations in the catchment. Lower Gregory gauge on the Gregory River recorded notable river level rises from 27 March through to a peak some 7.0m higher on 29 March. Laguna Quays Tide gauge observed a ~1.4m rise in the high tide on 28 March as the flood peak reached the coast.

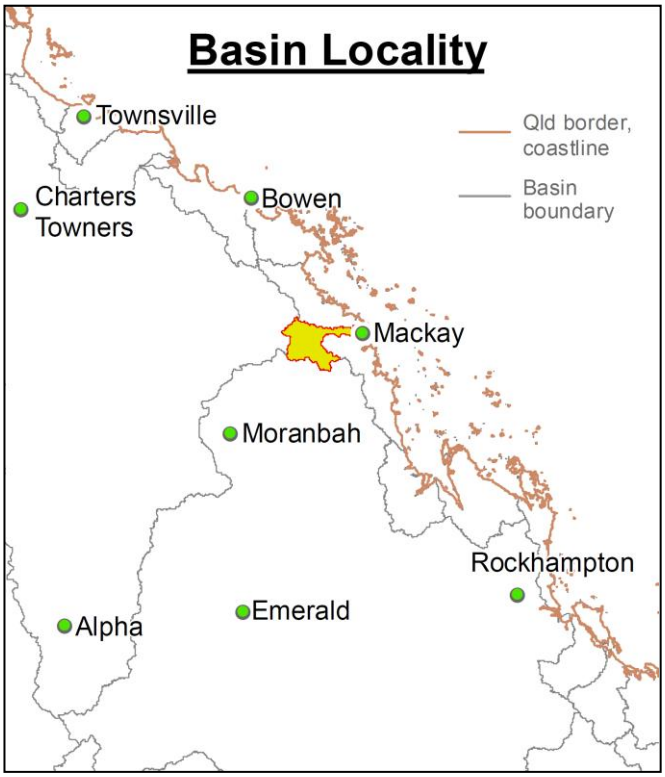
Proserpine catchment average rainfall

The catchment average rainfall totals for the Proserpine catchment on the 29 March was the 2nd highest daily total on record, and set a new record for the highest daily March total. The catchment average rainfall on the 30 March 2017 was the 3rd highest daily March total on record.

Proserpine catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
19 January 1970	309.83	1	-
29 March 2017	283.18	2	1
2 March 1979	255.45	14	2
30 March 2017	204.23	26	3

Pioneer River catchment overview	
No of warnings issued	15
Date of Flood Watch	Friday 24 March 2017 (mentioned from the first issue)
Date of first Flood Warning	Monday 27 March 2017
Date of Final Flood Warning	Thursday 30 March 2017
Forecast locations affected	Mirani, Mackay



Rainfall

Significant rainfall totals for the event were recorded across the whole catchment. Rainfall values between 500 to over 1000mm were common. The upper parts of the catchment had the highest rainfall totals recorded at Mt William (1328mm), Clarke Range (1023-1157mm) and Hannaville (795mm). In the lower region of the catchment around Mackay, values ranged from 690mm (Walkerston) to coastal values of 467mm (Mackay), 478mm (Mackay Airport) and 510mm (Outer Harbour). The highest daily rainfall total occurred at Clark Range, in the upper catchment, where 646mm were recorded on the 29 March.

Clarke Range Alert, Clarke Range Alert 2 and Marian Weir rain gauges all experienced rainfall above 1% of the Annual Exceedance Probability (AEP), meaning the chance of the rainfall rate being equalled or exceeded in any particular year are 1% or 1 in 100. Hannaville Alert, located in the upper catchment the AEP exceeded 1% for the 12h to 3d duration. Mackay Aero rain gauge experiences rainfall around the 20% AEP.

River levels

Minor to major flooding occurred across the catchment with the upper catchment experiencing major flood levels as a result of the heavy rainfall recorded. Finch Hatton, Whitefords, Sarich's, Mirani Weir and Dumbleton Rocks all experienced major flooding. At forecast location Mirani, no readings were available but it is expected the river level reached above major (9m) flood levels. Stations at Mirani Weir and Sarich's experienced record flooding. Mackay peaked just above the minor flood level (7m) at 7.4m while Gargett and Hospital Bridge peaked at moderate flood levels.

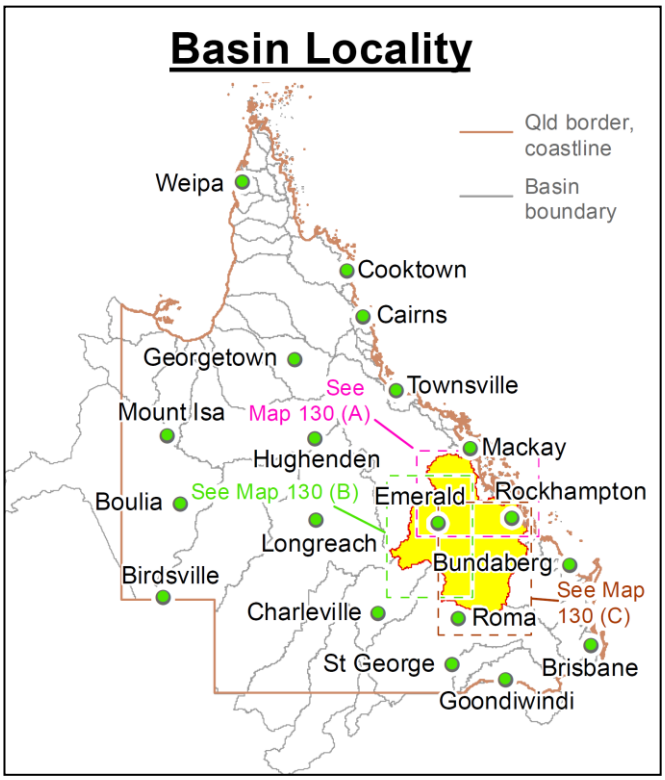
Pioneer catchment average rainfall

The catchment average rainfall totals for the Pioneer catchment on the 29 March were the 10th highest daily total on record, and set a new record for the highest March daily total.

Pioneer catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
18 February 1958	415.31	1	-
29 March 2017	277.39	10	1
4 April 1946	269.92	12	2
1 March 1988	244.36	13	3

Fitzroy River catchment overview	
No of warnings issued	55
Date of Flood Watch	Saturday 25 March 2017 (mentioned from the 3rd issue)
Date of first Flood Warning	Tuesday 28th March 2017 (see river levels description)
Date of Final Flood Warning	Monday 10 April 2017
Forecast locations affected	Yatton, Tartrus, Taroom, Yaamba, Rockhampton



Rainfall

Rainfall was recorded across the catchment with the highest totals in the upper Isaac and Connors, and some significant totals in the eastern region of the catchment around Kroombit. 1194mm were recorded at Undercliff, the highest in the catchment for the duration of the event. Additionally, Undercliff also recorded the highest daily totals for the event with 544mm on Wednesday 29 March.

Rainfall totals greater than 100mm were recorded across the catchment in the week prior to the rainfall that was recorded as a result of *Debbie*. This rainfall wetted the catchment before the onset of the significant rainfall totals from the remnants of the tropical cyclone.

River levels

River levels had started to fall at Yatton, but had not returned to normal levels before the flood peak from severe tropical cyclone Debbie arrived. Flood Warnings were already in place with reference to renewed rises as a result of severe tropical cyclone Debbie made from the 9th issue.

Minor to major flooding was observed across the Fitzroy catchment with the majority of the forecast locations reaching major flood levels. Taroom was the exception, water levels remained below minor. New flood record levels were reached at Yatton and Tartrus and two information locations; Braeside and Coolmaringa. The forecast locations all experience double-peaks in water levels, with the second peak at a higher flood class level. Many information locations also reached major flood levels.

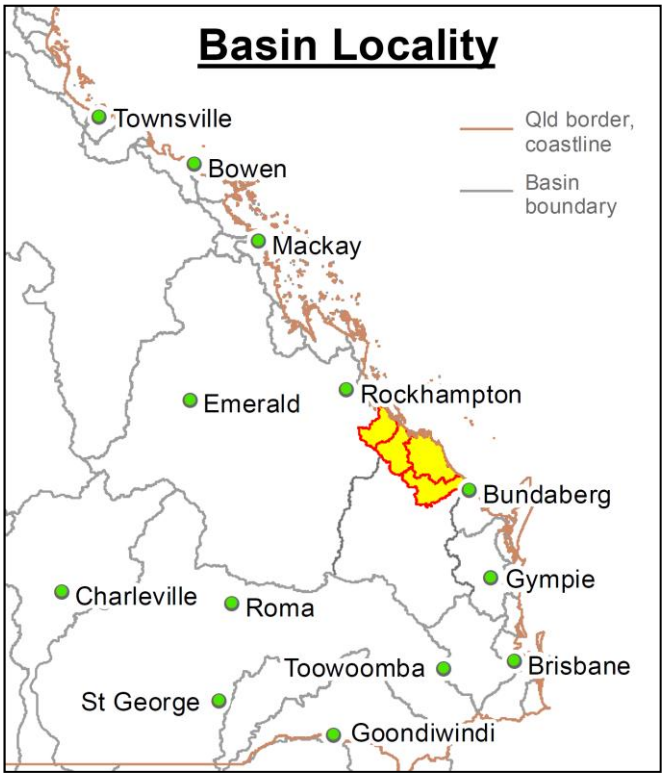
Fitzroy catchment average rainfall

The catchment average rainfall total in the table above are for the Connors and Isaac Rivers only. The daily total on 30 March was the 7th highest on record, and set a new daily record for March.

Fitzroy catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
25 January 2013	103.33	1	-
30 March 2017	81.13	7	1
18 March 1940	68.35	17	2

Calliope River catchment overview	
No of warnings issued	15
Date of Flood Watch	Saturday 25 March 2017 (mentioned from the 3rd issue)
Date of first Flood Warning	Wednesday 29 March 2017
Date of Final Flood Warning	Sunday 2 April 2017
Forecast locations affected	n/a – no forecast locations



Rainfall

The entire catchment recorded totals above 200mm for this event with the highest being 281mm at Gladstone AWS. Most of the rain fell between 29 March and 30 March with values above 100mm recorded in the 24h to 9am on 30 March.

River levels

The rainfall totals recorded resulted in river levels rises along the Calliope River. Castlehope recorded a river level rise of approximately 12m while Police Creek observed a rise of around 3m.

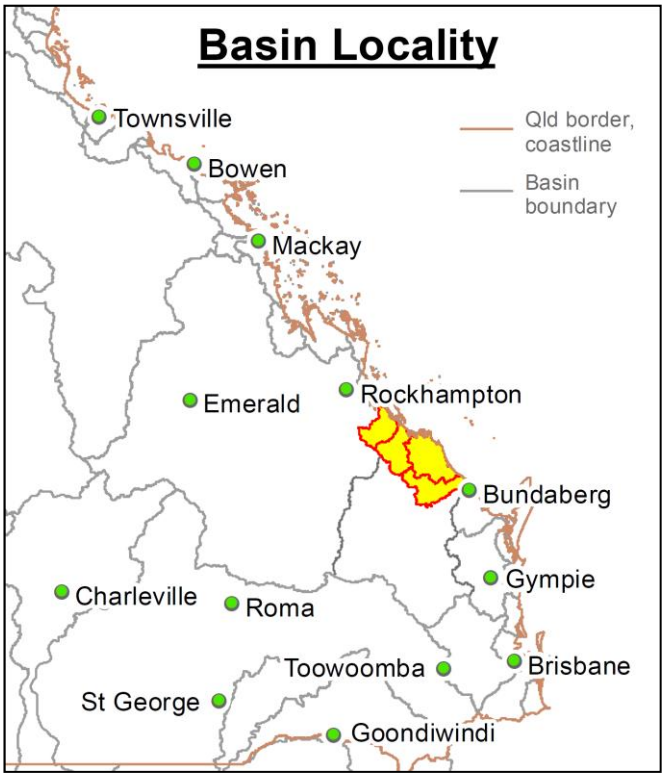
Calliope catchment average rainfall

The catchment average rainfall total for the Calliope catchment on the 30 March were the 44th highest daily total on record, and the 5th highest March daily total.

Calliope catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
25 January 2013	289.48	1	-
3 March 1949	210.84	6	1
30 March 2017	121.12	44	5

Boyne River catchment overview	
No of warnings issued	15
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 5th issue)
Date of first Flood Warning	Wednesday 29 March 2017
Date of Final Flood Warning	Sunday 2 April 2017
Forecast locations affected	No forecast locations



Rainfall

Totals above 200mm were mostly recorded with the highest values in upper catchment regions. Mt Seaview recorded 343mm, Table Tops recorded 293mm and Bulburin recorded 322mm for the duration of the event.

River levels

River levels rises were observed along the Boyne River at Nagoorin, Milton and Marlua. The water level at Awoonga Dam rose above the spillway (40m) and reached just over 42m at its highest.

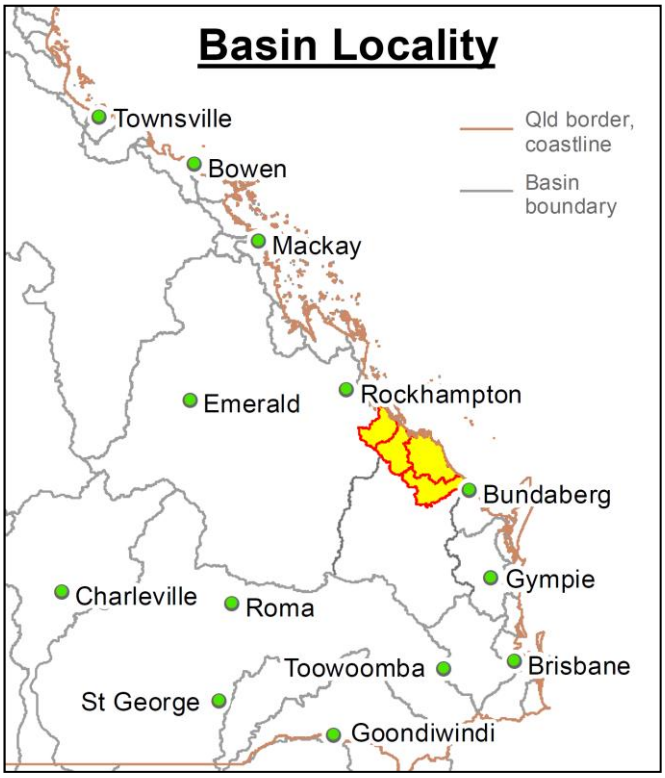
Boyne catchment average rainfall

The catchment average rainfall total for the Boyne catchment on the 30 March was the 38th highest daily total on record, and the 3rd highest March daily total.

Boyne significant catchment rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
12 February 1974	361.65	1	-
3 March 1949	215.82	6	1
30 March 2017	117.88	38	3
29 March 2017	94.18	78	9

Baffle River catchment overview	
No of warnings issued	15
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Wednesday 29 March 2017
Date of last Flood Warning	Sunday 2 April 2017
Forecast locations affected	Essendean Bridge



Rainfall

Most of the rainfall totals recorded in the Baffle catchment were over 200mm with most in the mid-200s range. Captain Creek had the highest rainfall totals for the event in the catchment with 283mm recorded.

River levels

Essendean Bridge recorded two moderate peaks and both set new records for the first and second highest flood peaks for the station. Mimdale TM and ALERT both reached major flood levels, with the latter setting a new peak record for its 6 years of records.

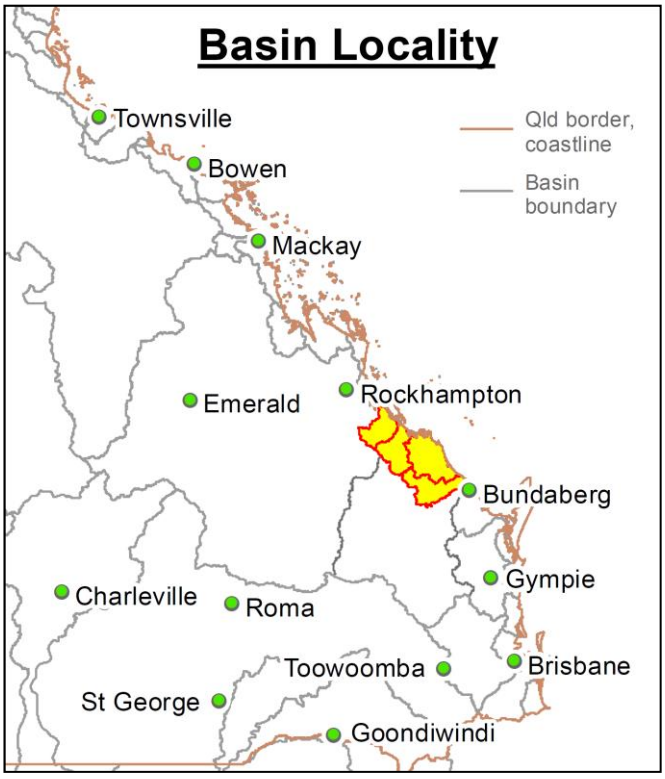
Baffle catchment average rainfall

The catchment average rainfall total for the Baffle catchment on 30 March was the 177th highest daily total on record, and the 27th highest March daily total.

Baffle catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
26 January 2013	274.66	1	-
16 March 1992	192.42	9	1
30 March 2017	71.77	177	27

Kolan River catchment overview	
No of warnings issued	15
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Wednesday 29 March 2017
Date of Final Flood Warning	Sunday 2 April 2017
Forecast locations affected	Bucca Weir



Rainfall

The upper catchment regions had the highest rainfall totals for the event with values ranging between 200-290mm. The lower catchment totals ranged between 160-180mm. The highest event rainfall totals in the catchment were observed at Springfield with 291mm recorded.

River levels

The observed rainfall caused major flooding at most location along the Kolan River, except for Springfield and Moolboolaman. The forecast location, Bucca Weir, recorded major flood levels. Record flooding was recorded at a number of newer information locations at Gin Gin and Gooburrum.

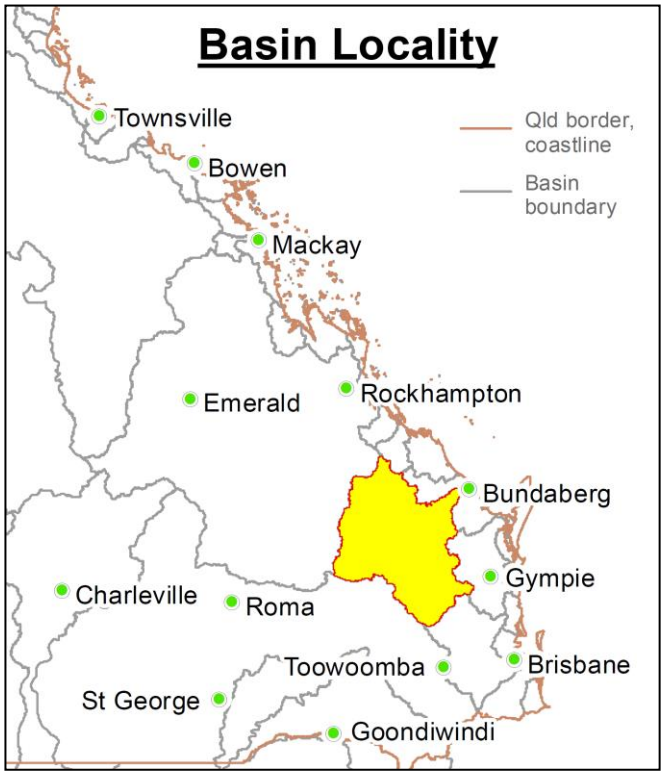
Kolan catchment average rainfall

The catchment average rainfall total for the Kolan catchment on the 31 March was the 122nd highest daily total on record, and the 21st highest March daily total.

Kolan significant catchment rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
27 January 2013	294.16	1	-
16 January 1913	251.38	2	-
15 March 1937	137.27	15	1
31 March 2017	70.36	122	21

Burnett River catchment overview	
No of warnings issued	9
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Friday 31 March 2017
Date of Final Flood Warning	Monday 3 April 2017
Forecast locations affected	Dunollie, Eidsvold Bridge, Munduberra, Walla



Rainfall

Average rainfall totals for the event in the Burnett catchment ranged typically from 120-180mm. The highest rainfall values were recorded in the upper reaches of the Burnett River. The highest total was recorded at Boolaroo Tops with 451mm.

River levels

Minor to moderate river levels were recorded at the forecast location in the Burnett catchment. Major flood levels were recorded at Ceratodus, Cooranga, Coringa, Marriages and Yarrol information locations. Some locations experienced double peaks including Walla, Cooranga, Coringa and Yarrol. Record flooding occurred at Brovinia and Marriages ALERT stations.

Burnett catchment average rainfall

The North-east Burnett catchment average rainfall total on 31 March was the 96th highest daily total on record, and the 14th highest March daily total. The rainfall total on 30 March were the 106th highest daily total on record and 16th highest March daily total.

The North-west Burnett catchment average rainfall total on 30 March was the 7th highest daily total on record, and the new highest March daily total. The last record for highest daily March total was set in 1992.

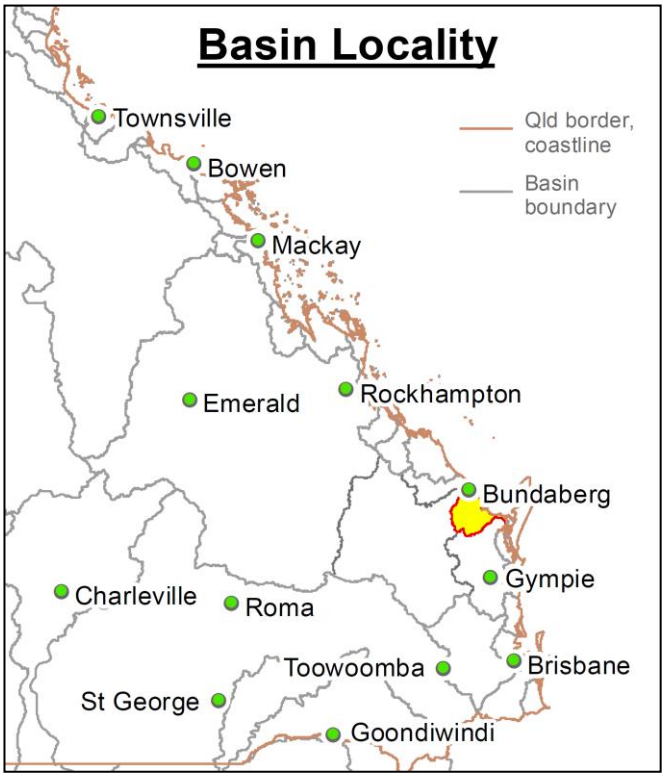
North-east Burnett catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
27 January 2013	297.92	1	-
1 March 1947	162.13	2	1
31 March 2017	60.37	96	14
30 March 2017	57.57	106	16

North-west Burnett catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
27 January 2013	172.1	1	-
17 May 1926	133.36	2	-
30 March 2017	99.45	7	1
16 March 1992	91.11	12	2

Burrum-Cherwell catchment overview	
No of warnings issued	8
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Wednesday 29 March 2017
Date of Final Flood Warning	Saturday 1 April 2017
Forecast locations affected	Howard, Pacific Haven



Rainfall

Rainfall values generally in the range of 150-200mm were recorded across the catchment. The highest rainfall total for the event was recorded at Burrum Hwy with a value for 239mm.

River levels

Rises in the Burrum and Cherwell Rivers resulted in minor flood levels observed at Howard and Pacific Haven, respectively. Major flooding was recorded at Dr Mays Crossing on the Elliot River, while rising water levels in the Gregory River resulted in moderate flooding at Burrum Highway. The Isis River experienced minor flooding at Bruce Highway.

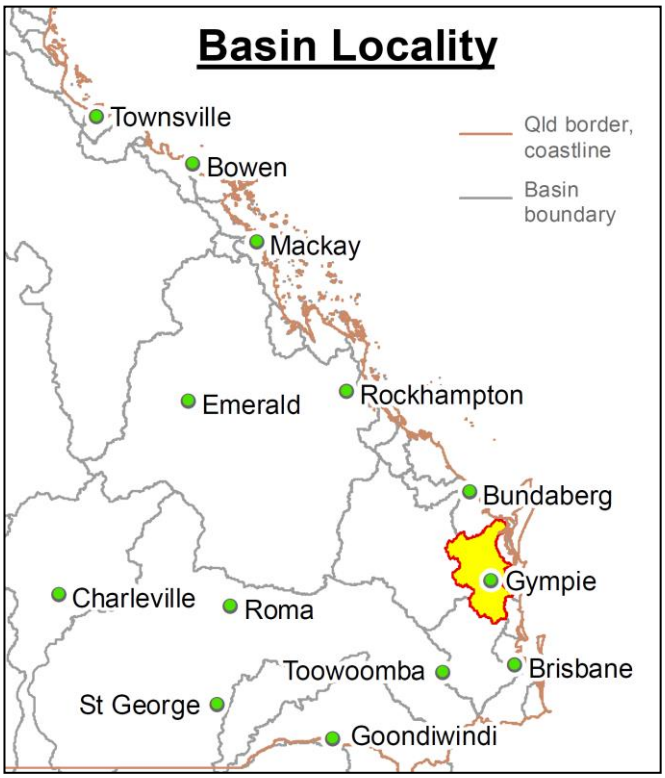
Burrum-Cherwell catchment average rainfall

The catchment average rainfall total for the Burrum and Cherwell catchments on 31 March was the 166th highest daily total on record, and the 24th highest March daily total.

Burrum-Cherwell catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
27 January 2013	1092.16	1	-
28 March 1955	868.36	4	1
31 March 2017	254.61	166	24

Mary River catchment overview	
No of warnings issued	7
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Thursday 31 March 2017
Date of Final Flood Warning	Sunday 2 April 2017
Forecast locations affected	Dagun Pocket, Miva, Tiaro



Rainfall

Catchment wide rainfall for the event generally reached values between 100-150mm. A few locations experienced higher rainfall totals above 200mm. The highest total was of 285mm was recorded at Maleny.

River levels

The recorded rainfall totals resulted in river rises along the Mary River, with higher flood levels generally observed in the lower Mary River below Gympie. Major flood levels were recorded at Tagigan Road along Tiana Creek. Miva and Tiaro recorded moderate peaks due to inflows and water level rises along the Mary River. Marodian along Munna Creek also experienced moderate flooding. Above Gympie, Dagun Pocket and Lake MacDonald Drive recorded minor flood peaks while Cooran recorded moderate flood levels.

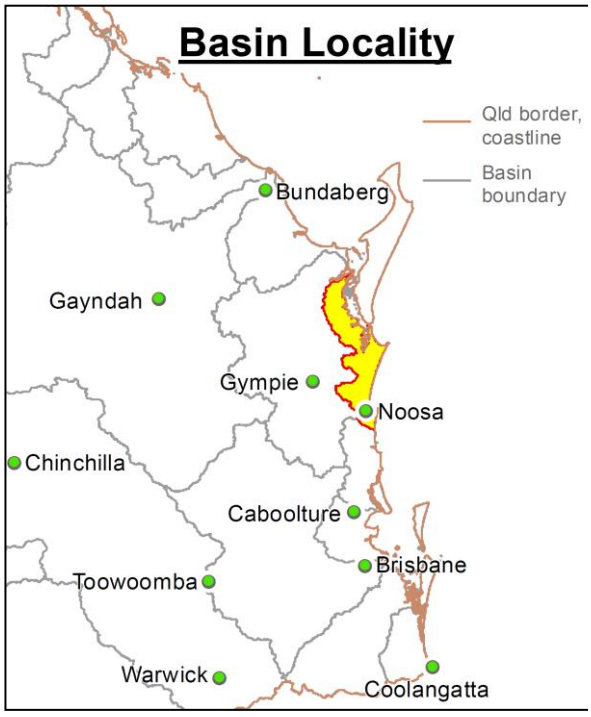
Mary catchment average rainfall

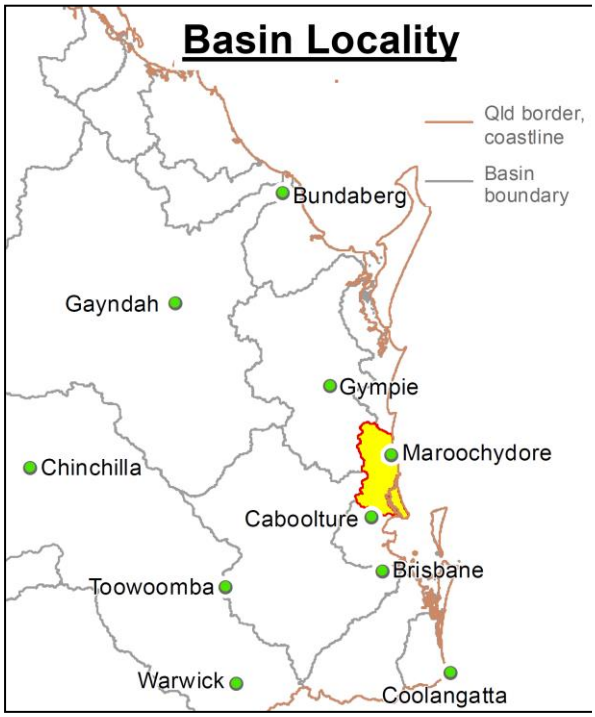
The catchment average rainfall total for the Mary catchment on 31 March was the 123rd highest daily total on record, and the 20th highest March daily total.

Mary catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
27 January 2013	480.35	1	-
28 March 1955	464.24	2	1
31 March 2017	123.00	123	20

Sunshine Coast Rivers catchment overview	
No of warnings issued	n/a
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	No Flood Warnings were issued
Date of Final Flood Warning	No Flood Warnings were issued
Forecast locations affected	Picnic Point





Rainfall

Sunshine Coast catchment received rainfall total in the range of 100-170mm for the event. Highest total was recorded at Black Pinch Rd with a value of 194mm. The upper Maroochy-Mooloolah catchment received rainfall totals exceeding 200mm. The coastal rainfall values are smaller ranging from 40-130mm. The highest rainfall in this catchment was recoded at Diddillibah with 275mm.

River levels

Rises in the Maroochy River resulted in minor flooding at Doonan Creek, Yandina, Kiamba and Picnic Point. Rises in the Mooloolah River resulted in moderate flooding at Jordan St, Mooloolah and Palmview. Coochin Creek experienced minor flooding at Mawsons Road. No significant peaks were observed along the Noosa River.

Sunshine Coast catchment average rainfall

The catchment average rainfall total for the Noosa catchment on 31 March was the 183rd highest daily total on record, and the 32nd highest March daily total.

Sunshine Coast catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
5 February 1931	286.53	1	-
5 March 2012	207.91	8	1
31 March 2017	183.00	183	32

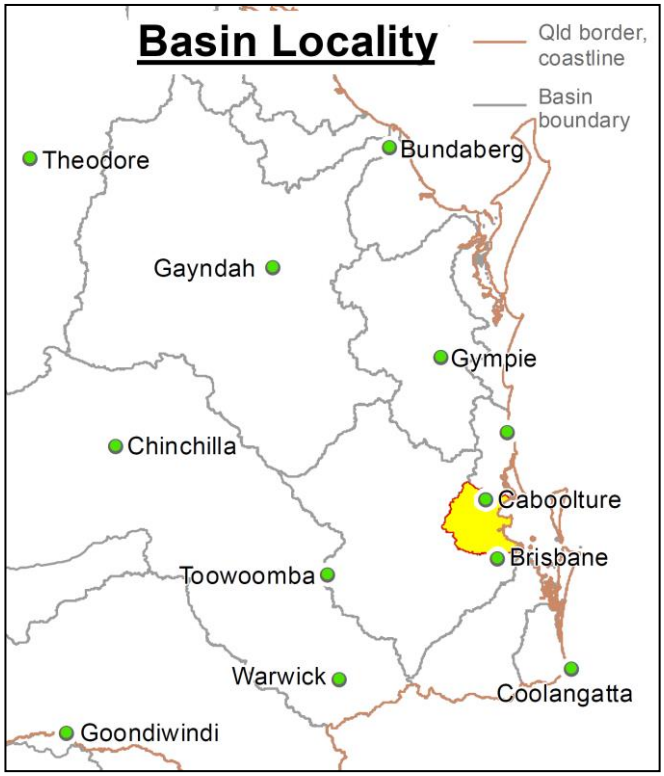
Maroochy and Mooloolah average rainfall

The catchment average rainfall total for the Maroochy and Mooloolah catchments on 31 March was the 286th highest daily total on record, and 52nd highest March daily total.

Maroochy and Mooloolah catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
5 February 1931	286.53	1	-
5 March 2012	207.91	8	1
31 March 2017	72.28	286	52

Pine and Caboolture Rivers catchment overview	
No of warnings issued	n/a
Date of Flood Watch	n/a
Date of first Flood Warning	n/a
Date of Final Flood Warning	n/a
Forecast locations affected	No forecast locations



Rainfall

Rainfall totals upwards of 100mm were widely recorded throughout the catchment, as well as many totals over 200mm. The highest rainfall event total occurred at Ocean View with a value of 375mm.

River levels

Rises along Cabbage Tree Creek resulted in minor flood levels observed at Aspley, Burpengary (at Dalt St & Rowley Rd), Everton Hills and Zillmere. Everton Hills experienced three subsequent peaks with the highest reaching just over moderate flood levels. Rises on the Caboolture River saw minor flood levels reached at Caboolture WTP river gauge.

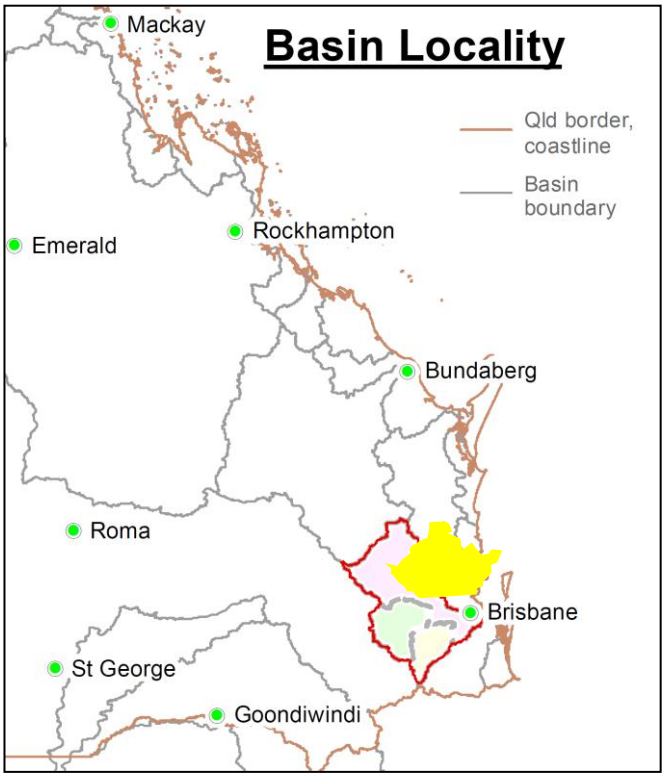
Pine and Caboolture catchment average rainfall

The catchment average rainfall total for the Pine and Caboolture catchments on 31 March was the 66th highest daily total on record, and the 12th highest March daily total.

Pine and Caboolture catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
6 February 1931	839.18	1	-
14 March 1908	678.22	2	1
31 March 2017	318.35	66	12

Upper Brisbane River catchment overview	
No of warnings issued	5
Date of Flood Watch	Thursday 30 March 2017 (mentioned from the 8th issue)
Date of first Flood Warning	Thursday 30 March 2017
Date of Final Flood Warning	Saturday 1 April 2017
Forecast locations affected	Woodford



Rainfall

The most significant rainfall in the Upper Brisbane River catchment during this event was recorded between 9am, 29 March and 9am, 31 March. Event rainfall totals ranged from 50-150mm widespread across the catchment, and 250-350mm in the upper east part of the catchment in the Stanley River around Woodford.

River levels

The rainfall resulted in river levels in the Upper Brisbane and Stanley River, including a minor flood peak at Woodford. Initial river level rises began at the gauge during 30 March, and peaked during 31 March.

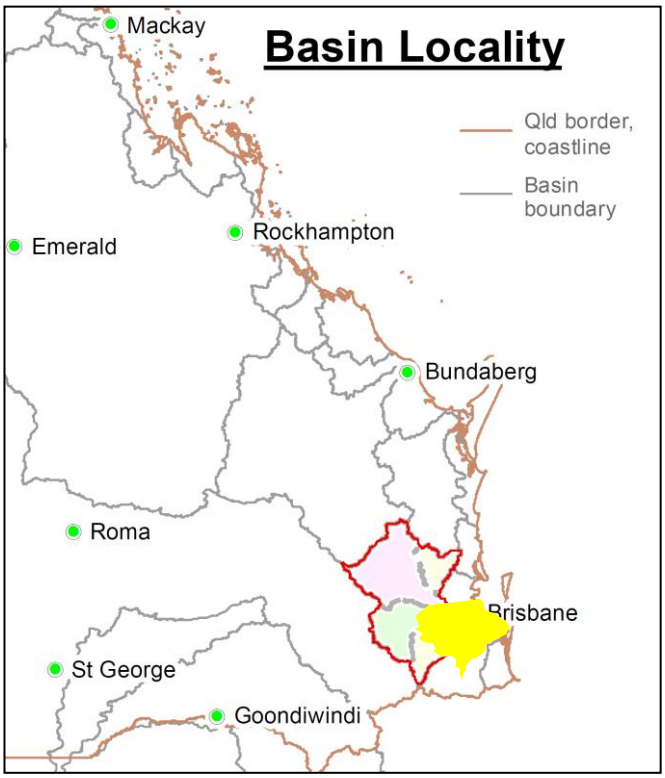
Brisbane catchment average rainfall

The catchment average rainfall total for the Brisbane catchment (upper and lower) on 31 March was the 31st highest daily total on record, and the 6th highest March daily total.

Brisbane catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
27 January 1974	736.15	1	-
28 March 1955	589.52	4	1
31 March 2017	355.8	31	6

Lower Brisbane River catchment overview	
No of warnings issued	
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Wednesday 30 March 2017
Date of Final Flood Warning	Sunday 2 April 2017
Forecast locations affected	Rosewood, Five Mile Bridge, Walloon, Ipswich, Kalbar, Amberley, Harrisville



Rainfall

The most significant rainfall in the Lower Brisbane River catchment during this event was recorded between 9am, 29 March and 9am, 31 March. Event rainfall totals ranged from 100-200mm widespread across the catchment, and 200-300mm in the south and east part of the catchment south of Ipswich. The highest 24-hour rainfall and event total rainfall were recorded at Oxley Creek, where a value of 202mm was recorded in the 24-hours to 9am, 31 March.

River levels

The rainfall resulted in significant river levels in the Lower Brisbane, including a record major flood peak at Kalbar manual gauge. Initial river level rises were reported during 30 March, with a reported peak during 31 March.

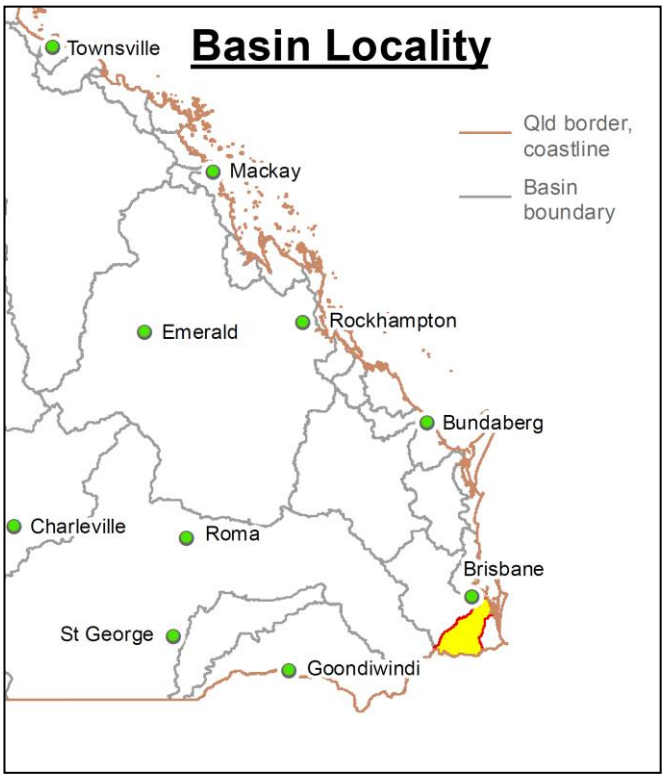
Brisbane catchment average rainfall

The catchment average rainfall total for the Brisbane catchment (upper and lower) on 31 March was the 31st highest daily total on record, and the 6th highest March daily total.

Brisbane catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
27 January 1974	736.15	1	-
28 March 1955	589.52	4	1
31 March 2017	355.8	31	6

Logan-Albert Rivers catchment overview	
No of warnings issued	25
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Thursday 30 March 2017
Date of Final Flood Warning	Tuesday 4 April 2017
Forecast locations affected	Wolffdene, Beenleigh, Beaudesert, Maclean Bridge, Waterford



Rainfall

The most significant rainfall in the Logan-Albert River catchment during this event was recorded between 9am, 29 March and 9am, 31 March. Event rainfall totals ranged from 150-250mm widespread, 200-400mm in central parts of the catchment around Beaudesert and up to 550mm was reported on the New South Wales Border in the upper reaches of the Albert River. The highest 24-hour rainfall total was at O'Reillys where 414mm of rain was recorded in the 24-hours to 9 am, 31 March.

In the Observations section, IFD rainfall curves for Yarrahappini, Beaudesert, Maclean Bridge, Tramway Lane, Cedar Grove and Flagstone Creek, all seven of the curves show the AEP exceeding the 1% (or 1 in 100) occurrence generally from the 24 hour to 2-day period. Yarrahappini TM recorded an AEP consistently above the 1% curve between the 12-hour and 24-hour time period.

River levels

The rainfall resulted in significant river levels in the Logan-Albert, including record major flooding at Beaudesert, Maclean Bridge and Waterford. Initial river level rises were reported during 30 March at all three gauges, with a reported peak during 31 March at Beaudesert and the following day at Maclean Bridge and Waterford.

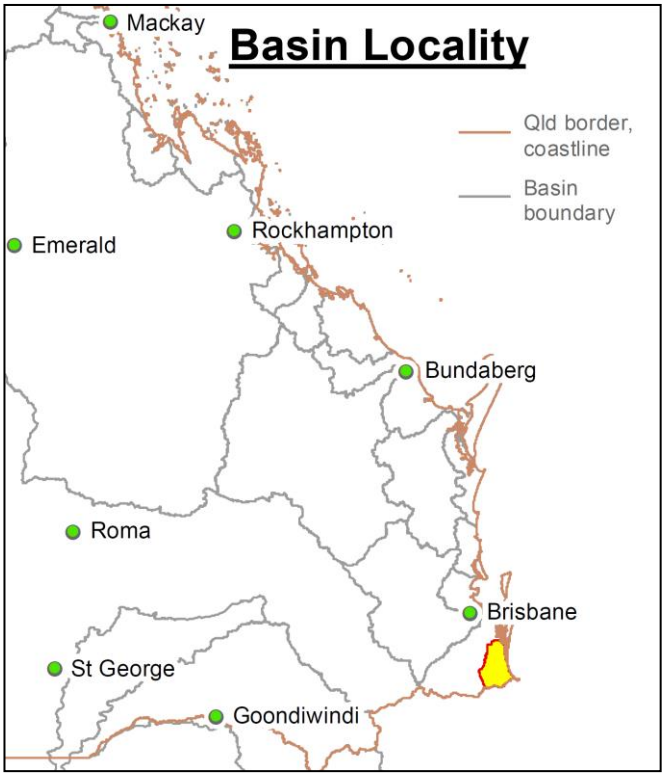
Logan-Albert catchment average rainfall

The catchment average rainfall total for the Logan-Albert catchment on 31 March was the 2nd highest daily total on record, and the record highest March daily total. The catchment average rainfall on 30 March was the 73rd highest daily total on record and the 11th highest March daily total.

Logan-Albert significant catchment rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
28 January 2013	209.27	1	-
31 March 2017	196.24	2	1
30 March 2017	80.92	73	11

South Coast rivers catchment overview	
No of warnings issued	5
Date of Flood Watch	Thursday 30 March 2017
Date of first Flood Warning	Thursday 30 March 2017
Date of Final Flood Warning	Sunday 2 April 2017
Forecast locations affected	No forecast locations affected



Rainfall

The most significant rainfall in the South Coast catchment during this event was recorded between 9am, 29 March and 9am, 31 March. Event rainfall totals ranged from 200-300mm widespread across the north of the catchment and 400-600mm widespread across the south of the catchment. On the southern edge of the catchment boundary at Upper Springbrook, 602mm was recorded in the 24-hours to 9 am, 31 March. At the same gauge recorded 890mm across the whole event.

River levels

The significant rainfall resulted in river levels rises in the South Coast catchment, with record flooding at a number of information locations. Initial river level rises were reported across the catchment during 30 March with reported peaks during 30 and 31 March.

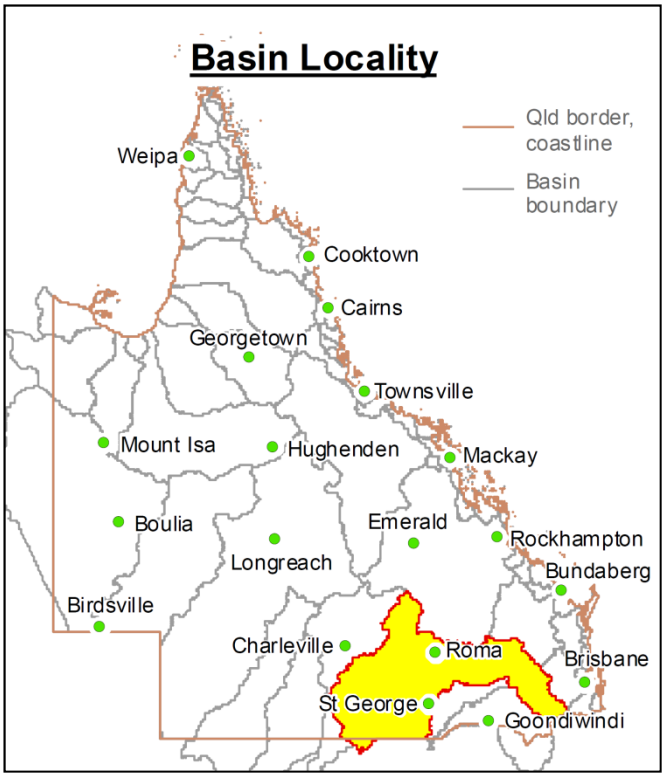
South Coast catchment average rainfall

The catchment average rainfall total for the South Coast catchments on 31 March was the 7th highest daily total on record, and the 2nd highest March daily total. The catchment average rainfall on 30 March was the 46th highest daily total on record and the 8th highest March daily total.

South Coast catchment significant catchment rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
6 February 1931	336.58	1	-
3 April1972	280.84	2	-
28 January 2013	278.72	3	-
26 January 1974	273.99	4	-
14 March 1908	263.3	5	1
11 February 1976	247.72	6	-
31 March 2017	243.88	7	2
30 March 2017	152.42	46	8

Condamine-Balonne Rivers catchment overview	
No of warnings issued	21
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Wednesday 30 March 2017
Date of Final Flood Warning	Thursday 13 April 2017
Forecast locations affected	Cecil Plains, Chinchilla Weir, Hebel, St George, Surat, Tummaville, Warkon, Warwick



Rainfall

The most significant rainfall in the Condamine-Balonne occurred in the upper Condamine catchment area with widespread rainfall totals above 100mm for the event. The rainfall totals in the Balonne were mostly under 100mm for the event. Most of the rainfall in the Condamine-Balonne was recorded from 9am 30 March to 9am 31 March. The highest 24-hour rainfall and event total rainfall were recorded at Spring Creek Road, where a value of 210mm was recorded in the 24-hours to 9 am, 31 March.

River levels

The rainfall resulted in minor to moderate flooding at forecast locations across the Condamine-Balonne. Initial river level rises were reported across the catchment during 30 March with peaks recorded from 30 March to 8 April. Eight information locations reach major flood levels with several other reaching between minor and moderate. Millbrook Alert set a new record flood level.

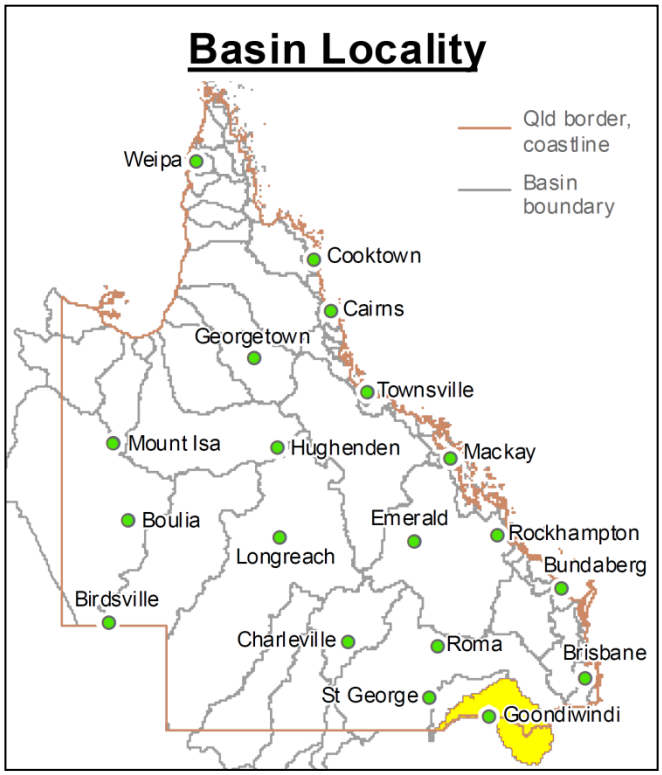
Condamine-Balonne catchment average rainfall

The catchment average rainfall total for the Condamine catchment on 30 and 31 March were not very significant, with a ranking of 28th and 96th highest daily total on record respectively. In terms of their rankings for March, the daily rainfall total on 30 March was ranked 4th and 31 March was ranked 17th.

Condamine-Balonne catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
22 January 1956	82.8	1	-
21 January 1956	78.33	2	-
27 January 2013	77.03	3	-
27 December 2010	76.16	4	-
30 March 2017	51.91	28	4
31 March 2017	38.56	96	17

Border Rivers catchment overview	
No of warnings issued	13
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Friday 31 March 2017
Date of Final Flood Warning	Monday 10 April 2017
Forecast locations affected	Boggabilla, Goondiwindi



Rainfall

The most significant rainfall in the Border Rivers catchment during this event was recorded between 9am, 29 March and 9am, 31 March. Event rainfall totals ranged from around 30-100mm widespread across the catchment, with the highest rainfall totals to the east of Retreat.

River levels

The rainfall resulted in river levels rises in the Border Rivers catchment, including a flood peak just below the major flood level at Goondiwindi. At this gauge, initial river level rises started on 1 April, with a flood peak reported on 3 April. Most stations saw minor flooding occurring with a smaller few reaching moderate and one reaching major flooding. The information location Woodspring ALERT observed a new record flood level.

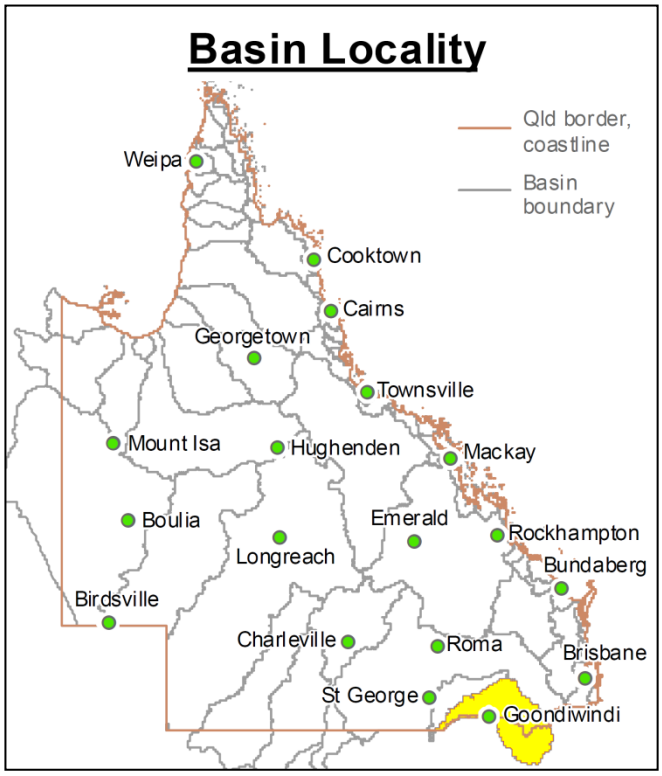
Border Rivers and Weir River catchment average rainfall

The Border Rivers basin includes both the Weir River and the Macintyre River catchments. The catchment average rainfall total for the whole of the Border Rivers catchment on 30 and 31 March was not very significant. The rainfall on 31 March was the higher of the two and was ranked 198th highest daily total on record, and the 28th highest March daily total.

Border Rivers and Weir River catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
11 February 1976	132.05	1	-
21 January 1956	111.95	2	-
28 January 2013	83.47	3	-
31 March 2017	29.41	198	28
30 March 2017	28.21	231	31

Weir River catchment overview	
No of warnings issued	13
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Friday 31 March 2017
Date of Final Flood Warning	Monday 10 April 2017
Forecast locations affected	None



Rainfall

Rainfall values recorded in the Weir were generally between 30-80mm during the event. Most of the rainfall that was recorded fell between 9am 30 March to 9am 31 March. The highest event total in the catchment of 133mm was recorded at Avoca.

River levels

No river level data was available at the forecast location of Talwood. The information locations across the Weir catchments recorded between minor and major flood levels. Peaks occurred upstream on the 31 March and took as long as the 12 of April to reach downstream waters at Jericho.

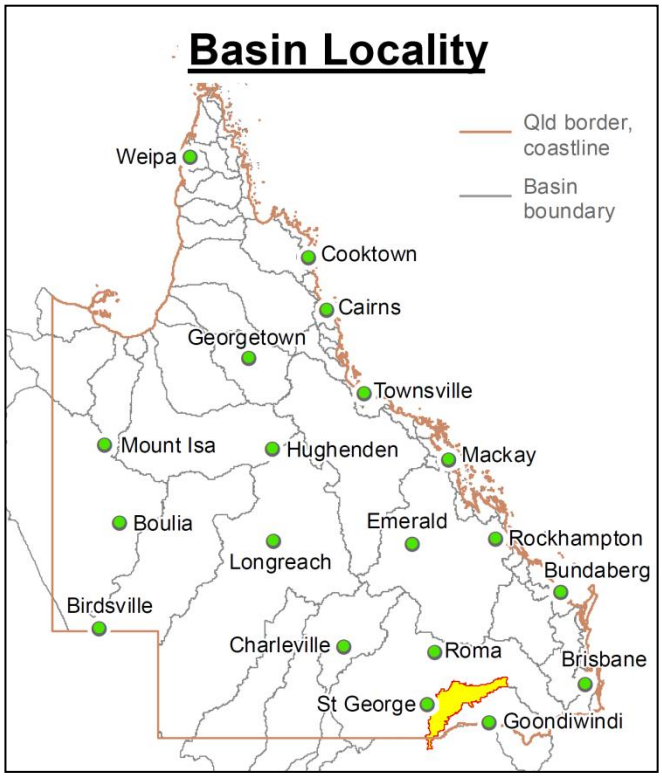
Border Rivers and Weir River catchment average rainfall

The Border Rivers basin includes both the Weir River and the Macintyre River catchments. The catchment average rainfall total for the whole of the Border Rivers catchment on 30 and 31 March was not very significant. The rainfall on 31 March was the higher of the two and was ranked 198th highest daily total on record, and the 28th highest March daily total.

Border Rivers and Weir River significant catchment rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
11 February 1976	132.05	1	-
21 January 1956	111.95	2	-
28 January 2013	83.47	3	-
31 March 2017	29.41	198	28
30 March 2017	28.21	231	31

Moonie River catchment overview	
No of warnings issued	15
Date of Flood Watch	Tuesday 28 March 2017 (mentioned from the 6th issue)
Date of first Flood Warning	Friday 31 March 2017
Date of Final Flood Warning	Thursday 13 April 2017
Forecast locations affected	Flinton, Nindigully, Thallon Bridge



Rainfall

Most of the rainfall that was recorded across the Moonie catchment was recorded from 9am 30 March to 9am 31 March. The highest 24h and event total was recorded at The Deep Crossing with a value of 119 to 9am 31 March and 169mm, respectively.

River levels

Two peaks moved down the Moonie River as a result of the rainfall at the top of the catchment around The Deep Crossing. Moderate flooding was observed at The Deep Crossing, Flinton, Nindigully and Warrie Station. Major flood levels were recorded at Southwood. Nindigully TM, Thallon Bridge and Fenton reached minor flood levels.

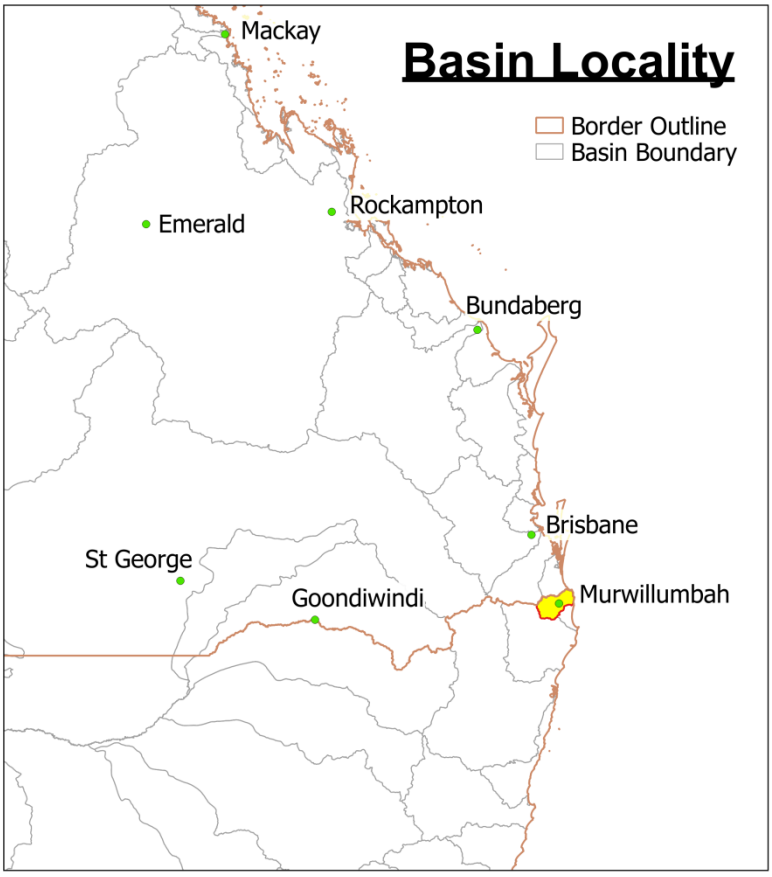
Moonie catchment average rainfall

The catchment average rainfall totals were not very significant for the Moonie River catchment. The highest daily rainfall total during the flood event was on 30 March and was the 219th highest on record, and the 27th highest March daily total.

Moonie catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
15 March 1937	107.32	1	1
8 January 1974	102.99	2	-
18 February 1959	91.72	3	-
2 March 2010	89.7	4	-
30 March 2017	29.34	219	27

Tweed River catchment overview	
No of warnings issued	22
Date of Flood Watch	Tuesday 28 March 2017
Date of first Flood Warning	Thursday 30 March 2017
Date of Final Flood Warning	Saturday 1 April 2017
Forecast locations affected	Murwillumbah, Chinderah



Rainfall

The first major warning was issued for The Tweed River at Murwillumbah at 12:03pm on 30 March. At this stage over 270mm had fallen in the previous 24 hours and the Tweed River at Murwillumbah.

Widespread rainfall in the 500mm to 600mm range was recorded in the Tweed catchment during the 30-31 March. The highest 24 hour totals were recorded at Couchy Creek (740mm) and Palmer Road (613mm).

In the Tweed catchment, short duration rainfall intensities (less than 30 minutes) for Couchy Creek and Palmers Road were not significant, with an Annual Exceedance Probability (AEP) between 50% and 10% at Couchy Creek and between 100% and 20% at Palmers Road. Significant rainfall intensities occurred at Couchy Creek for durations of 2 to 48 hours and at Palmers Road for durations of 24 hours, with AEP less than 1%.

River levels

Fast river level rises occurred upstream of Murwillumbah early in the morning on 30 March. Major flooding was recorded at Murwillumbah where river levels peaked above the 1954 flood peak of 6.05m. The river gauge at Murwillumbah failed at approximately 00:30am (AEDT) 31 March 2017. The river was already well above the Major threshold, and a nearby gauge was used to estimate subsequent river heights for this location. Major flooding also occurred at Chinderah, where river levels peaked near 2.3m, slightly below the 1974 flood level of 2.4m.

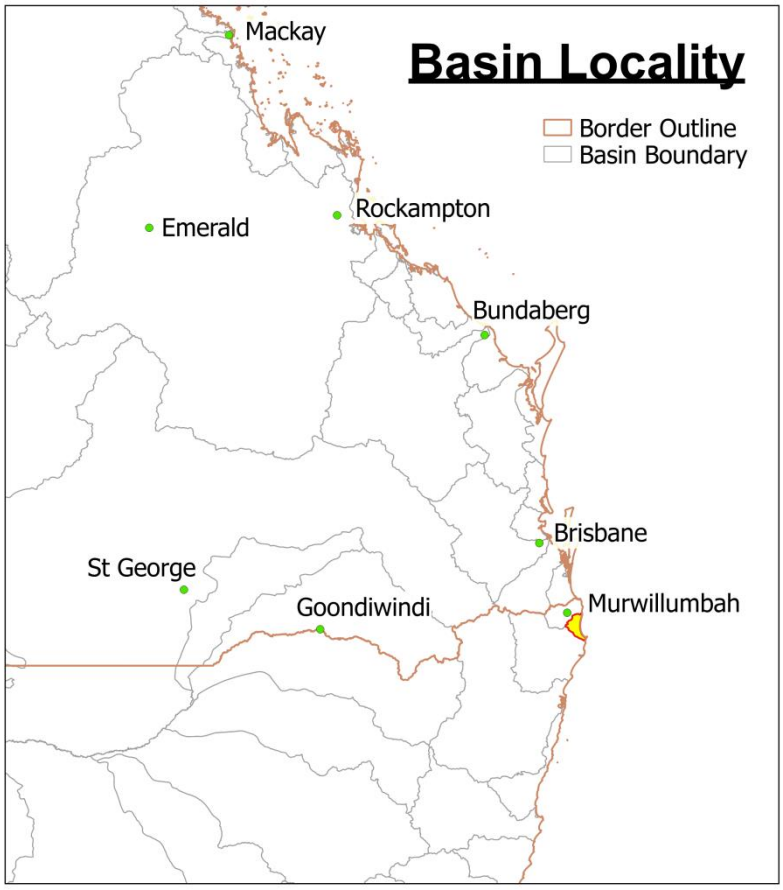
Tweed catchment average rainfall

The catchment average rainfall total for the Tweed catchment on 31 March was the highest daily total on record. Rainfall on 30 March was less significant and was ranked 47th highest daily total on record and 12th highest daily total in March.

Tweed catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
31 March 2017	374.15	1	1
6 February 1931	325.05	2	-
30 March 2017	159.2	47	12

Brunswick River catchment overview	
No of warnings issued	12
Date of Flood Watch	Tuesday 28 March 2017
Date of first Flood Warning	Thursday 30 March 2017
Date of Final Flood Warning	Friday 31 March 2017
Forecast locations affected	Billinudgel, Mullumbimby



Rainfall

Widespread rainfall in the 300 to 400mm range was recorded in the Brunswick catchment during the 30-31 March. In the Brunswick catchment, short duration rainfall intensities (less than 30 minutes) at Main Arm were insignificant, with AEP between those that would be expected every year and 20%. Significant rainfall intensities occurred at Main Arm for durations of 2 to 24 hours, with AEP between 10% and 5%. The highest rainfall intensity recorded at Main Arm was 460mm in 24 hours, which has a 2% to 5% chance of being equalled or exceeded in any particular year.

River levels

Brunswick is a rapid response catchment. Major flooding was recorded along the Marshalls Creek at Billinudgel, where the river peaked near 4.47m, slightly below the 2005 flood level of 4.51m. Moderate flooding occurred at Mullumbimby, where river levels peaked near 4.4m, higher than the 2005 flood level of 4.07m.

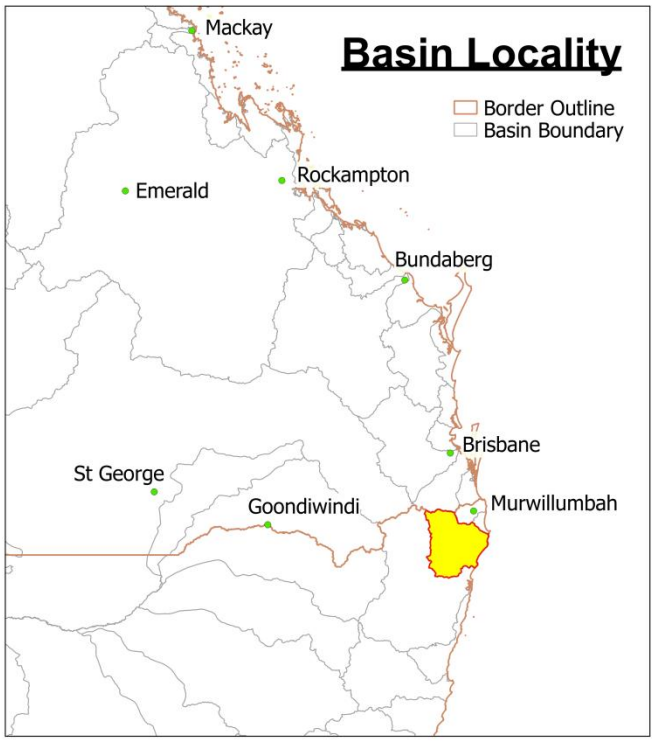
Brunswick catchment average rainfall

The catchment average rainfall total for Brunswick catchment on 31 March was the highest daily total on record. The daily rainfall total on 30 March was 157th highest daily total on record, and the 28th highest daily total for March.

Brunswick catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
31 March 2017	332.01	1	1
2 February 2001	277.4	2	-
11 March 1974	272.34	3	2
30 March 2017	106.73	157	28

Wilsons River catchment overview	
No of warnings issued	23
Date of Flood Watch	Tuesday 28 March 2017
Date of first Flood Warning	Thursday 30 March 2017
Date of Final Flood Warning	Monday 3 April 2017
Forecast locations affected	Lismore



Rainfall

A Flood Warning for the Wilsons River at Lismore was first issued at 12:39pm (AEDT) on 30 March 2017 and at 3:38pm it was updated with river levels forecast to exceed the major flood level (9.7m) late Thursday evening and reach around 11 metres early Friday morning. The SES issued evacuation notices by 5:30pm. Flood warnings for the Wilsons River were finalised on 3 April.

Heavy rainfall was recorded over the Wilsons River catchment. Rainfall totals of up to 631 mm were recorded in the Wilsons catchment, with widespread rainfall in the 350 to 500 mm range recorded during 30-31 March, causing significant river rises and major flooding at Lismore.

In the Wilson catchment, short duration rainfall intensities (less than 15 minutes) at Terania Creek and The Channon were typically insignificant, with AEP between 50% and 10%. The highest rainfall intensities occurred at Terania Creek and The Channon for durations of 24 hours with rainfall totals of 619mm recorded at Terania Creek and 573mm at The Channon which have less than 1% chance of being equalled or exceeded in any particular year.

River levels

River levels at Lismore peaked near 11.6m, which was below the 1974 flood, but higher than the 1989, 2001 and 2005 floods. The Lismore levee is at around 10.6m on the gauge and was breached early Friday morning, 31 March.

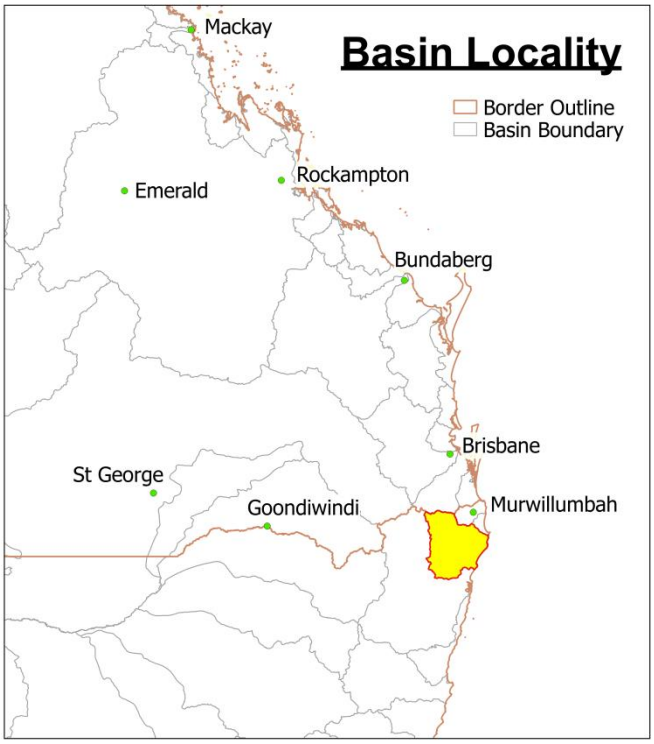
Richmond and Wilsons catchment average rainfall

The catchment average rainfall total for the Richmond catchment on 31 March was the 2nd highest daily total on record, and the record highest March daily total. Rainfall on 30 March was less significant and was ranked 253rd highest daily total on record and only 45th highest in March.

Richmond and Wilsons catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
21 February 1954	235.24	1	
31 March 2017	220.02	2	1
30 March 2017	56.32	253	45

Richmond River catchment overview	
No of warnings issued	23
Date of Flood Watch	Tuesday 28 March 2017
Date of first Flood Warning	Thursday 30 March 2017
Date of Final Flood Warning	Thursday 6 April 2017
Forecast locations affected	Wiangaree, Kyogle, Casino, Coraki, Bungawalbyn, Woodburn



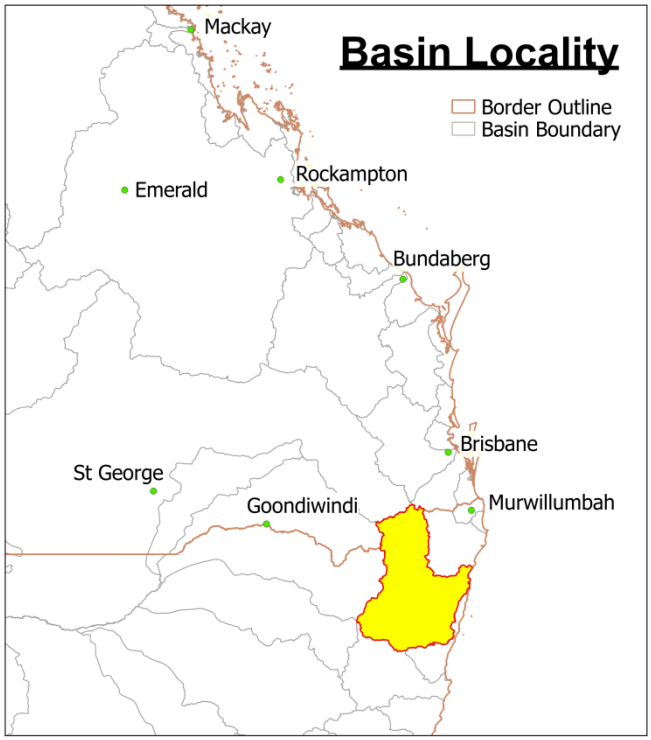
Rainfall

Widespread rainfall in the 150 to 200mm range was recorded in the main Richmond River Valley during the 30-31 March, causing significant river rises and minor to major flooding.

River levels

Major flooding was recorded at Kyogle, Coraki and Bungawalbyn Junction, with minor to moderate flooding occurring at Wiangaree, Casino and Woodburn. At Kyogle, river levels peaked just below the 1974 flood.

Clarence River catchment overview	
No of warnings issued	24
Date of Flood Watch	Tuesday 28 March 2017
Date of first Flood Warning	Thursday 30 March 2017
Date of Final Flood Warning	Monday 3 April 2017
Forecast locations affected	Glenreagh, Coutts Crossing, Grafton, Ulmarra



Rainfall

The Clarence River catchment received widespread rainfall between 30-31 March. The highest rainfall intensities occurred at Urbenville Old Post Office for durations of 24 hours with a rainfall total of 164mm recorded which has a 5% to 10% chance of being equalled or exceeded in any particular year.

River levels

Along the Orara River, minor to moderate flooding was recorded at Glenreagh and Coutts Crossing. Minor flooding also occurred along the Clarence River at Grafton and Ulmarra.

Clarence catchment average rainfall

The catchment average rainfall total for the Clarence catchment on 31 March was the 37th highest daily total on record, and the 8th highest March daily total.

Clarence catchment significant rainfall observations

Date	Catchment Total Rainfall (mm)	Overall Rank	March Ranks
21 February 1954	186.6	1	-
28 January 2013	146.83	2	-
9 March 2001	144.13	3	1
31 March 2017	83.56	37	8

4 Observations

4.1 Intensity Frequency Duration analysis

Rainfall Intensity-Frequency-Duration analysis in Queensland during the event:

Station	Rainfall (mm)	Period (AEST)	Annual Exceedance Probability
Clarke Range	187	3 hours ending at 2:56pm on 28 March	1%
Alert	311	6 hours ending at 4:29pm on 28 March	1%
Clarke Range 2	231	3 hours ending at 2:59pm on 28 March	1%
Alert	390	6 hours ending at 6:01pm on 28 March	1%
Marian Weir Alert	224	3 hours ending at 9:11am on 29 March	1%
	356	6 hours ending at 11:29am on 29 March	1%
Undercliff TM	299	3 hours ending at 4:04pm on 29 March	1%
	447	6 hours ending at 6:15pm on 29th March	1%
Yarrahappini Alert	143.2	3 hours ending at 3:35pm on 30 March	1%
	171.8	6 hours ending at 2:32pm on 30 March	1%
Beaudesert Alert	111	3 hours ending at 9:11pm on 30 March	2%
	156	6 hours ending at 10:50pm on 30 March	1%
Beaudesert Drumley Street	131.8	6 hours ending at 11:04pm on 30 March	2%
Maclean Bridge Alert	150	6 hours ending at 12:15pm on 30 March	2%
Tramway Lane TM	154	6 hours ending at 11:00pm on 30 March	1%
Flagstone Creek (Jimboomba) Alert	115	3 hours ending at 12:08pm on 30 March	2%
	161	6 hours ending at 2:28pm on 30 March	1%

Rainfall Intensity-Frequency-Duration analysis in NSW during the event:

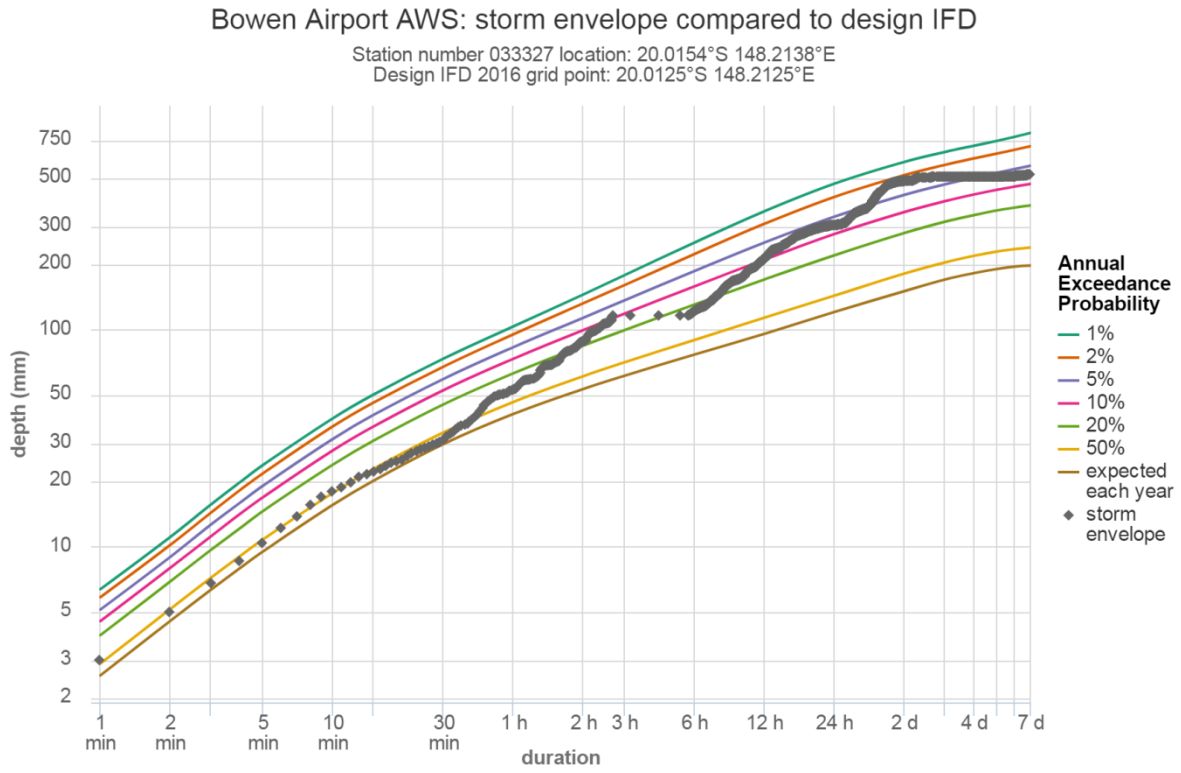
Station	Rainfall (mm)	Period (AEDT)	Annual Exceedance Probability
Numinbah (Couchy Creek)	216	3 hours ending at 11:41am on 31 March	1%
	306	6 hours ending at 12:10pm on 31 March	1%
Terania Creek	158	3 hours ending at 2:32am on 31 March	2%
	214	6 hours ending at 2:34am on 31 March	2%
The Channon	131	3 hours ending at 2:33am on 31 March	2%
	200	6 hours ending at 5:34am on 31 March	2%

Intensity-Frequency Duration design rainfalls (IFDs)

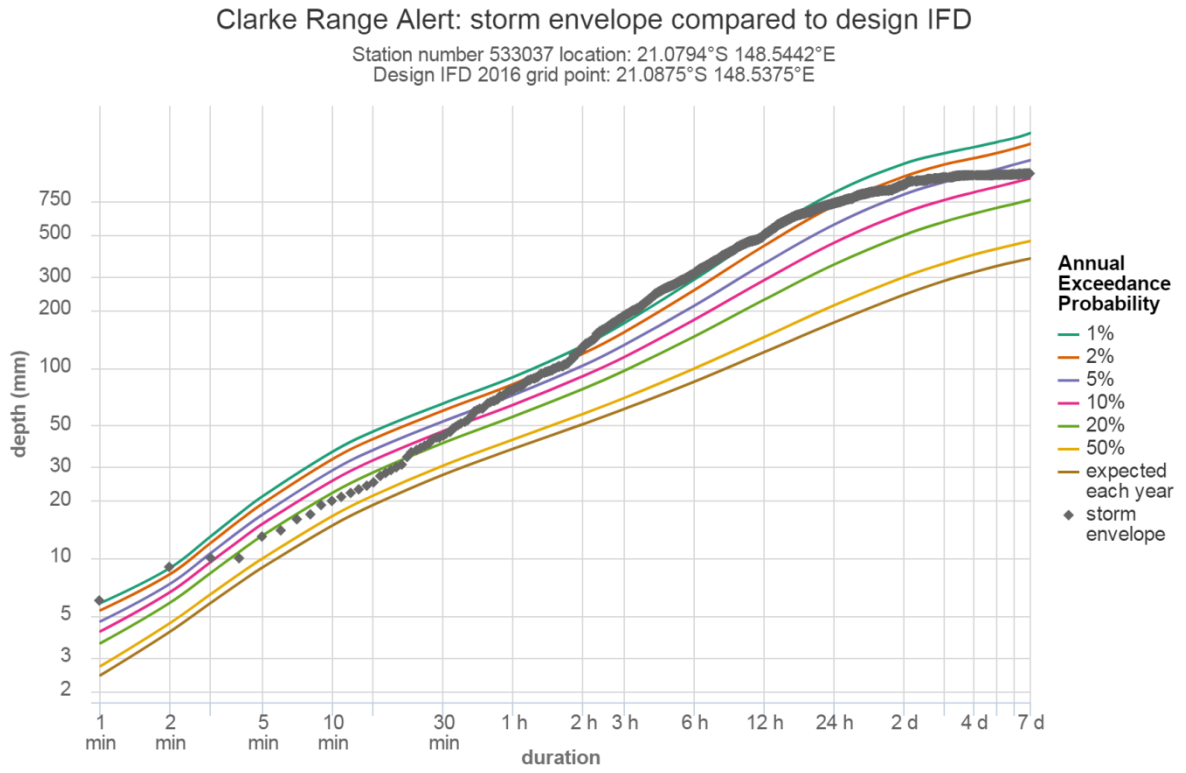
The 2016 Intensity Frequency Duration design rainfalls are provided for use in conjunction with Australian Rainfall and Runoff (ARR2016), and:

- Are based on more extensive database, with more than 30 years of additional rainfall data and data from extra rainfall stations.
- Are more accurate estimates, combining contemporary statistical analysis and techniques.
- Have an increased probability range from 12 exceedances per year to 1-in-2000 annual exceedance probability.
- Provide better estimates of the 2% and 1% annual exceedance probability IFDs than the interim 2013 IFDs.

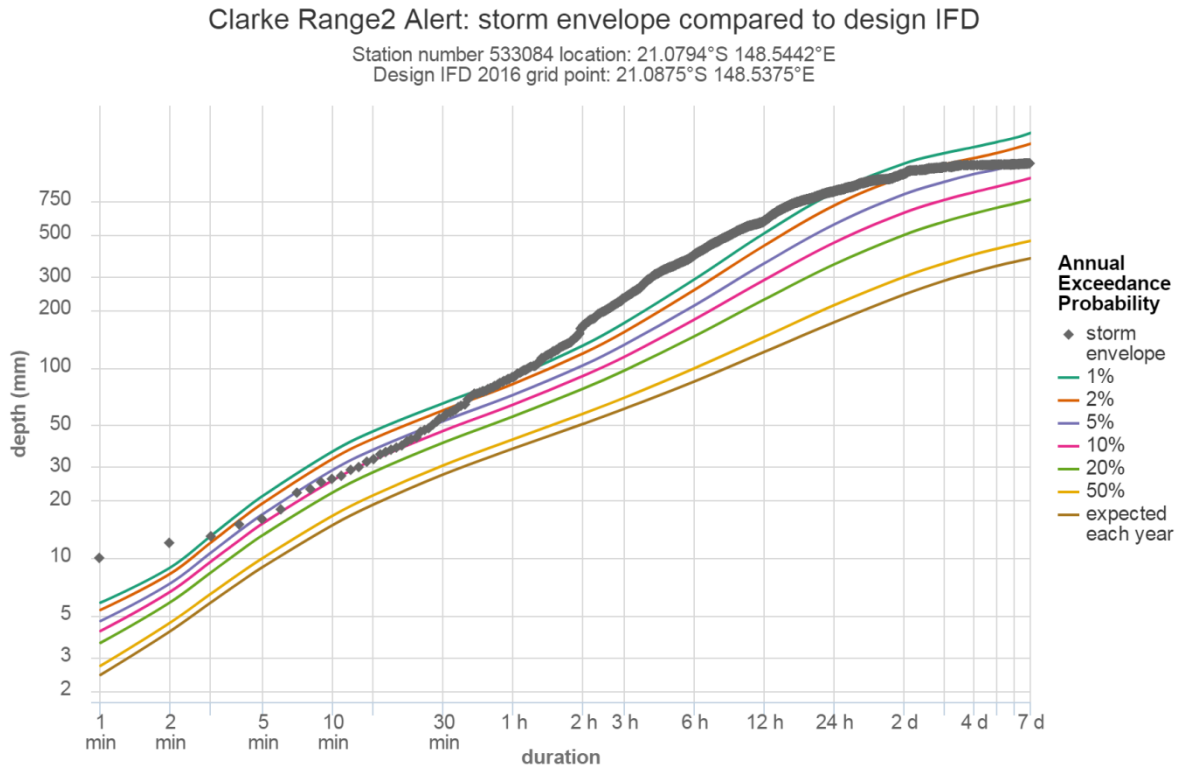
Intensity Frequency Duration (IFD) design rainfall curves range from 1 minute to 7 days in duration and are reported with their associated Annual Exceedance Probability (AEP) for the particular duration. AEP is the probability that a given rainfall total accumulated over a given duration will be exceeded in any one year.



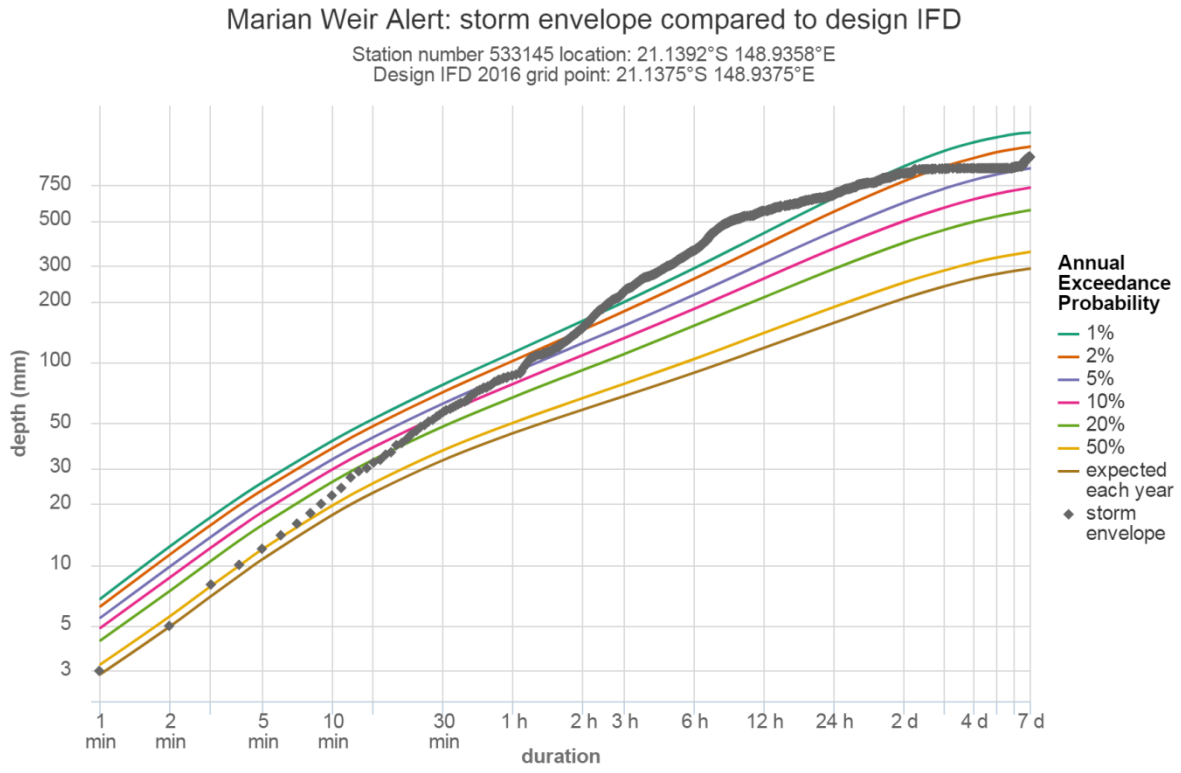
Period	Peak depth	From…	...to	Upper AEP bound	Lower AEP bound
1 minutes	3.0 mm	2017-03-29 20:10:00	2017-03-29 20:11:00	20%	50%
2 minutes	5.0 mm	2017-03-29 20:09:00	2017-03-29 20:11:00	50%	expected each year
3 minutes	6.8 mm	2017-03-29 20:09:00	2017-03-29 20:12:00	50%	expected each year
5 minutes	10.4 mm	2017-03-29 18:08:00	2017-03-29 18:13:00	50%	expected each year
10 minutes	18.0 mm	2017-03-29 19:33:00	2017-03-29 19:43:00	20%	50%
15 minutes	22.2 mm	2017-03-29 19:28:00	2017-03-29 19:43:00	50%	expected each year
30 minutes	31.2 mm	2017-03-29 18:03:00	2017-03-29 18:33:00	50%	expected each year
1 hours	53.2 mm	2017-03-29 17:53:00	2017-03-29 18:53:00	20%	50%
2 hours	88.6 mm	2017-03-29 17:45:00	2017-03-29 19:45:00	10%	20%
3 hours	116.6 mm	2017-03-29 17:30:00	2017-03-29 20:12:00	10%	20%
6 hours	121.8 mm	2017-03-28 11:28:00	2017-03-28 17:28:00	20%	50%
12 hours	213.0 mm	2017-03-28 08:06:00	2017-03-28 20:06:00	5%	10%
24 hours	304.8 mm	2017-03-27 22:38:00	2017-03-28 22:31:00	5%	10%
2 days	487.6 mm	2017-03-27 20:20:00	2017-03-29 20:12:00	2%	5%
3 days	509.4 mm	2017-03-26 21:00:00	2017-03-29 20:12:00	2%	5%
4 days	509.4 mm	2017-03-25 21:00:00	2017-03-29 20:12:00	2%	5%
5 days	509.4 mm	2017-03-24 21:00:00	2017-03-29 20:12:00	5%	10%
6 days	514.0 mm	2017-03-23 20:22:00	2017-03-29 20:12:00	5%	10%
7 days	522.6 mm	2017-03-22 21:00:00	2017-03-29 20:12:00	5%	10%



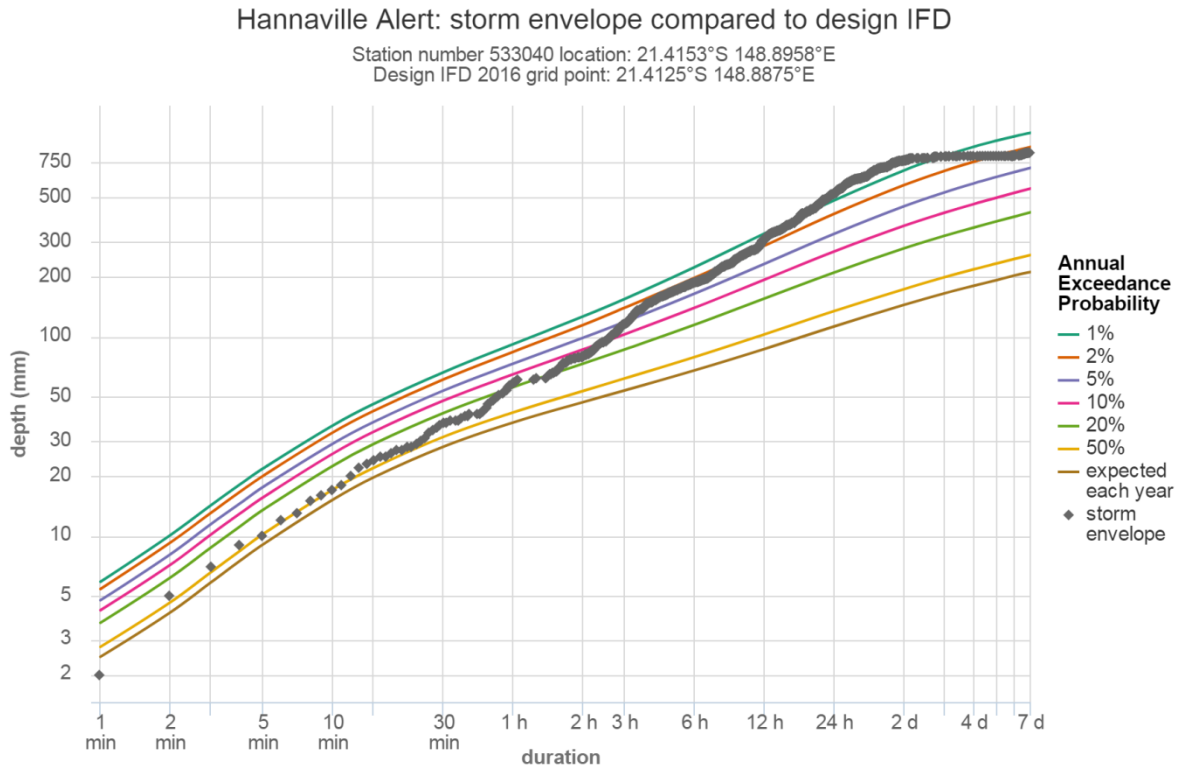
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	6.0 mm	2017-03-28 07:36:10	2017-03-28 07:36:51	< 1%	1%
2 minutes	9.0 mm	2017-03-28 12:00:54	2017-03-28 12:02:45	< 1%	1%
3 minutes	10.0 mm	2017-03-28 12:00:54	2017-03-28 12:03:26	5%	10%
5 minutes	13.0 mm	2017-03-28 13:46:04	2017-03-28 13:50:28	20%	50%
10 minutes	20.0 mm	2017-03-28 12:17:56	2017-03-28 12:27:35	20%	50%
15 minutes	25.0 mm	2017-03-28 12:12:57	2017-03-28 12:27:35	20%	50%
30 minutes	44.0 mm	2017-03-28 12:12:04	2017-03-28 12:41:51	10%	20%
1 hours	77.0 mm	2017-03-28 11:54:30	2017-03-28 12:53:56	2%	5%
2 hours	129.0 mm	2017-03-28 12:18:39	2017-03-28 14:18:33	1%	2%
3 hours	187.0 mm	2017-03-28 11:56:12	2017-03-28 14:56:04	< 1%	1%
6 hours	311.0 mm	2017-03-28 10:29:24	2017-03-28 16:29:07	< 1%	1%
12 hours	496.0 mm	2017-03-28 05:59:46	2017-03-28 17:59:17	1%	2%
24 hours	731.0 mm	2017-03-27 21:45:34	2017-03-28 21:45:17	1%	2%
2 days	914.0 mm	2017-03-27 14:55:07	2017-03-29 14:50:33	2%	5%
3 days	998.0 mm	2017-03-27 04:23:18	2017-03-30 04:23:02	2%	5%
4 days	1 024.0 mm	2017-03-26 07:23:23	2017-03-30 07:23:01	5%	10%
5 days	1 030.0 mm	2017-03-25 07:23:28	2017-03-30 07:23:01	5%	10%
6 days	1 036.0 mm	2017-03-24 07:23:34	2017-03-30 07:23:01	5%	10%
7 days	1 047.0 mm	2017-03-23 07:23:39	2017-03-30 07:23:01	5%	10%



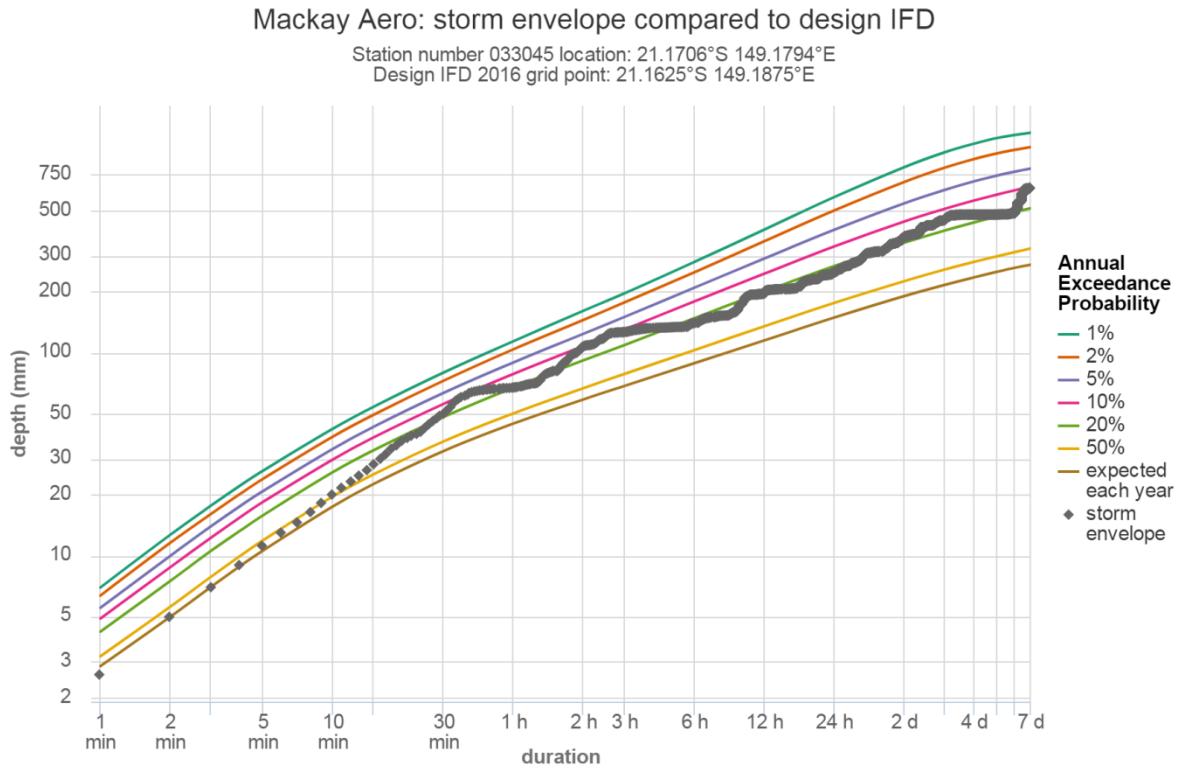
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	10.0 mm	2017-03-28 14:16:40	2017-03-28 14:17:30	< 1%	1%
2 minutes	12.0 mm	2017-03-28 14:15:45	2017-03-28 14:17:30	< 1%	1%
3 minutes	13.0 mm	2017-03-28 12:19:06	2017-03-28 12:22:02	1%	2%
5 minutes	16.0 mm	2017-03-28 12:17:43	2017-03-28 12:22:02	5%	10%
10 minutes	26.0 mm	2017-03-28 14:07:37	2017-03-28 14:17:30	5%	10%
15 minutes	33.0 mm	2017-03-28 14:02:36	2017-03-28 14:17:30	5%	10%
30 minutes	55.0 mm	2017-03-28 13:47:56	2017-03-28 14:17:30	2%	5%
1 hours	89.0 mm	2017-03-28 13:39:44	2017-03-28 14:39:14	1%	2%
2 hours	166.0 mm	2017-03-28 12:17:43	2017-03-28 14:17:30	< 1%	1%
3 hours	231.0 mm	2017-03-28 11:59:28	2017-03-28 14:58:49	< 1%	1%
6 hours	390.0 mm	2017-03-28 12:00:58	2017-03-28 18:00:57	< 1%	1%
12 hours	587.0 mm	2017-03-28 06:10:15	2017-03-28 18:09:44	< 1%	1%
24 hours	843.0 mm	2017-03-27 21:44:23	2017-03-28 21:41:50	< 1%	1%
2 days	1 043.0 mm	2017-03-27 14:55:10	2017-03-29 14:54:31	1%	2%
3 days	1 132.0 mm	2017-03-27 04:53:34	2017-03-30 04:53:24	2%	5%
4 days	1 157.0 mm	2017-03-26 07:53:37	2017-03-30 07:53:24	2%	5%
5 days	1 164.0 mm	2017-03-25 07:53:41	2017-03-30 07:53:24	2%	5%
6 days	1 170.0 mm	2017-03-24 04:53:45	2017-03-30 04:53:24	5%	10%
7 days	1 182.0 mm	2017-03-23 07:53:48	2017-03-30 07:53:24	5%	10%



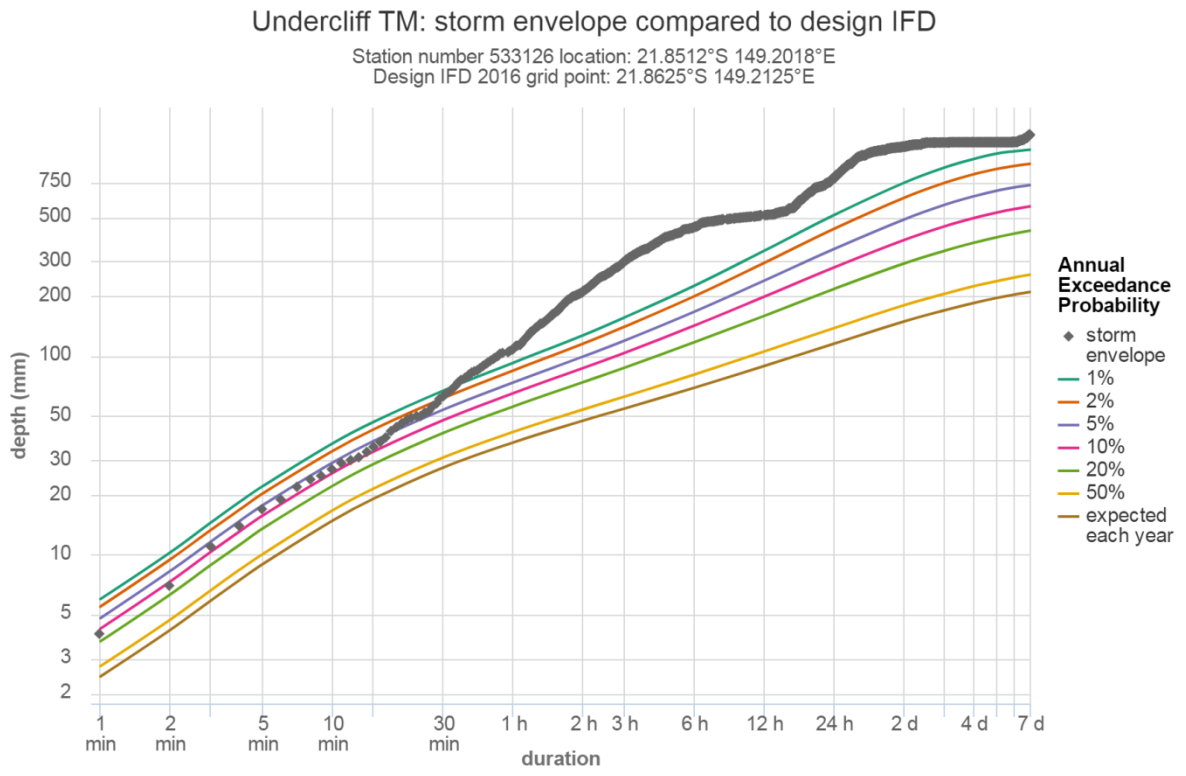
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	3.0 mm	2017-03-29 09:07:16	2017-03-29 09:08:14	50%	expected each year
2 minutes	5.0 mm	2017-03-29 06:15:02	2017-03-29 06:16:55	50%	expected each year
3 minutes	8.0 mm	2017-03-29 09:06:01	2017-03-29 09:08:57	20%	50%
5 minutes	12.0 mm	2017-03-29 08:07:11	2017-03-29 08:12:11	50%	expected each year
10 minutes	22.0 mm	2017-03-29 08:00:37	2017-03-29 08:10:32	20%	50%
15 minutes	32.0 mm	2017-03-29 08:00:06	2017-03-29 08:14:46	20%	50%
30 minutes	57.0 mm	2017-03-29 08:00:06	2017-03-29 08:29:51	5%	10%
1 hours	86.0 mm	2017-03-29 08:00:06	2017-03-29 08:58:51	5%	10%
2 hours	149.0 mm	2017-03-29 06:42:09	2017-03-29 08:42:05	1%	2%
3 hours	224.0 mm	2017-03-29 06:11:25	2017-03-29 09:11:25	< 1%	1%
6 hours	356.0 mm	2017-03-29 05:29:51	2017-03-29 11:29:04	< 1%	1%
12 hours	559.0 mm	2017-03-29 02:31:04	2017-03-29 14:29:36	< 1%	1%
24 hours	671.0 mm	2017-03-28 14:08:23	2017-03-29 14:07:31	< 1%	1%
2 days	856.0 mm	2017-03-27 19:33:09	2017-03-29 19:04:14	1%	2%
3 days	904.0 mm	2017-03-26 21:13:17	2017-03-29 21:13:07	2%	5%
4 days	907.0 mm	2017-03-26 06:13:16	2017-03-30 06:13:07	2%	5%
5 days	908.0 mm	2017-03-25 06:13:18	2017-03-30 06:13:07	2%	5%
6 days	918.0 mm	2017-03-23 21:13:21	2017-03-29 21:13:07	2%	5%
7 days	1 035.0 mm	2017-03-22 20:10:04	2017-03-29 19:04:14	2%	5%



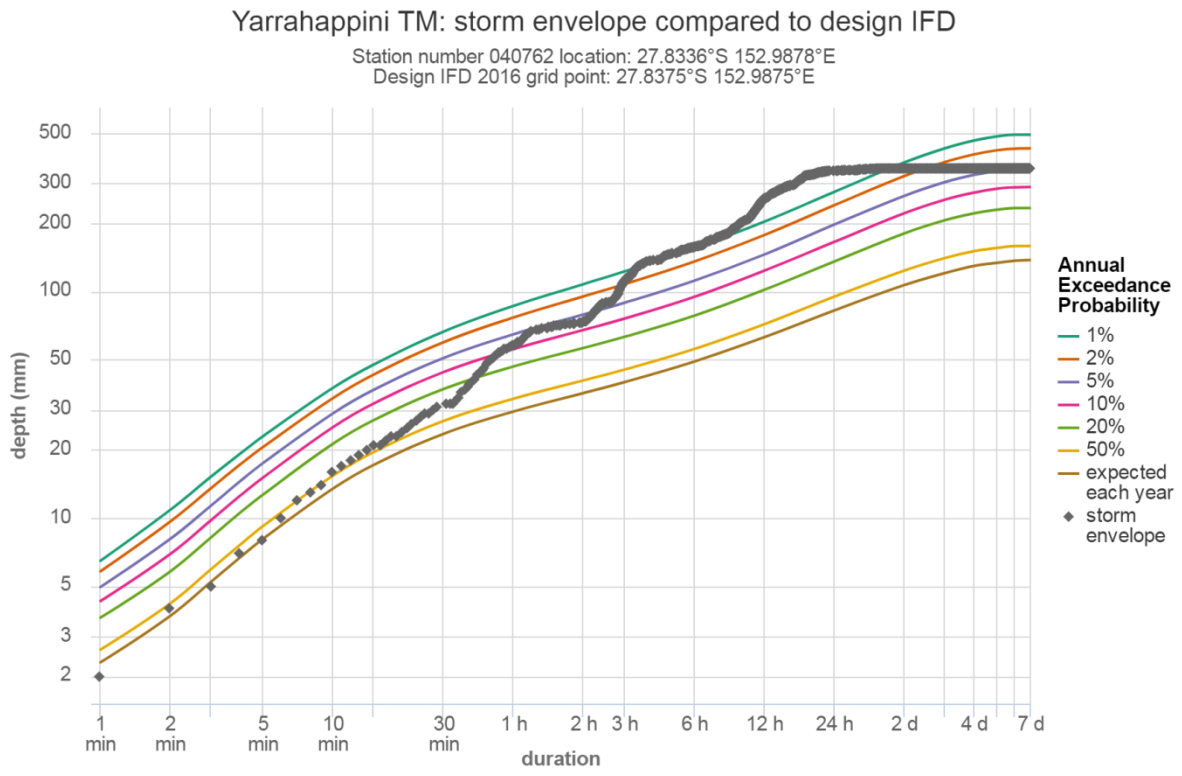
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.0 mm	2017-03-29 06:44:32	2017-03-29 06:45:31	expected each year	
2 minutes	5.0 mm	2017-03-29 06:45:06	2017-03-29 06:46:59	20%	50%
3 minutes	7.0 mm	2017-03-29 06:44:01	2017-03-29 06:46:59	20%	50%
5 minutes	10.0 mm	2017-03-29 06:42:16	2017-03-29 06:46:59	50%	expected each year
10 minutes	17.0 mm	2017-03-29 06:38:09	2017-03-29 06:47:57	50%	expected each year
15 minutes	24.0 mm	2017-03-29 17:41:31	2017-03-29 17:56:10	20%	50%
30 minutes	37.0 mm	2017-03-29 17:29:03	2017-03-29 17:58:45	20%	50%
1 hours	59.0 mm	2017-03-29 16:57:41	2017-03-29 17:57:35	10%	20%
2 hours	80.0 mm	2017-03-29 07:50:43	2017-03-29 09:50:41	10%	20%
3 hours	116.0 mm	2017-03-29 06:32:58	2017-03-29 09:32:01	5%	10%
6 hours	187.0 mm	2017-03-29 04:49:08	2017-03-29 10:48:23	2%	5%
12 hours	307.0 mm	2017-03-29 05:56:28	2017-03-29 17:56:10	1%	2%
24 hours	524.0 mm	2017-03-28 17:57:12	2017-03-29 17:56:10	< 1%	1%
2 days	770.0 mm	2017-03-27 18:01:13	2017-03-29 17:58:45	< 1%	1%
3 days	807.0 mm	2017-03-27 08:31:18	2017-03-30 08:31:06	1%	2%
4 days	811.0 mm	2017-03-26 08:31:22	2017-03-30 08:31:06	1%	2%
5 days	811.0 mm	2017-03-25 08:31:26	2017-03-30 08:31:06	2%	5%
6 days	816.0 mm	2017-03-23 18:55:53	2017-03-29 18:28:12	2%	5%
7 days	842.0 mm	2017-03-22 20:31:36	2017-03-29 18:28:12	2%	5%



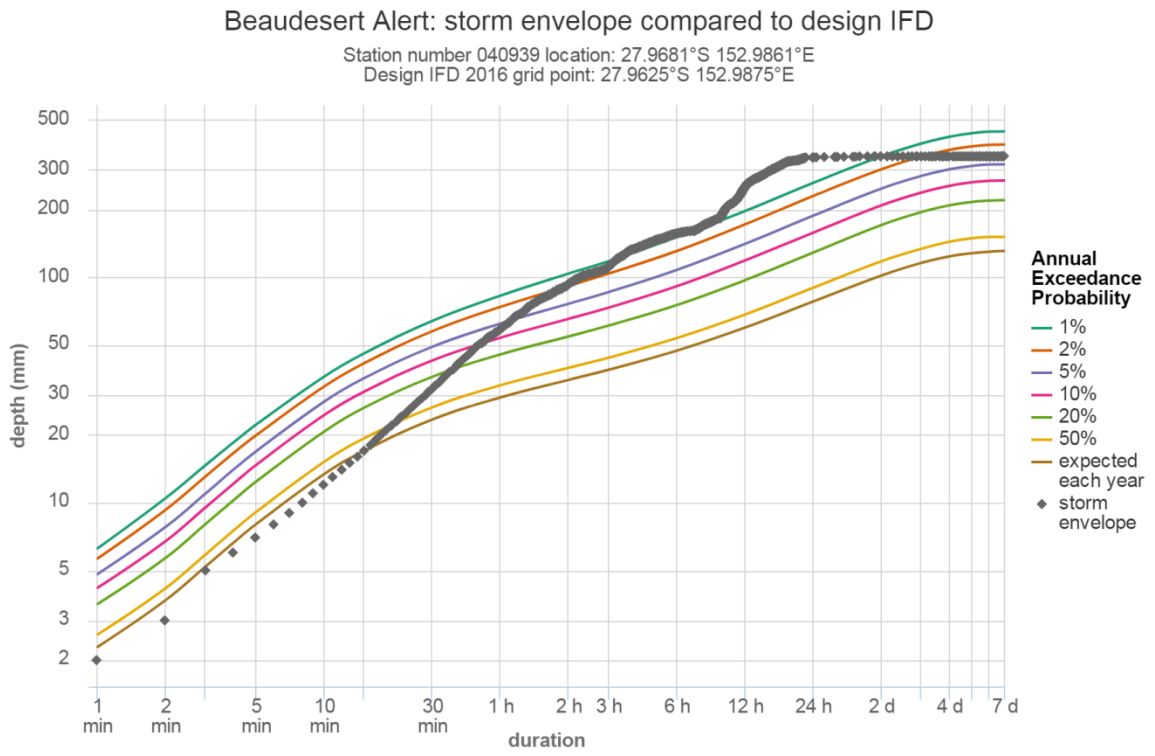
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.6 mm	2017-03-29 18:43:00	2017-03-29 18:44:00	expected each year	
2 minutes	5.0 mm	2017-03-29 18:42:00	2017-03-29 18:44:00	expected each year	
3 minutes	7.0 mm	2017-03-29 19:03:00	2017-03-29 19:06:00	expected each year	
5 minutes	11.2 mm	2017-03-29 18:42:00	2017-03-29 18:47:00	50%	expected each year
10 minutes	20.0 mm	2017-03-29 18:57:00	2017-03-29 19:07:00	20%	50%
15 minutes	28.2 mm	2017-03-29 19:00:00	2017-03-29 19:15:00	20%	50%
30 minutes	50.0 mm	2017-03-29 18:39:00	2017-03-29 19:09:00	10%	20%
1 hours	67.4 mm	2017-03-29 18:34:00	2017-03-29 19:34:00	20%	50%
2 hours	107.2 mm	2017-03-29 18:38:00	2017-03-29 20:38:00	10%	20%
3 hours	126.4 mm	2017-03-29 18:19:00	2017-03-29 21:19:00	10%	20%
6 hours	140.0 mm	2017-03-29 15:20:00	2017-03-29 21:19:00	20%	50%
12 hours	195.2 mm	2017-03-29 09:22:00	2017-03-29 21:19:00	20%	50%
24 hours	247.8 mm	2017-03-28 21:19:00	2017-03-29 21:19:00	20%	50%
2 days	369.6 mm	2017-03-27 21:28:00	2017-03-29 21:26:00	10%	20%
3 days	451.8 mm	2017-03-26 22:08:00	2017-03-29 22:06:00	10%	20%
4 days	478.2 mm	2017-03-26 09:00:00	2017-03-30 09:00:00	10%	20%
5 days	479.2 mm	2017-03-25 05:19:00	2017-03-30 05:03:00	10%	20%
6 days	488.0 mm	2017-03-23 21:20:00	2017-03-29 21:19:00	20%	50%
7 days	646.6 mm	2017-03-23 02:00:00	2017-03-30 02:00:00	10%	20%



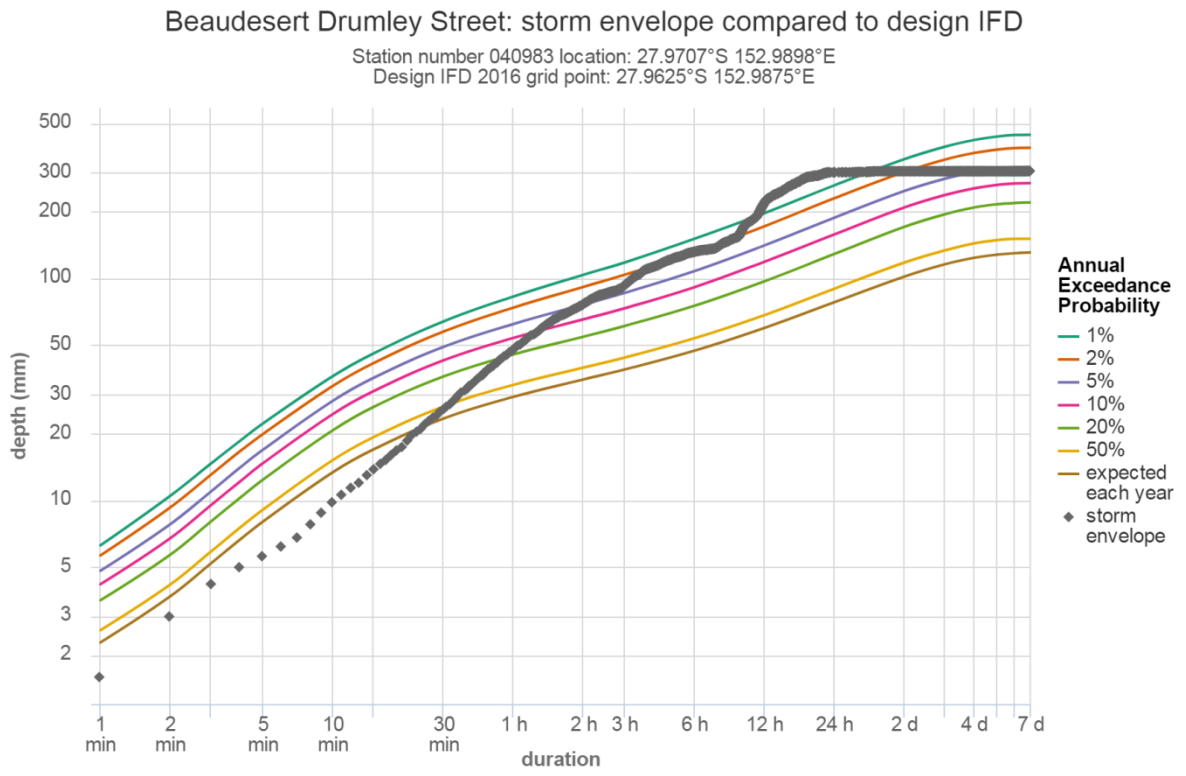
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	4.0 mm	2017-03-29 14:21:00	2017-03-29 14:22:00	10%	20%
2 minutes	7.0 mm	2017-03-29 14:20:00	2017-03-29 14:22:00	10%	20%
3 minutes	11.0 mm	2017-03-29 14:21:00	2017-03-29 14:24:00	5%	10%
5 minutes	17.0 mm	2017-03-29 14:20:00	2017-03-29 14:25:00	5%	10%
10 minutes	27.0 mm	2017-03-29 14:15:00	2017-03-29 14:25:00	5%	10%
15 minutes	35.0 mm	2017-03-29 14:17:00	2017-03-29 14:32:00	5%	10%
30 minutes	63.0 mm	2017-03-29 13:55:00	2017-03-29 14:25:00	1%	2%
1 hours	109.0 mm	2017-03-29 13:44:00	2017-03-29 14:44:00	< 1%	1%
2 hours	212.0 mm	2017-03-29 13:49:00	2017-03-29 15:49:00	< 1%	1%
3 hours	299.0 mm	2017-03-29 13:04:00	2017-03-29 16:04:00	< 1%	1%
6 hours	447.0 mm	2017-03-29 12:15:00	2017-03-29 18:15:00	< 1%	1%
12 hours	514.0 mm	2017-03-29 06:36:00	2017-03-29 18:16:00	< 1%	1%
24 hours	787.0 mm	2017-03-28 17:22:00	2017-03-29 17:13:00	< 1%	1%
2 days	1 139.0 mm	2017-03-28 01:16:00	2017-03-30 01:15:00	< 1%	1%
3 days	1 195.0 mm	2017-03-27 03:00:00	2017-03-30 03:00:00	< 1%	1%
4 days	1 198.0 mm	2017-03-26 03:00:00	2017-03-30 03:00:00	< 1%	1%
5 days	1 198.0 mm	2017-03-25 03:00:00	2017-03-30 03:00:00	< 1%	1%
6 days	1 202.0 mm	2017-03-24 04:00:00	2017-03-30 04:00:00	< 1%	1%
7 days	1 307.0 mm	2017-03-22 20:00:00	2017-03-29 20:00:00	< 1%	1%



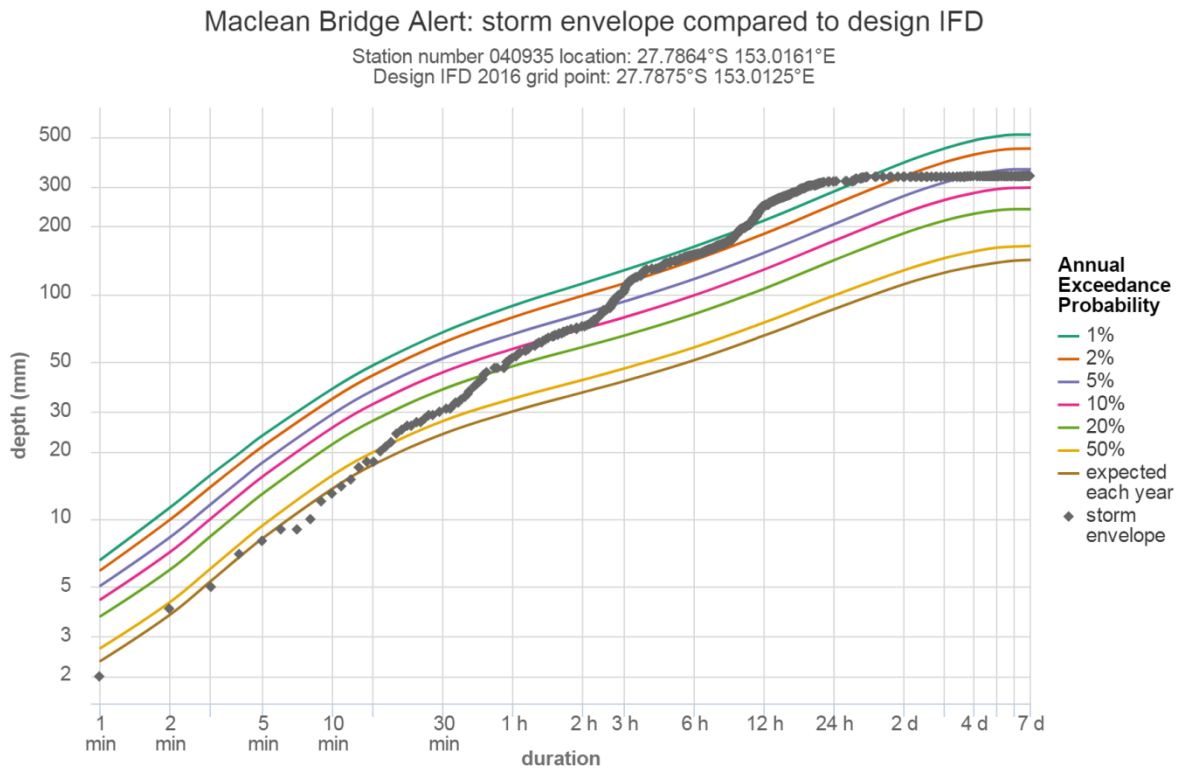
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.0 mm	2017-03-30 09:14:00	2017-03-30 09:15:00	expected each year	
2 minutes	4.0 mm	2017-03-30 09:16:00	2017-03-30 09:18:00	50%	expected each year
3 minutes	5.0 mm	2017-03-30 09:14:00	2017-03-30 09:17:00	expected each year	
5 minutes	8.0 mm	2017-03-30 09:13:00	2017-03-30 09:18:00	expected each year	
10 minutes	16.0 mm	2017-03-30 11:58:00	2017-03-30 12:08:00	20%	50%
15 minutes	21.0 mm	2017-03-30 11:57:00	2017-03-30 12:12:00	20%	50%
30 minutes	31.0 mm	2017-03-30 11:47:00	2017-03-30 12:15:00	20%	50%
1 hours	58.0 mm	2017-03-30 11:12:00	2017-03-30 12:12:00	5%	10%
2 hours	74.0 mm	2017-03-30 10:20:00	2017-03-30 12:20:00	5%	10%
3 hours	111.0 mm	2017-03-30 09:09:00	2017-03-30 12:09:00	1%	2%
6 hours	158.0 mm	2017-03-30 06:20:00	2017-03-30 12:20:00	< 1%	1%
12 hours	257.0 mm	2017-03-30 08:34:00	2017-03-30 20:34:00	< 1%	1%
24 hours	342.0 mm	2017-03-29 23:00:00	2017-03-30 23:00:00	< 1%	1%
2 days	350.0 mm	2017-03-29 03:00:00	2017-03-31 03:00:00	1%	2%
3 days	350.0 mm	2017-03-28 03:00:00	2017-03-31 03:00:00	2%	5%
4 days	350.0 mm	2017-03-27 03:00:00	2017-03-31 03:00:00	2%	5%
5 days	350.0 mm	2017-03-26 03:00:00	2017-03-31 03:00:00	2%	5%
6 days	350.0 mm	2017-03-25 03:00:00	2017-03-31 03:00:00	2%	5%
7 days	350.0 mm	2017-03-24 03:00:00	2017-03-31 03:00:00	2%	5%



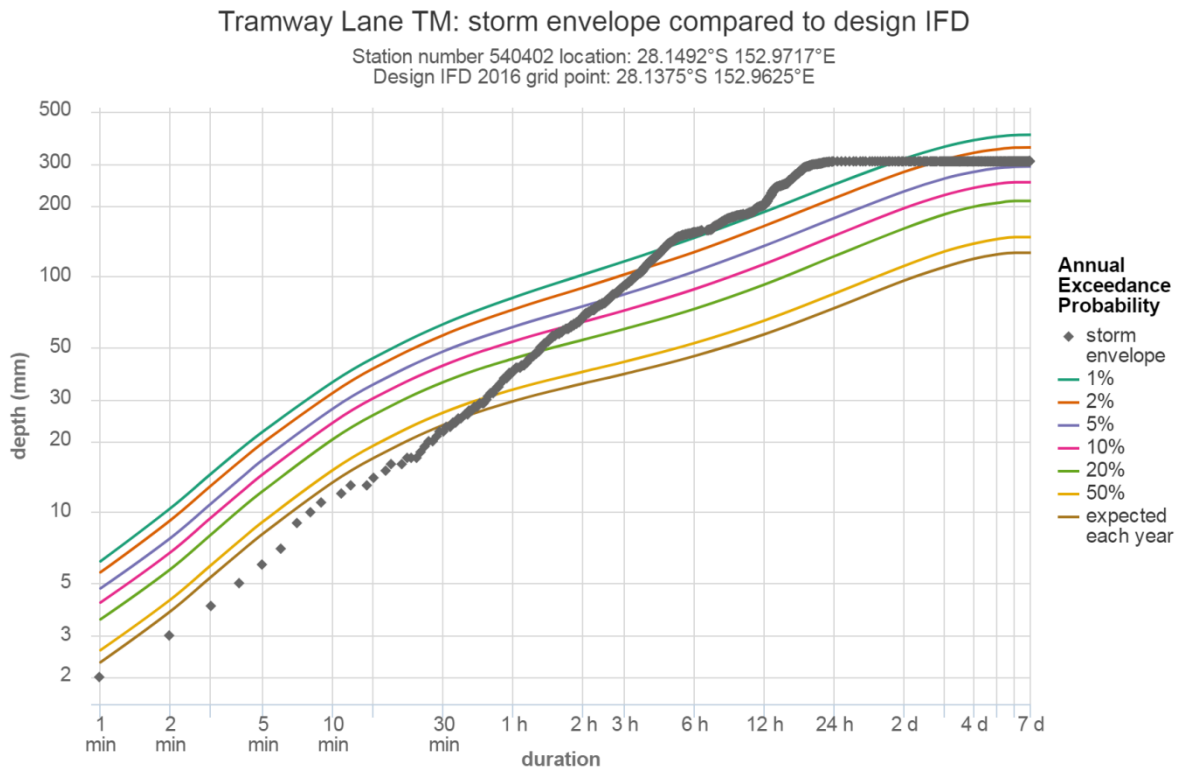
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.0 mm	2017-03-30 09:31:01	2017-03-30 09:32:01	expected each year	
2 minutes	3.0 mm	2017-03-19 06:38:20	2017-03-19 06:40:16	expected each year	
3 minutes	5.0 mm	2017-03-19 06:38:20	2017-03-19 06:41:18	expected each year	
5 minutes	7.0 mm	2017-03-19 06:37:14	2017-03-19 06:41:48	expected each year	
10 minutes	12.0 mm	2017-03-30 20:21:54	2017-03-30 20:31:31	expected each year	
15 minutes	17.0 mm	2017-03-30 20:13:36	2017-03-30 20:28:35	expected each year	
30 minutes	32.0 mm	2017-03-30 20:05:49	2017-03-30 20:35:36	20%	50%
1 hours	59.0 mm	2017-03-30 19:54:46	2017-03-30 20:54:42	5%	10%
2 hours	93.0 mm	2017-03-30 19:11:43	2017-03-30 21:11:21	1%	2%
3 hours	111.0 mm	2017-03-30 18:11:42	2017-03-30 21:11:21	1%	2%
6 hours	156.0 mm	2017-03-30 16:53:28	2017-03-30 22:50:03	< 1%	1%
12 hours	251.0 mm	2017-03-30 09:22:50	2017-03-30 21:22:24	< 1%	1%
24 hours	340.0 mm	2017-03-30 01:15:46	2017-03-31 01:14:32	< 1%	1%
2 days	344.0 mm	2017-03-29 04:30:21	2017-03-31 04:30:18	1%	2%
3 days	344.0 mm	2017-03-28 04:30:23	2017-03-31 04:30:18	2%	5%
4 days	344.0 mm	2017-03-27 04:30:25	2017-03-31 04:30:18	2%	5%
5 days	344.0 mm	2017-03-26 04:30:26	2017-03-31 04:30:18	2%	5%
6 days	344.0 mm	2017-03-25 04:30:28	2017-03-31 04:30:18	2%	5%
7 days	345.0 mm	2017-03-24 04:30:30	2017-03-31 04:30:18	2%	5%



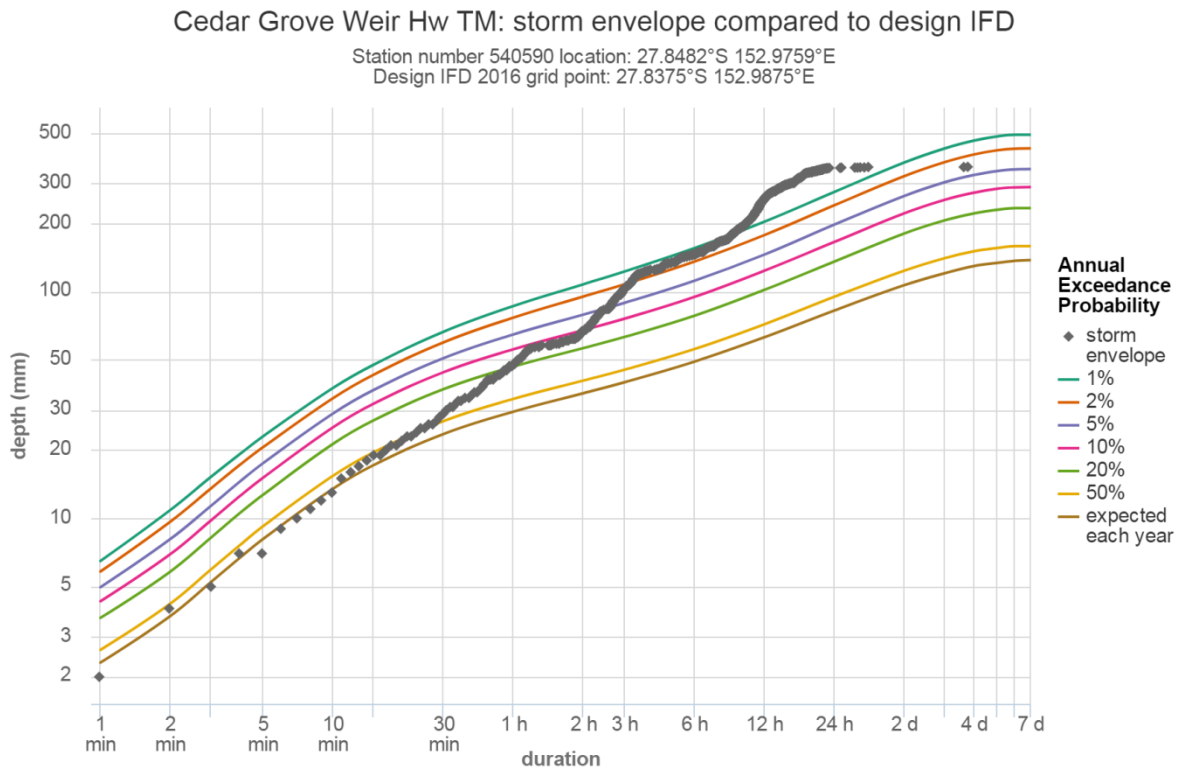
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	1.6 mm	2017-03-30 11:27:00	2017-03-30 11:28:00	expected each year	
2 minutes	3.0 mm	2017-03-30 11:26:00	2017-03-30 11:28:00	expected each year	
3 minutes	4.2 mm	2017-03-30 11:26:00	2017-03-30 11:29:00	expected each year	
5 minutes	5.6 mm	2017-03-30 10:05:00	2017-03-30 10:10:00	expected each year	
10 minutes	9.8 mm	2017-03-30 09:23:00	2017-03-30 09:33:00	expected each year	
15 minutes	13.8 mm	2017-03-30 20:19:00	2017-03-30 20:34:00	expected each year	
30 minutes	25.8 mm	2017-03-30 20:08:00	2017-03-30 20:38:00	50%	expected each year
1 hours	48.0 mm	2017-03-30 20:00:00	2017-03-30 21:00:00	10%	20%
2 hours	76.4 mm	2017-03-30 19:13:00	2017-03-30 21:13:00	2%	5%
3 hours	92.8 mm	2017-03-30 18:13:00	2017-03-30 21:13:00	2%	5%
6 hours	131.8 mm	2017-03-30 17:04:00	2017-03-30 23:04:00	1%	2%
12 hours	217.4 mm	2017-03-30 09:05:00	2017-03-30 21:05:00	< 1%	1%
24 hours	300.8 mm	2017-03-30 00:54:00	2017-03-31 00:41:00	< 1%	1%
2 days	304.2 mm	2017-03-29 02:00:00	2017-03-31 02:00:00	1%	2%
3 days	304.2 mm	2017-03-28 02:00:00	2017-03-31 02:00:00	2%	5%
4 days	304.2 mm	2017-03-27 02:00:00	2017-03-31 02:00:00	2%	5%
5 days	304.2 mm	2017-03-26 02:00:00	2017-03-31 02:00:00	5%	10%
6 days	304.2 mm	2017-03-25 02:00:00	2017-03-31 02:00:00	5%	10%
7 days	305.0 mm	2017-03-24 01:37:00	2017-03-31 01:05:00	5%	10%



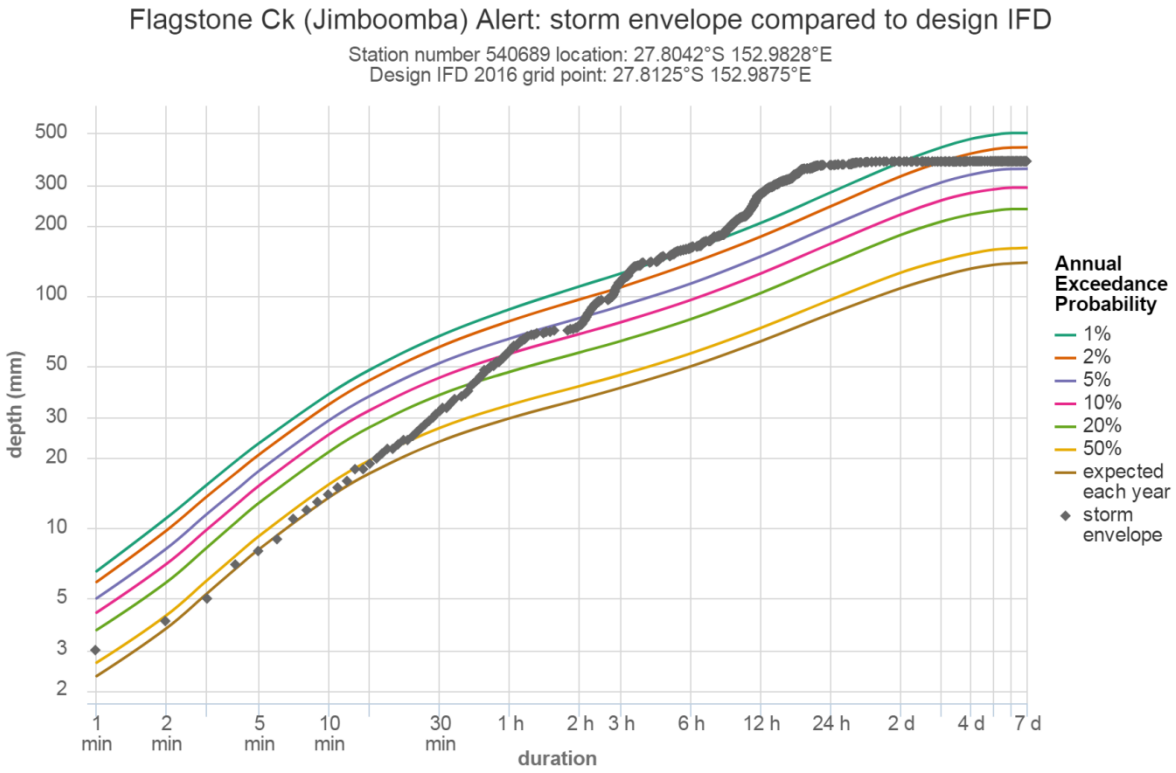
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.0 mm	2017-03-30 12:07:24	2017-03-30 12:08:21	expected each year	
2 minutes	4.0 mm	2017-03-30 12:07:24	2017-03-30 12:09:09	50%	expected each year
3 minutes	5.0 mm	2017-03-30 09:07:45	2017-03-30 09:10:43	expected each year	
5 minutes	8.0 mm	2017-03-30 12:04:36	2017-03-30 12:09:32	expected each year	
10 minutes	13.0 mm	2017-03-30 11:30:58	2017-03-30 11:40:36	expected each year	
15 minutes	18.0 mm	2017-03-30 11:24:04	2017-03-30 11:38:42	50%	expected each year
30 minutes	30.0 mm	2017-03-30 11:19:42	2017-03-30 11:48:10	20%	50%
1 hours	52.0 mm	2017-03-30 11:11:10	2017-03-30 12:09:32	10%	20%
2 hours	72.0 mm	2017-03-30 10:17:44	2017-03-30 12:15:01	5%	10%
3 hours	103.0 mm	2017-03-30 08:59:09	2017-03-30 11:58:55	2%	5%
6 hours	150.0 mm	2017-03-30 06:15:22	2017-03-30 12:15:01	1%	2%
12 hours	247.0 mm	2017-03-30 08:29:51	2017-03-30 20:24:46	< 1%	1%
24 hours	317.0 mm	2017-03-29 22:54:24	2017-03-30 22:54:23	< 1%	1%
2 days	333.0 mm	2017-03-29 01:54:24	2017-03-31 01:54:23	2%	5%
3 days	333.0 mm	2017-03-28 01:54:25	2017-03-31 01:54:23	2%	5%
4 days	335.0 mm	2017-03-27 01:54:26	2017-03-31 01:54:23	5%	10%
5 days	335.0 mm	2017-03-26 01:54:27	2017-03-31 01:54:23	5%	10%
6 days	335.0 mm	2017-03-25 07:54:27	2017-03-31 07:54:22	5%	10%
7 days	336.0 mm	2017-03-24 01:54:28	2017-03-31 01:54:23	5%	10%



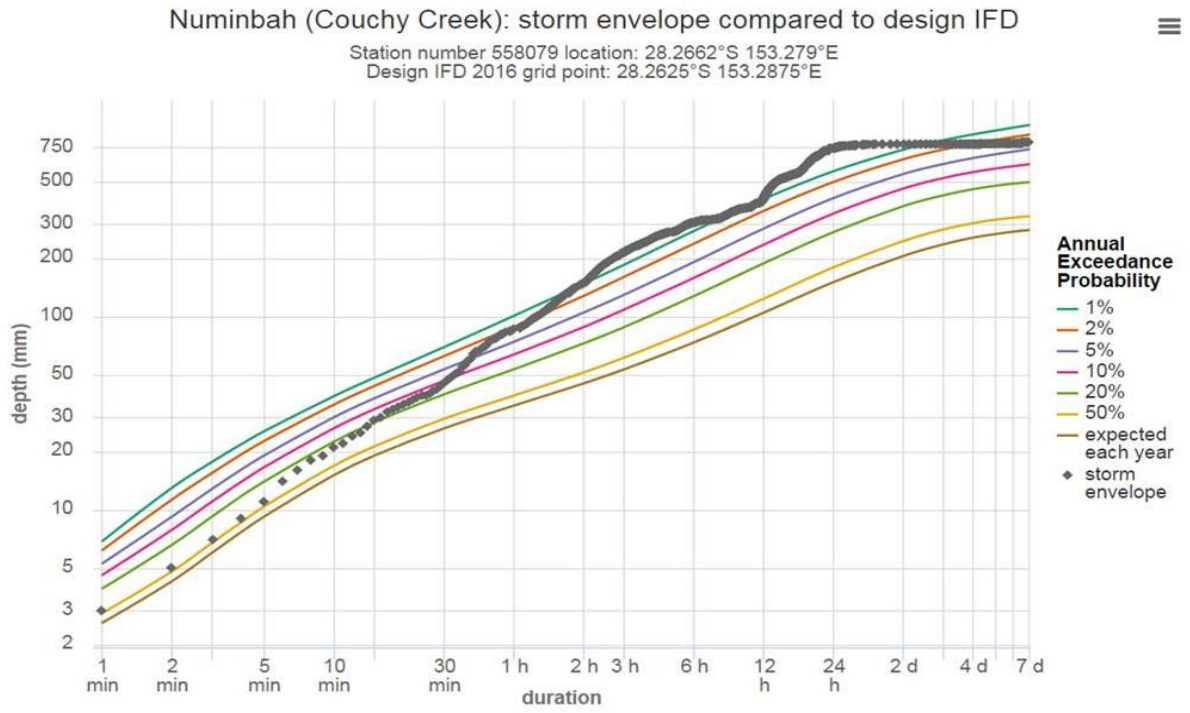
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.0 mm	2017-03-20 12:43:00	2017-03-20 12:44:00	expected each year	
2 minutes	3.0 mm	2017-03-20 12:42:00	2017-03-20 12:44:00	expected each year	
3 minutes	4.0 mm	2017-03-20 12:41:00	2017-03-20 12:44:00	expected each year	
5 minutes	6.0 mm	2017-03-20 12:41:00	2017-03-20 12:46:00	expected each year	
10 minutes	11.0 mm	2017-03-20 12:41:00	2017-03-20 12:50:00	expected each year	
15 minutes	14.0 mm	2017-03-20 12:35:00	2017-03-20 12:50:00	expected each year	
30 minutes	22.0 mm	2017-03-30 09:20:00	2017-03-30 09:50:00	expected each year	
1 hours	40.0 mm	2017-03-30 18:22:00	2017-03-30 19:22:00	20%	50%
2 hours	67.0 mm	2017-03-30 17:55:00	2017-03-30 19:55:00	5%	10%
3 hours	91.0 mm	2017-03-30 17:56:00	2017-03-30 20:56:00	2%	5%
6 hours	154.0 mm	2017-03-30 17:00:00	2017-03-30 23:00:00	< 1%	1%
12 hours	201.0 mm	2017-03-30 11:30:00	2017-03-30 23:29:00	< 1%	1%
24 hours	308.0 mm	2017-03-30 00:00:00	2017-03-31 00:00:00	< 1%	1%
2 days	308.0 mm	2017-03-29 00:00:00	2017-03-31 00:00:00	1%	2%
3 days	308.0 mm	2017-03-28 00:00:00	2017-03-31 00:00:00	2%	5%
4 days	308.0 mm	2017-03-27 00:00:00	2017-03-31 00:00:00	2%	5%
5 days	308.0 mm	2017-03-26 00:00:00	2017-03-31 00:00:00	2%	5%
6 days	308.0 mm	2017-03-25 00:00:00	2017-03-31 00:00:00	2%	5%
7 days	309.0 mm	2017-03-24 00:00:00	2017-03-31 00:00:00	2%	5%



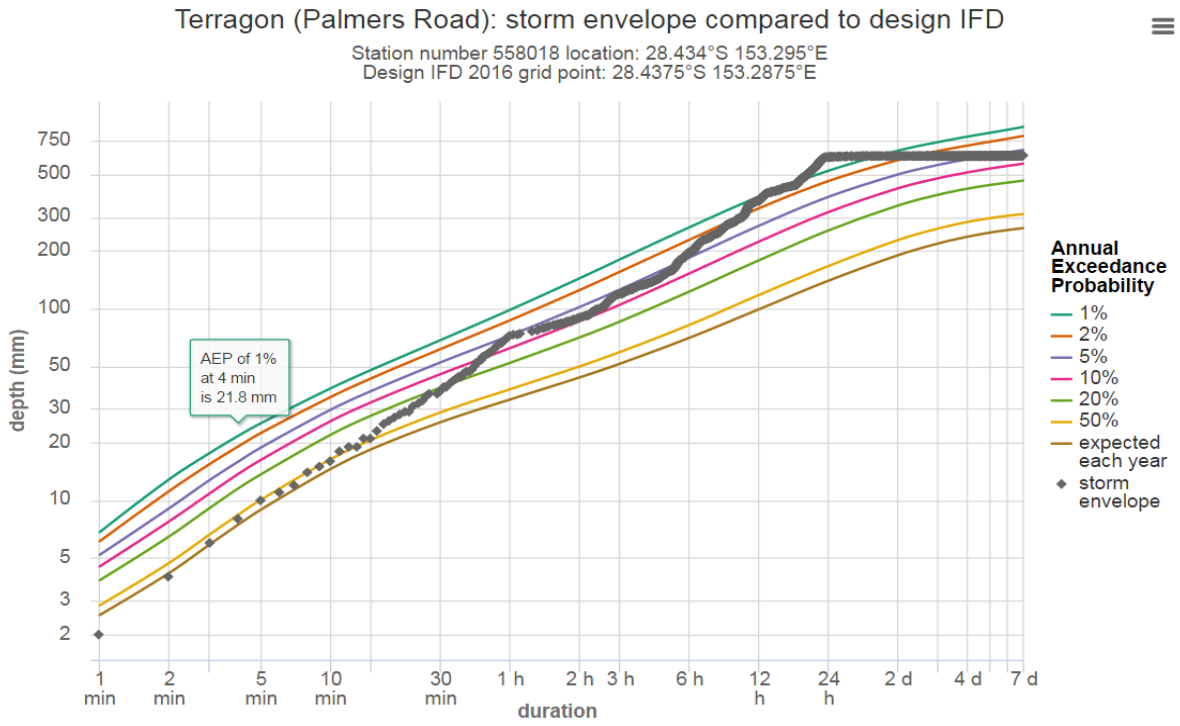
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.0 mm	2017-03-30 09:13:20	2017-03-30 09:14:20	expected each year	
2 minutes	4.0 mm	2017-03-30 10:04:20	2017-03-30 10:06:20	50%	expected each year
3 minutes	5.0 mm	2017-03-30 10:03:00	2017-03-30 10:06:00	expected each year	
5 minutes	7.0 mm	2017-03-30 09:11:00	2017-03-30 09:16:00	expected each year	
10 minutes	13.0 mm	2017-03-30 09:11:00	2017-03-30 09:20:20	expected each year	
15 minutes	19.0 mm	2017-03-30 11:20:00	2017-03-30 11:35:00	50%	expected each year
30 minutes	29.0 mm	2017-03-30 11:04:20	2017-03-30 11:34:00	20%	50%
1 hours	48.0 mm	2017-03-30 11:14:40	2017-03-30 12:14:40	10%	20%
2 hours	67.0 mm	2017-03-30 09:52:20	2017-03-30 11:51:20	10%	20%
3 hours	103.0 mm	2017-03-30 08:50:40	2017-03-30 11:50:40	2%	5%
6 hours	146.0 mm	2017-03-30 08:34:40	2017-03-30 14:34:00	1%	2%
12 hours	256.0 mm	2017-03-30 08:50:40	2017-03-30 20:50:40	< 1%	1%
24 hours	352.0 mm	2017-03-30 00:35:40	2017-03-30 23:28:00	< 1%	1%
2 days	355.0 mm	2017-03-29 16:30:00	2017-03-31 02:21:20	1%	2%
3 days	355.0 mm	2017-03-29 16:30:00	2017-03-31 02:21:20	2%	5%
4 days	356.0 mm	2017-03-27 08:02:20	2017-03-31 02:21:20	2%	5%
5 days	356.0 mm	2017-03-27 08:02:20	2017-03-31 02:21:20	2%	5%
6 days	356.0 mm	2017-03-27 08:02:20	2017-03-31 02:21:20	2%	5%
7 days	356.0 mm	2017-03-27 08:02:20	2017-03-31 02:21:20	2%	5%



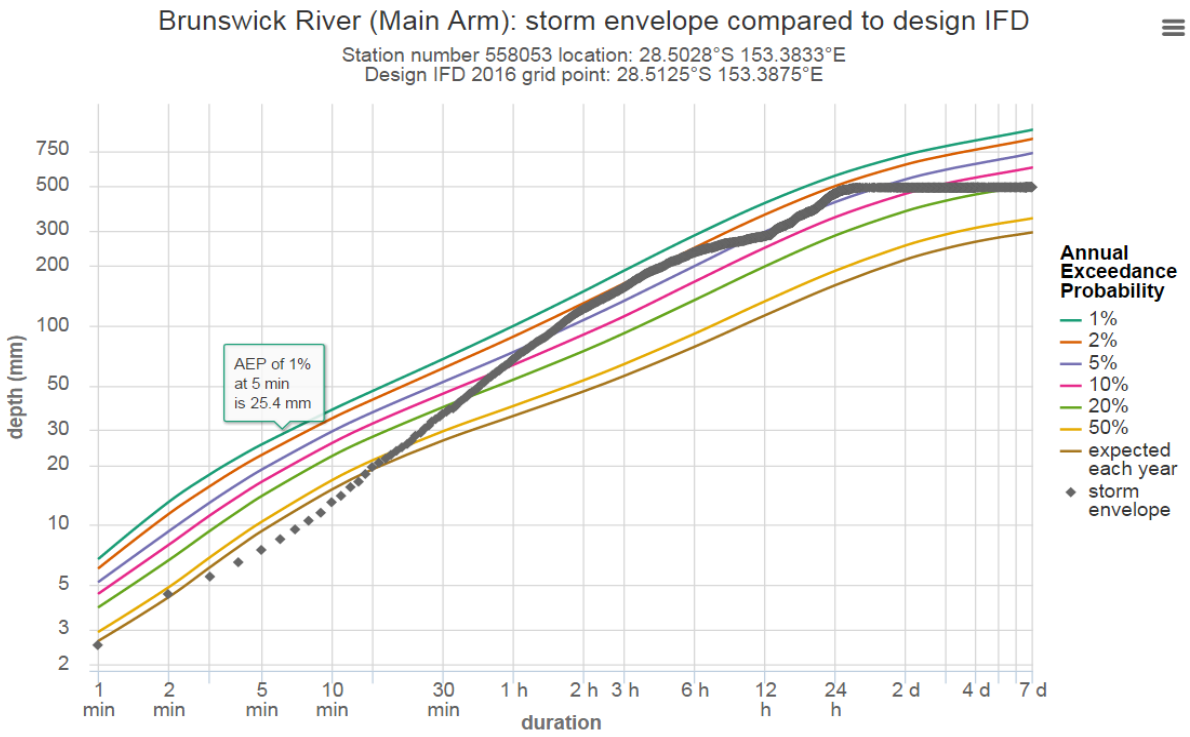
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	3.0 mm	2017-03-30 10:00:17	2017-03-30 10:01:14	20%	50%
2 minutes	4.0 mm	2017-03-30 11:56:09	2017-03-30 11:58:02	50%	expected each year
3 minutes	5.0 mm	2017-03-30 09:11:04	2017-03-30 09:13:46	expected each year	
5 minutes	8.0 mm	2017-03-30 09:08:49	2017-03-30 09:13:46	expected each year	
10 minutes	14.0 mm	2017-03-30 11:16:13	2017-03-30 11:25:40	50%	expected each year
15 minutes	19.0 mm	2017-03-30 11:14:36	2017-03-30 11:29:31	50%	expected each year
30 minutes	32.0 mm	2017-03-30 11:02:03	2017-03-30 11:31:57	20%	50%
1 hours	58.0 mm	2017-03-30 11:02:03	2017-03-30 12:02:00	5%	10%
2 hours	75.0 mm	2017-03-30 10:12:59	2017-03-30 12:12:42	5%	10%
3 hours	115.0 mm	2017-03-30 09:08:05	2017-03-30 12:07:50	1%	2%
6 hours	161.0 mm	2017-03-30 08:28:32	2017-03-30 14:28:03	< 1%	1%
12 hours	274.0 mm	2017-03-30 08:28:32	2017-03-30 20:26:47	< 1%	1%
24 hours	365.0 mm	2017-03-30 00:46:11	2017-03-31 00:46:11	< 1%	1%
2 days	378.0 mm	2017-03-29 03:46:12	2017-03-31 03:46:11	< 1%	1%
3 days	378.0 mm	2017-03-28 03:46:12	2017-03-31 03:46:11	2%	5%
4 days	379.0 mm	2017-03-27 03:46:13	2017-03-31 03:46:11	2%	5%
5 days	379.0 mm	2017-03-26 03:46:13	2017-03-31 03:46:11	2%	5%
6 days	379.0 mm	2017-03-25 06:46:14	2017-03-31 06:46:11	2%	5%
7 days	379.0 mm	2017-03-24 06:46:15	2017-03-31 06:46:11	2%	5%



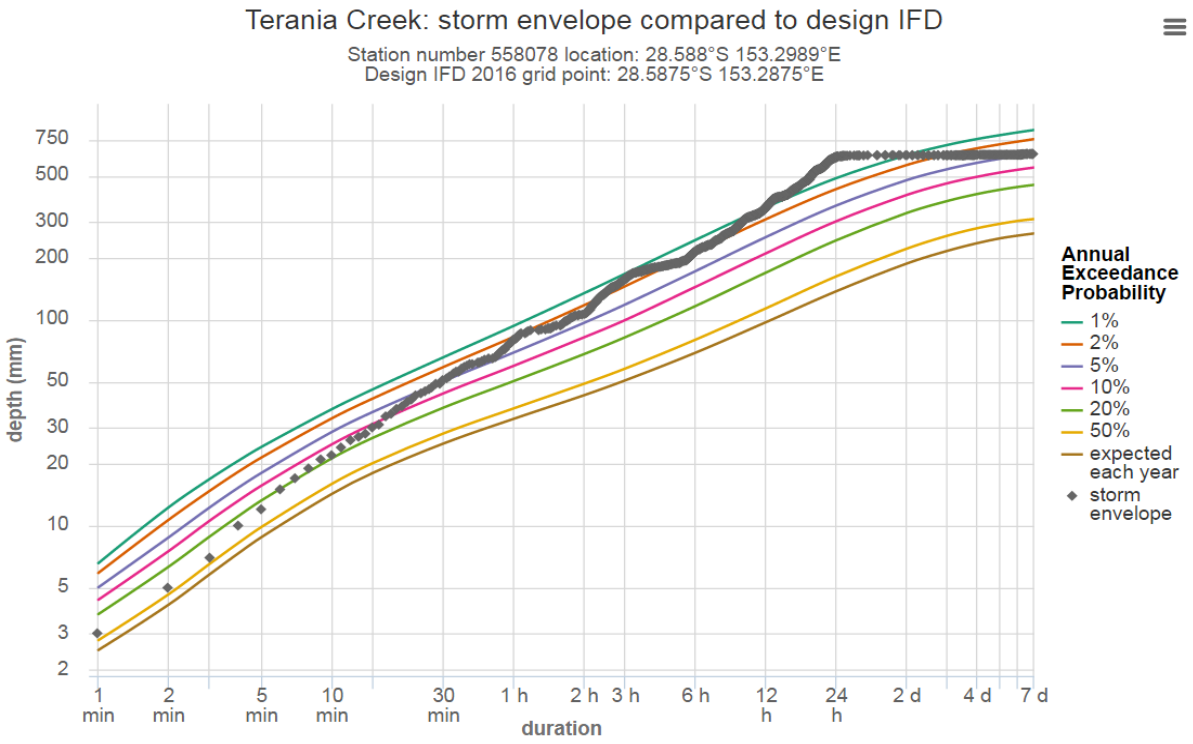
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	3.0 mm	2017-03-30 12:03:45	2017-03-30 12:04:30	20%	50%
2 minutes	5.0 mm	2017-03-30 12:03:45	2017-03-30 12:05:35	20%	50%
3 minutes	7.0 mm	2017-03-30 12:36:50	2017-03-30 12:39:43	20%	50%
5 minutes	11.0 mm	2017-03-30 12:37:58	2017-03-30 12:42:48	20%	50%
10 minutes	21.0 mm	017-03-30 12:34:58	2017-03-30 12:44:40	20%	50%
15 minutes	29.0 mm	2017-03-30 12:29:41	2017-03-30 12:44:40	10%	20%
30 minutes	45.0 mm	2017-03-30 12:13:44	2017-03-30 12:43:33	10%	20%
1 hours	86.0 mm	2017-03-30 11:48:15	2017-03-30 12:47:39	2%	5%
2 hours	149.0 mm	2017-03-30 21:49:59	2017-03-30 23:49:45	< 1%	1%
3 hours	216.0 mm	2017-03-30 21:41:31	2017-03-31 00:41:23	< 1%	1%
6 hours	306.0 mm	2017-03-30 19:13:08	2017-03-31 01:10:08	< 1%	1%
12 hours	409.0 mm	2017-03-30 12:06:20	2017-03-31 00:06:01	< 1%	1%
24 hours	742.0 mm	2017-03-30 01:52:29	2017-03-31 01:13:17	< 1%	1%
48 hours	779.0 mm	2017-03-29 06:45:20	2017-03-31 06:45:10	< 1%	1%
72 hours	779.0 mm	2017-03-28 06:45:21	2017-03-31 06:45:10	1%	2%



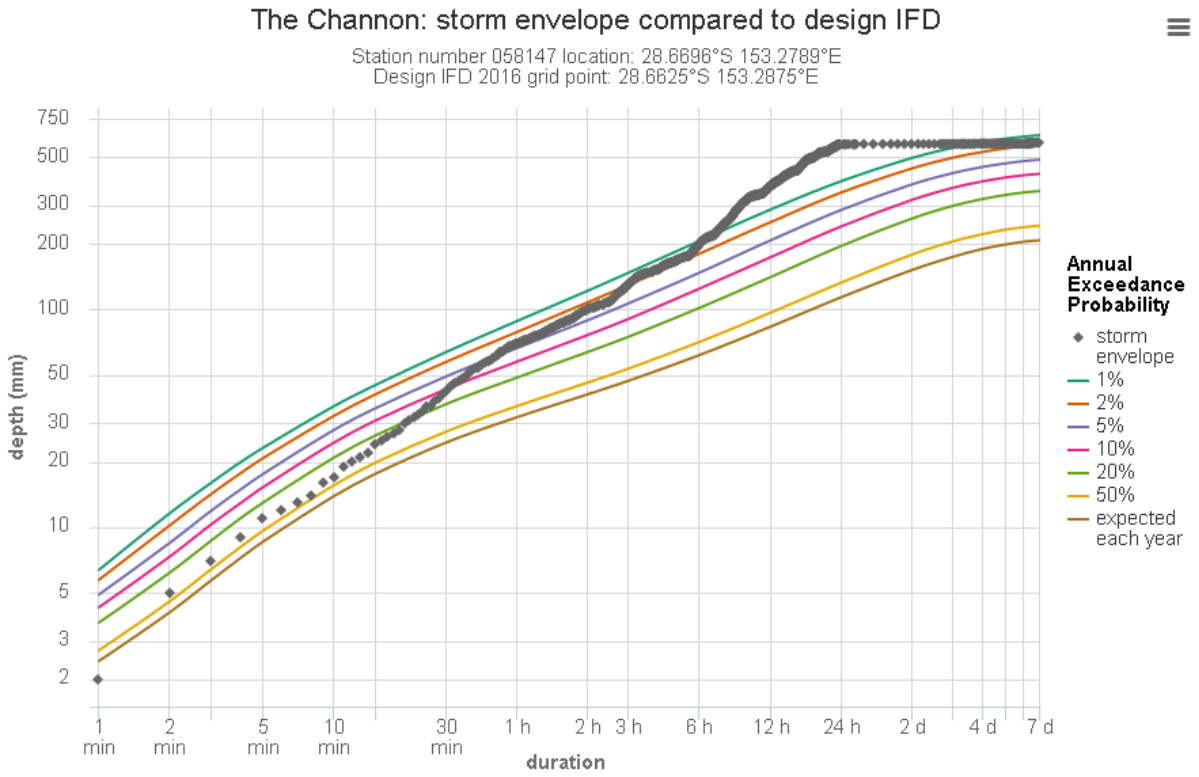
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.0 mm	2017-03-30 02:37:49	2017-03-30 02:38:19	expected each year	
2 minutes	4.0 mm	2017-03-30 06:48:22	2017-03-30 06:50:22	expected each year	
3 minutes	6.0 mm	2017-03-30 12:56:28	2017-03-30 12:59:25	50%	expected each year
5 minutes	10.0 mm	2017-03-30 12:56:28	2017-03-30 13:01:11	50%	expected each year
10 minutes	16.0 mm	2017-03-30 12:51:32	2017-03-30 13:01:11	50%	expected each year
15 minutes	21.0 mm	2017-03-30 12:47:28	2017-03-30 13:01:40	20%	50%
30 minutes	37.0 mm	2017-03-30 02:12:56	2017-03-30 02:42:52	20%	50%
1 hours	72.0 mm	2017-03-30 12:10:10	2017-03-30 13:10:10	5%	10%
2 hours	89.0 mm	2017-03-30 11:36:24	2017-03-30 13:35:01	5%	10%
3 hours	119.0 mm	2017-03-30 12:08:17	2017-03-30 15:06:04	5%	10%
6 hours	196.0 mm	2017-03-30 02:12:56	2017-03-30 08:11:51	2%	5%
12 hours	364.0 mm	2017-03-30 02:12:56	2017-03-30 14:04:56	1%	2%
24 hours	616.0 mm	2017-03-30 02:12:56	2017-03-31 02:05:15	< 1%	1%
48 hours	625.0 mm	2017-03-29 07:18:56	2017-03-31 07:18:55	1%	2%
72 hours	625.0 mm	2017-03-28 07:18:56	2017-03-31 07:18:55	2%	5%



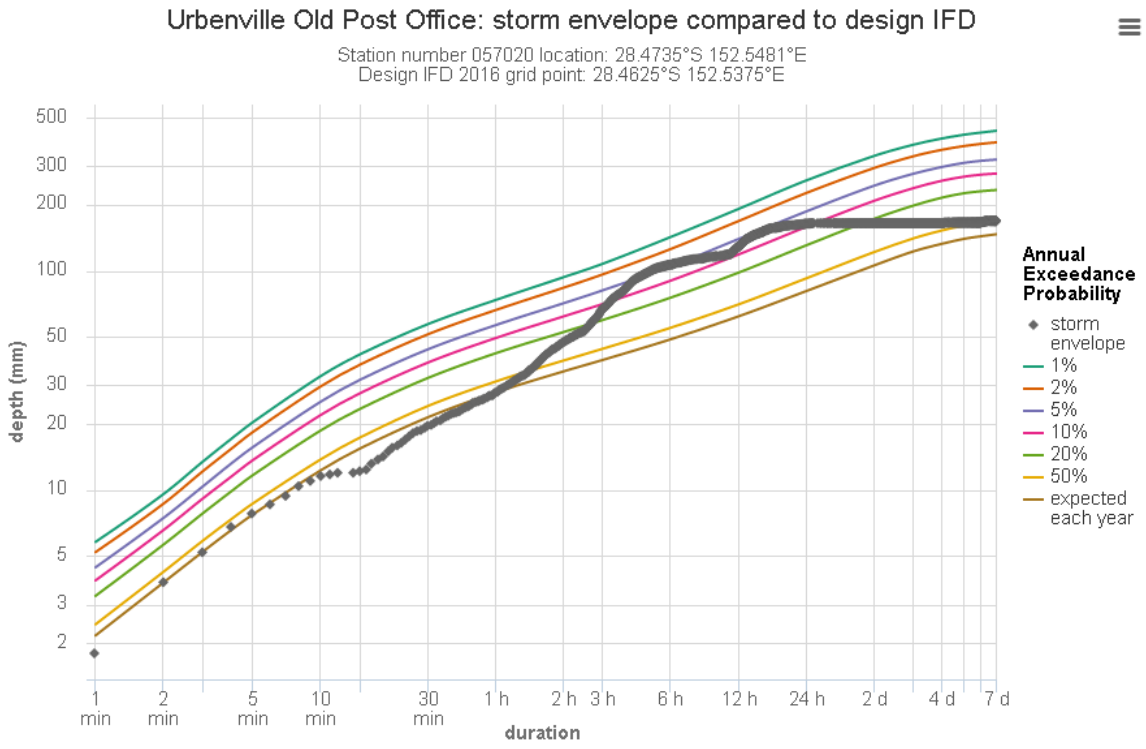
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.5 mm	2017-03-19 03:09:57	2017-03-19 03:10:52	expected each year	
2 minutes	4.5 mm	2017-03-19 03:09:35	2017-03-19 03:11:33	50%	expected each year
3 minutes	5.5 mm	2017-03-19 03:09:02	2017-03-19 03:11:49	expected each year	
5 minutes	7.5 mm	2017-03-19 13:41:05	2017-03-19 13:46:05	expected each year	
10 minutes	13.0 mm	2017-03-31 00:15:49	2017-03-31 00:25:44	expected each year	
15 minutes	19.5 mm	2017-03-31 00:11:40	2017-03-31 00:26:30	50%	expected each year
30 minutes	36.0 mm	2017-03-30 23:57:24	2017-03-31 00:27:21	20%	50%
1 hours	68.0 mm	2017-03-31 00:00:08	2017-03-31 01:00:03	5%	10%
2 hours	121.0 mm	2017-03-30 23:12:11	2017-03-31 01:11:44	2%	5%
3 hours	156.0 mm	2017-03-30 22:26:01	2017-03-31 01:25:59	2%	5%
6 hours	234.0 mm	2017-03-30 19:56:30	2017-03-31 01:56:29	2%	5%
12 hours	281.5 mm	2017-03-30 15:35:33	2017-03-31 03:34:46	5%	10%
24 hours	460.5 mm	2017-03-30 02:20:57	2017-03-31 02:19:57	2%	5%
48 hours	493.5 mm	2017-03-29 16:45:00	2017-03-31 16:45:00	5%	10%
72 hours	493.5 mm	2017-03-28 16:55:00	2017-03-31 16:45:00	10%	20%



Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	3.0 mm	2017-03-30 20:33:41	2017-03-30 20:34:40	20%	50%
2 minutes	5.0 mm	2017-03-30 15:17:30	2017-03-30 15:19:29	20%	50%
3 minutes	7.0 mm	2017-03-30 15:16:30	2017-03-30 15:19:29	20%	50%
5 minutes	12.0 mm	2017-03-30 15:16:30	2017-03-30 15:21:30	20%	50%
10 minutes	22.0 mm	2017-03-30 15:13:56	2017-03-30 15:23:49	10%	20%
15 minutes	30.0 mm	2017-03-30 15:12:04	2017-03-30 15:26:58	10%	20%
30 minutes	51.0 mm	2017-03-30 14:54:46	2017-03-30 15:24:44	2%	5%
1 hours	80.0 mm	2017-03-30 14:27:04	2017-03-30 15:26:58	2%	5%
2 hours	106.0 mm	2017-03-30 13:34:24	2017-03-30 15:31:54	2%	5%
3 hours	158.0 mm	2017-03-30 12:31:57	2017-03-30 15:31:54	1%	2%
6 hours	214.0 mm	2017-03-30 09:37:08	2017-03-30 15:34:26	1%	2%
12 hours	351.0 mm	2017-03-30 12:23:51	2017-03-31 00:23:06	1%	2%
24 hours	619.0 mm	2017-03-30 02:33:40	2017-03-31 02:33:37	< 1%	1%
48 hours	631.0 mm	2017-03-29 08:33:44	2017-03-31 08:33:36	1%	2%
72 hours	631.0 mm	2017-03-28 08:33:48	2017-03-31 08:33:36	2%	5%



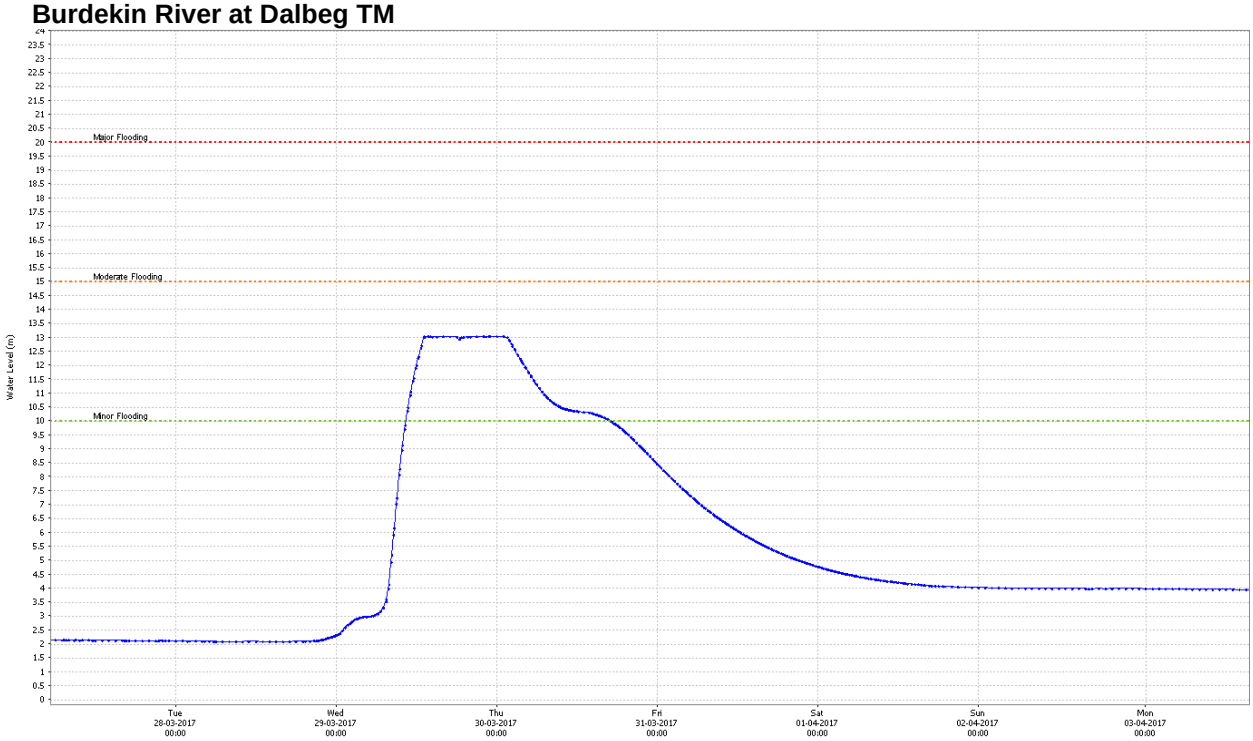
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	2.0 mm	2017-03-30 14:30:02	2017-03-30 14:30:55	expected each year	
2 minutes	5.0 mm	2017-03-30 14:30:02	2017-03-30 14:32:00	20%	50%
3 minutes	7.0 mm	2017-03-30 14:30:02	2017-03-30 14:32:50	20%	50%
5 minutes	11.0 mm	2017-03-30 14:30:02	2017-03-30 14:34:41	20%	50%
10 minutes	17.0 mm	2017-03-30 20:49:39	2017-03-30 20:59:27	20%	50%
15 minutes	24.0 mm	2017-03-30 20:47:23	2017-03-30 21:02:21	20%	50%
30 minutes	42.0 mm	2017-03-30 20:46:49	2017-03-30 21:16:27	10%	20%
1 hours	70.0 mm	2017-03-30 20:36:13	2017-03-30 21:35:50	2%	5%
2 hours	100.0 mm	2017-03-30 20:00:47	2017-03-30 22:00:05	2%	5%
3 hours	131.0 mm	2017-03-30 12:33:36	2017-03-30 15:32:51	1%	2%
6 hours	200.0 mm	2017-03-30 12:34:48	2017-03-30 18:33:59	1%	2%
12 hours	367.0 mm	2017-03-30 09:47:01	2017-03-30 21:46:27	< 1%	1%
24 hours	573.0 mm	2017-03-30 02:41:10	2017-03-31 02:19:10	< 1%	1%
48 hours	576.0 mm	2017-03-29 06:14:19	2017-03-31 06:14:07	< 1%	1%
72 hours	576.0 mm	2017-03-28 06:14:23	2017-03-31 06:14:07	< 1%	1%



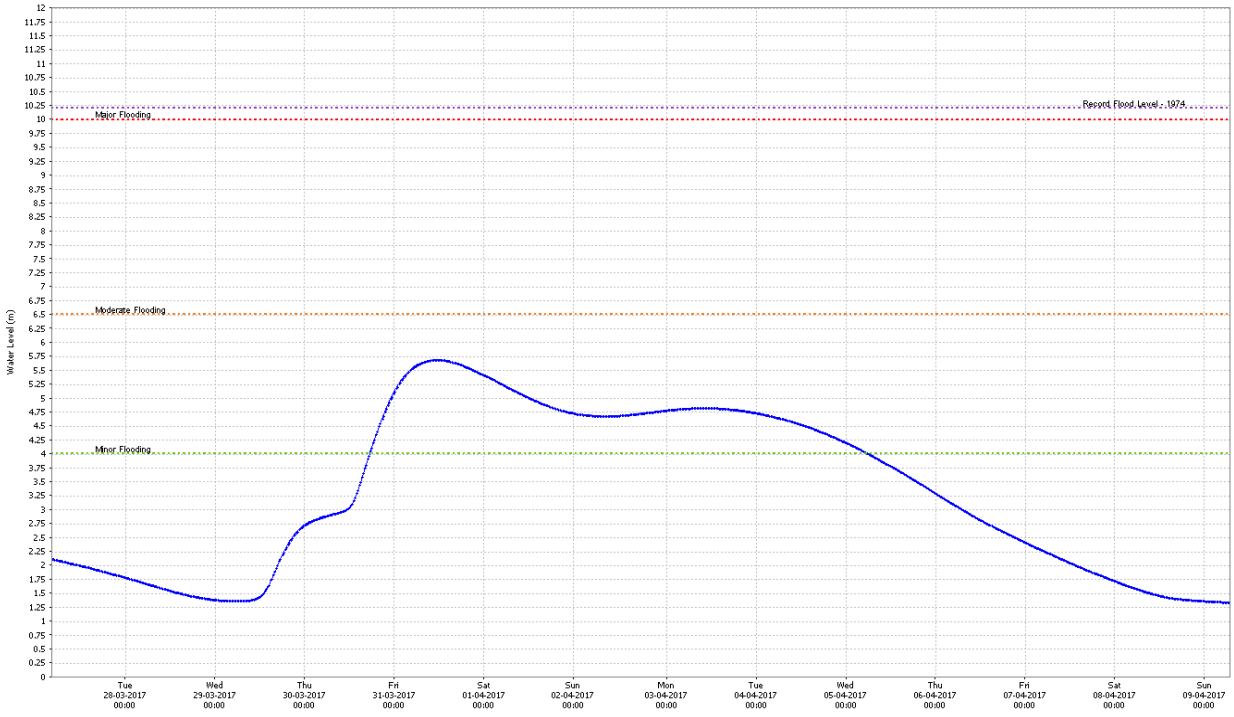
Period	Peak depth	From...	...to	Upper AEP bound	Lower AEP bound
1 minutes	1.8 mm	2017-03-19 01:38:34	2017-03-19 01:39:33	expected each year	
2 minutes	3.8 mm	2017-03-19 01:39:00	2017-03-19 01:40:55	50%	expected each year
3 minutes	5.2 mm	2017-03-19 01:37:55	2017-03-19 01:40:55	expected each year	
5 minutes	7.8 mm	2017-03-19 01:37:19	2017-03-19 01:42:16	50%	expected each year
10 minutes	11.6 mm	2017-03-19 01:34:10	2017-03-19 01:44:07	expected each year	
15 minutes	12.2 mm	2017-03-19 01:30:55	2017-03-19 01:45:48	expected each year	
30 minutes	19.6 mm	2017-03-30 15:41:18	2017-03-30 16:11:15	expected each year	
1 hours	27.8 mm	2017-03-30 18:00:54	2017-03-30 19:00:41	expected each year	
2 hours	47.2 mm	2017-03-30 17:47:44	2017-03-30 19:47:37	20%	50%
3 hours	67.2 mm	2017-03-30 15:41:18	2017-03-30 18:41:06	10%	20%
6 hours	106.8 mm	2017-03-30 15:07:41	2017-03-30 21:07:06	2%	5%
12 hours	129.0 mm	2017-03-30 08:48:20	2017-03-30 20:47:54	5%	10%
24 hours	164.2 mm	2017-03-30 03:18:12	2017-03-31 03:15:06	5%	10%
48 hours	165.2 mm	2017-03-29 17:30:45	2017-03-31 17:30:36	20%	50%
72 hours	165.2 mm	2017-03-29 17:30:45	2017-04-01 17:30:44	20%	50%

4.2 Hydrograph plots

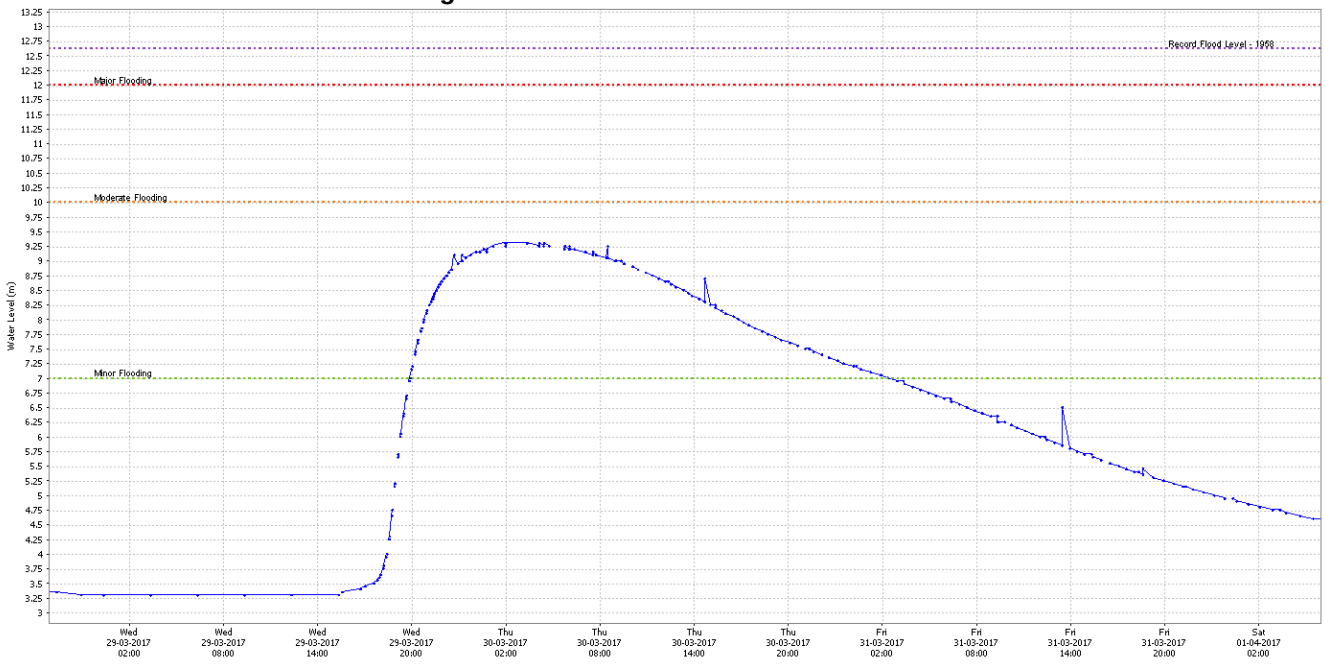
Burdekin River at Dalbeg TM



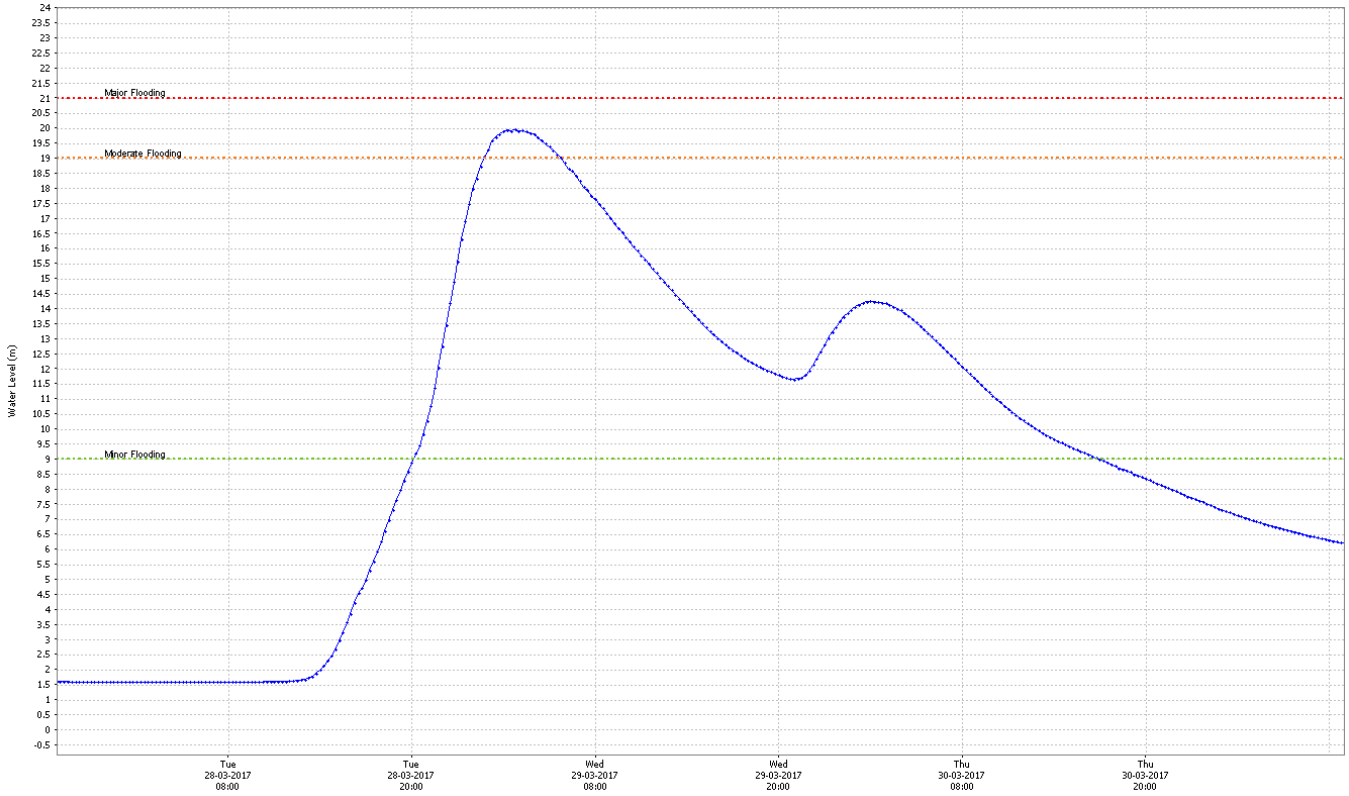
Belyando River at St Anns TM



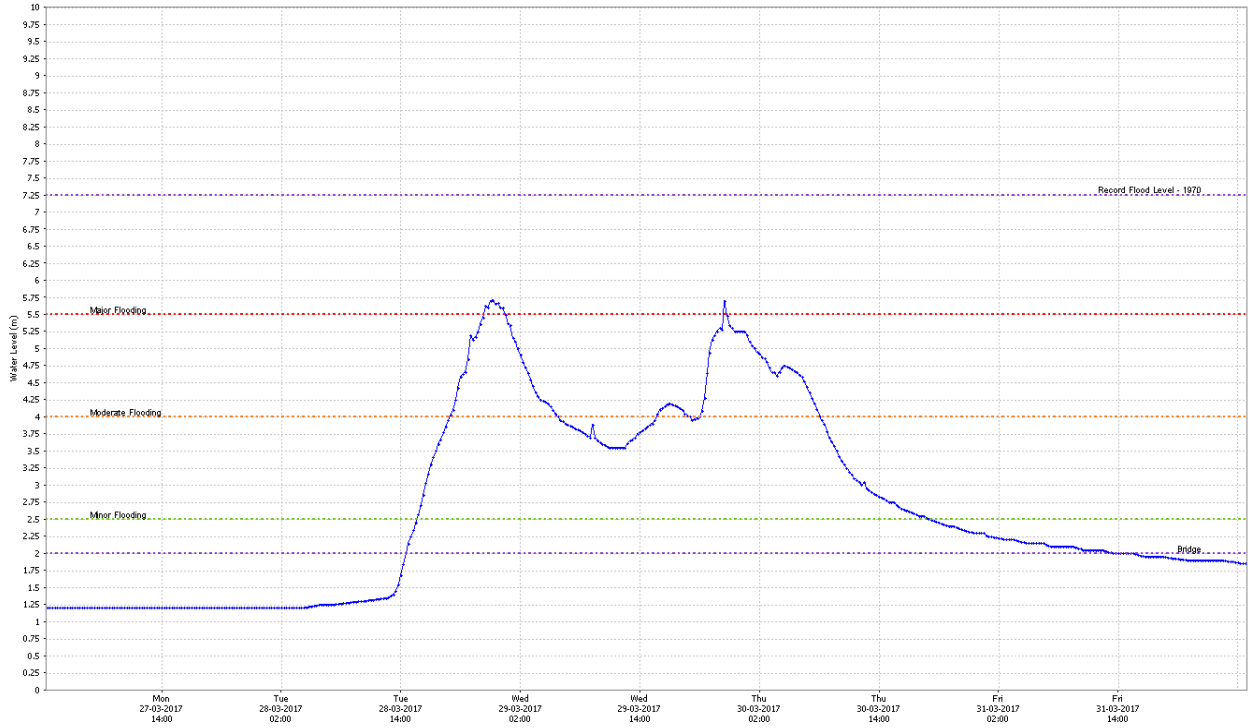
Burdekin River at Inkerman Bridge ALERT



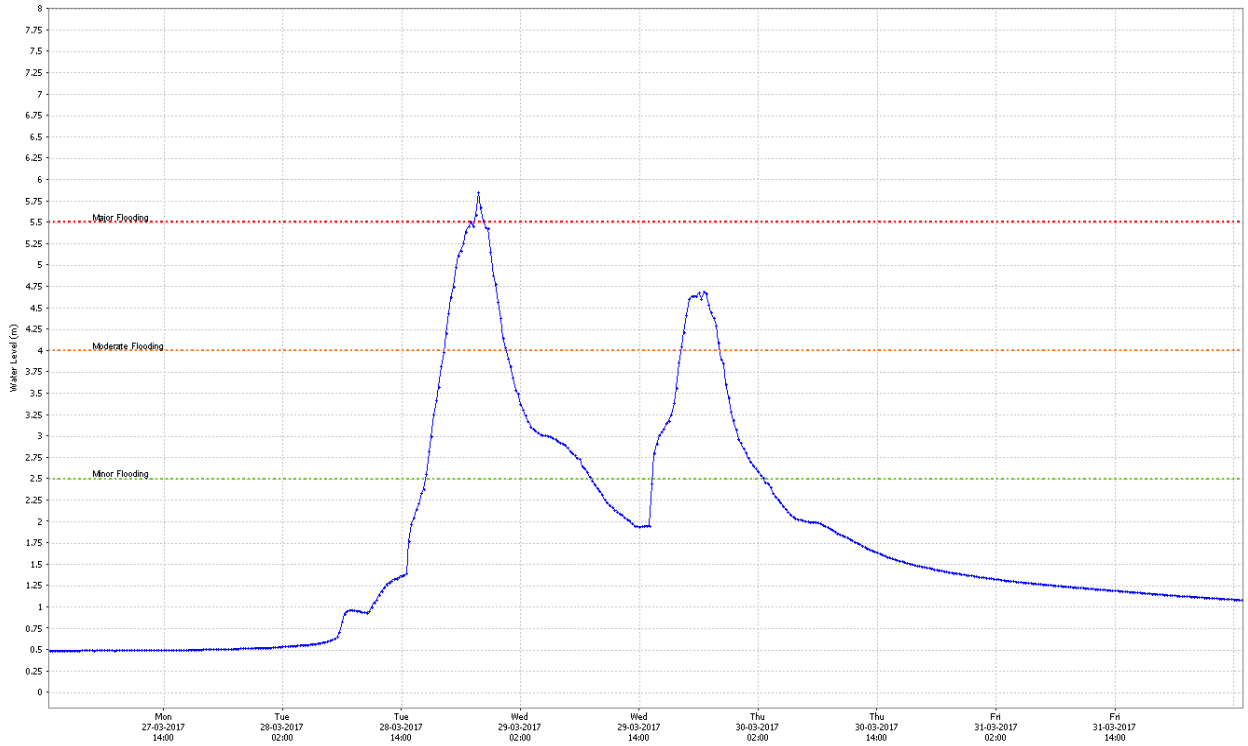
Bowen River at Jacks Creek TM



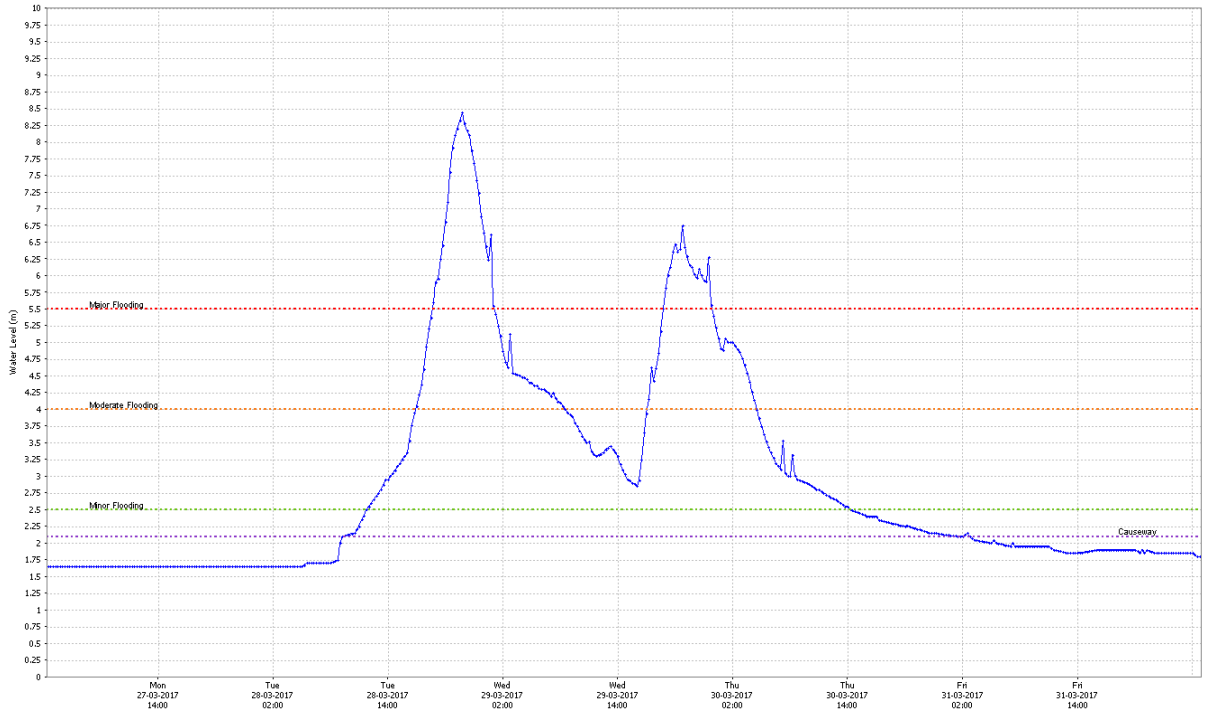
Don River at Bowen Pump Station



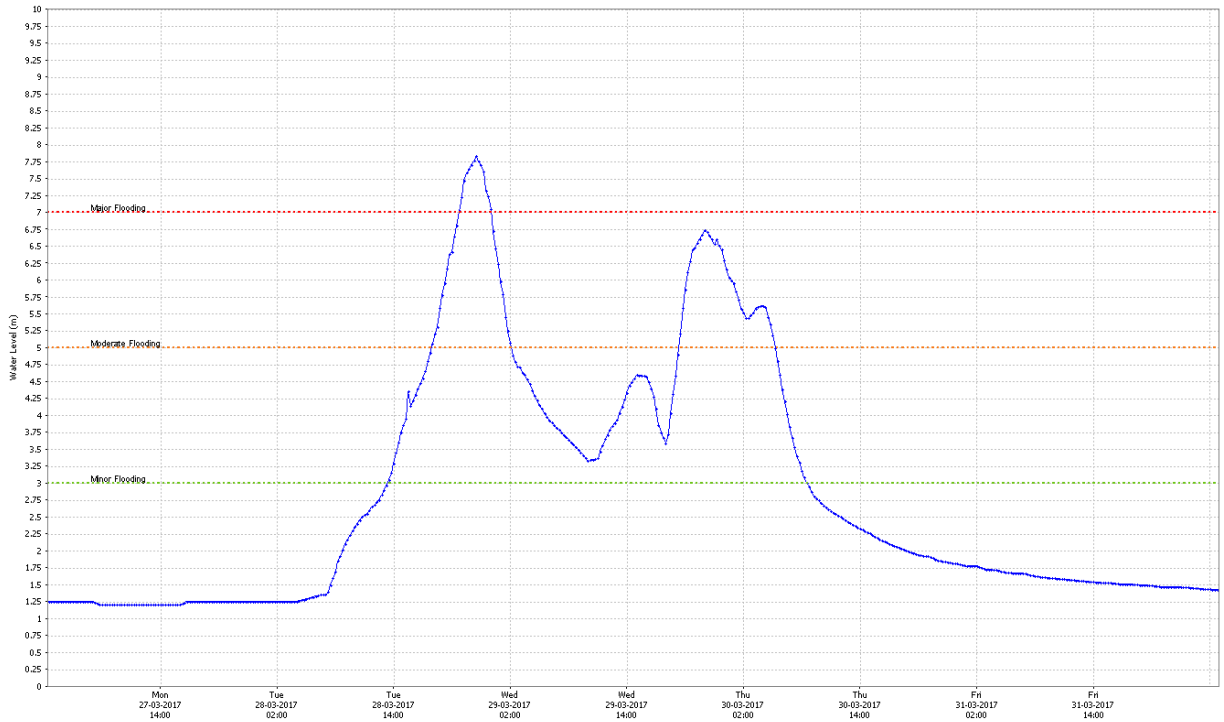
Don River at Ida Creek TM



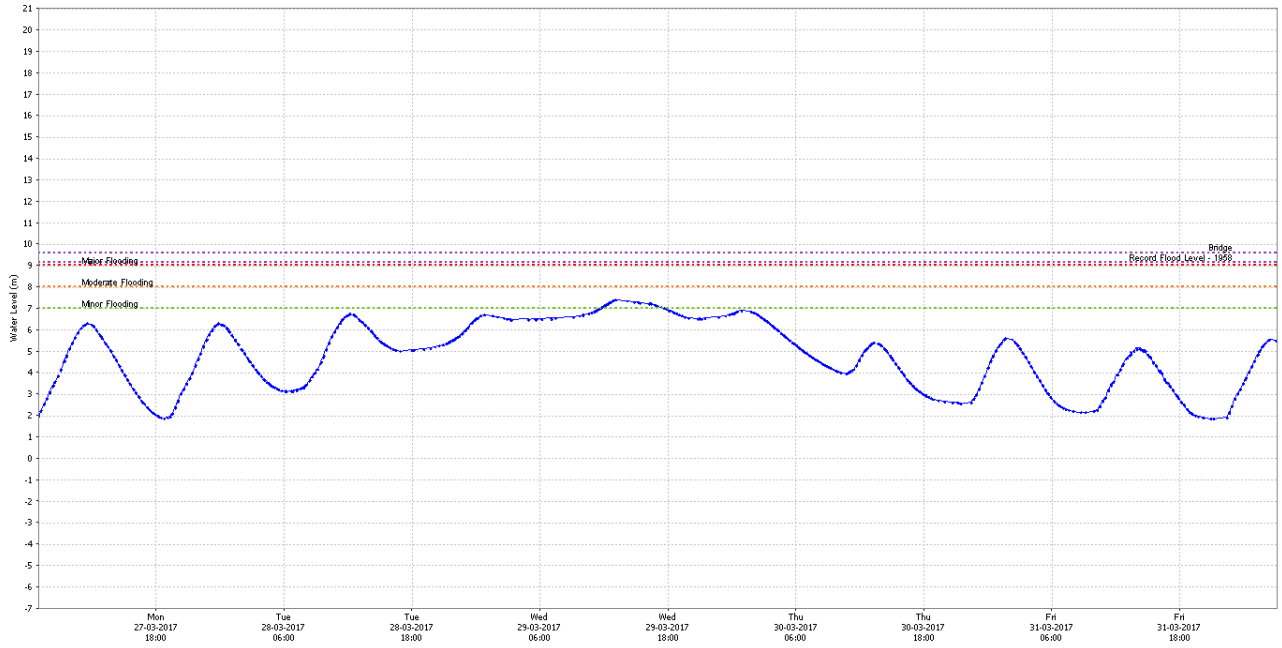
Don River at Mt Dangar ALERT



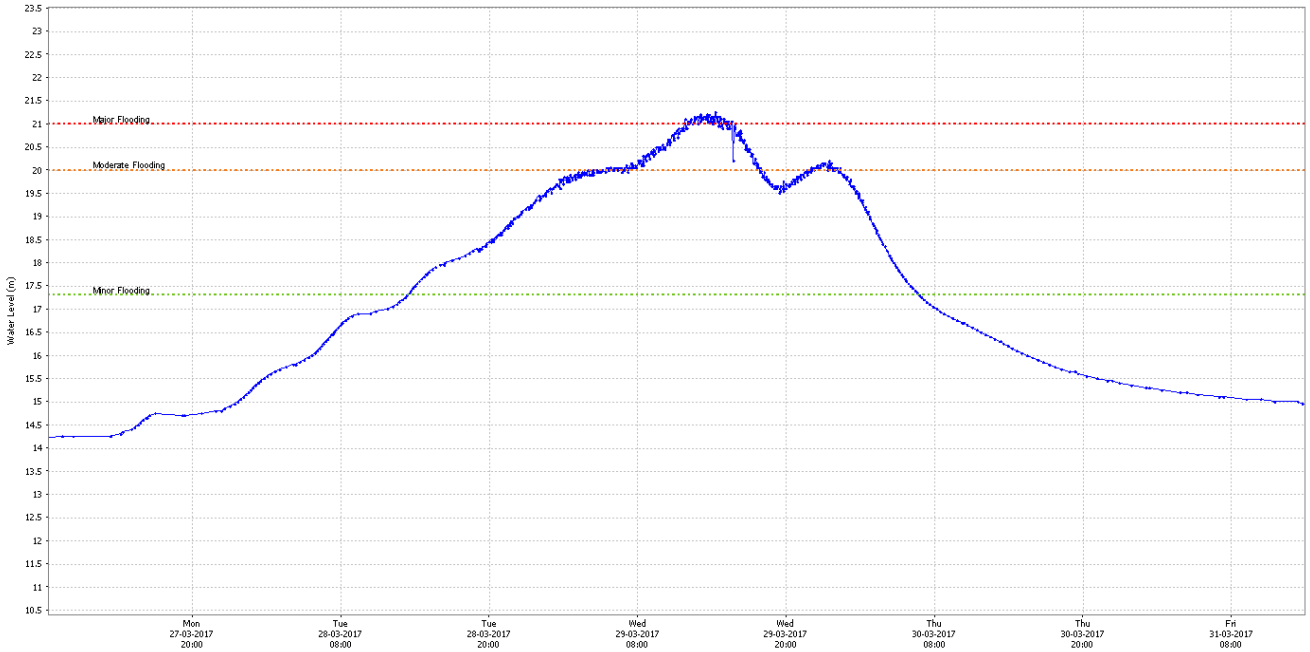
Don River at Reeves TM



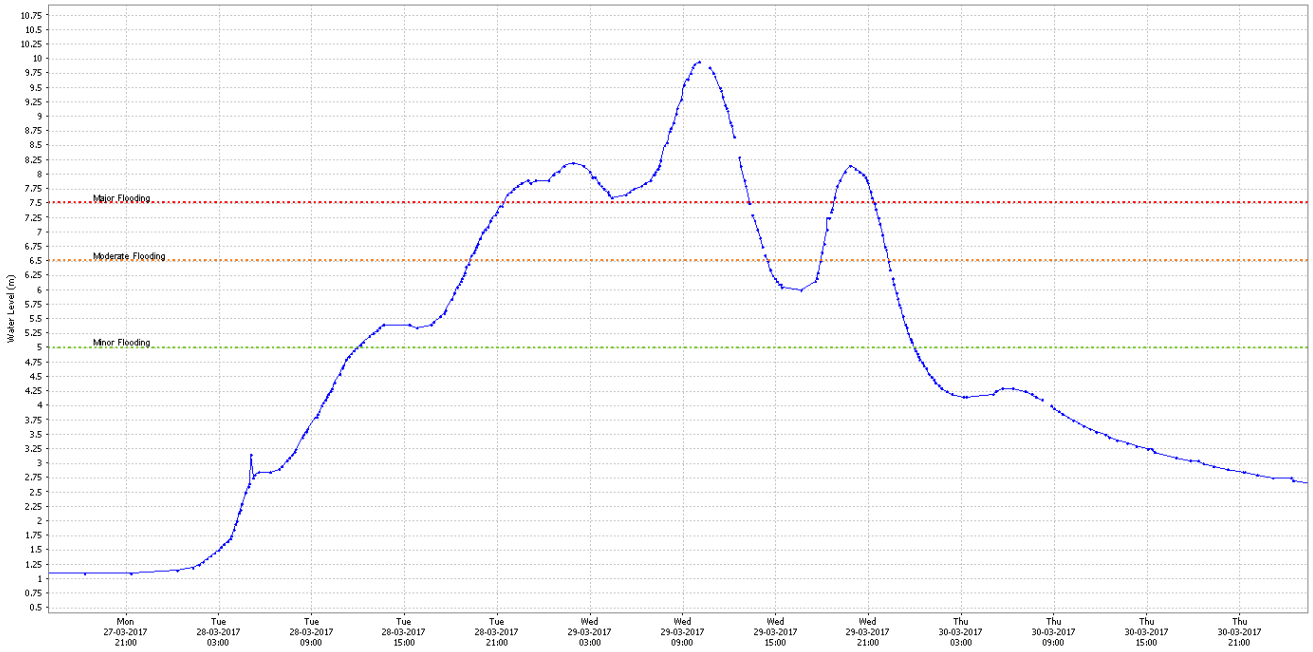
Pioneer River at Mackay ALERT



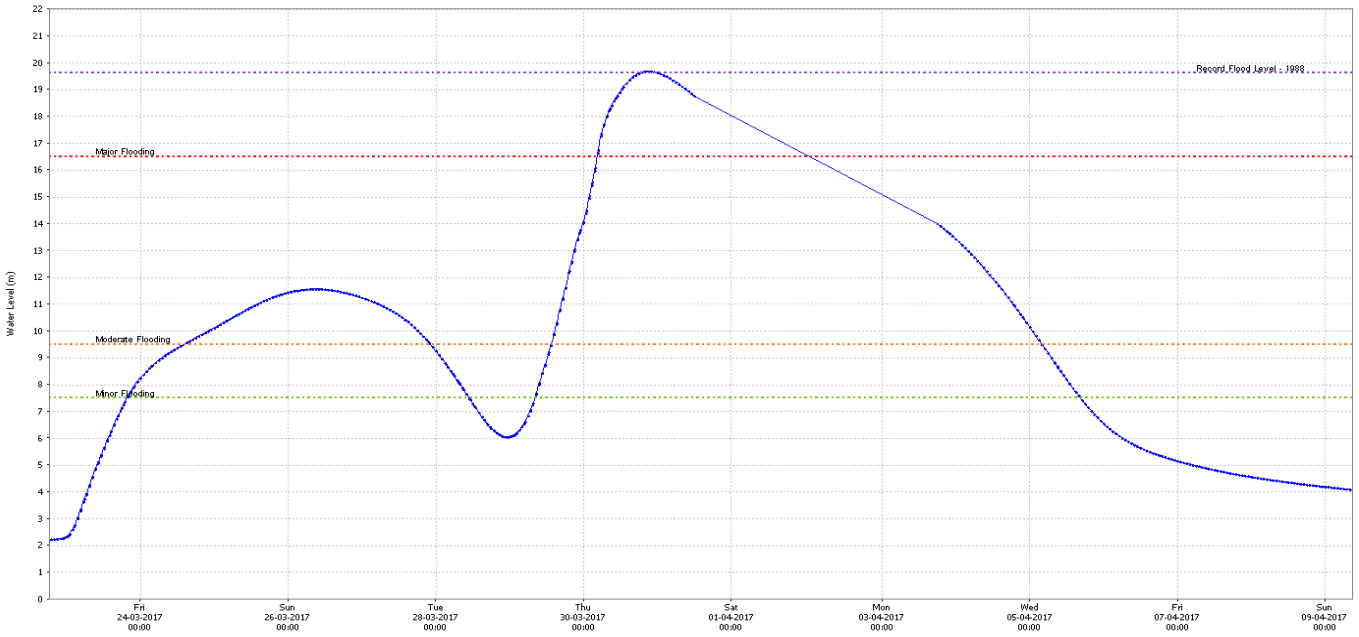
Pioneer River at Dumbleton Rocks ALERT



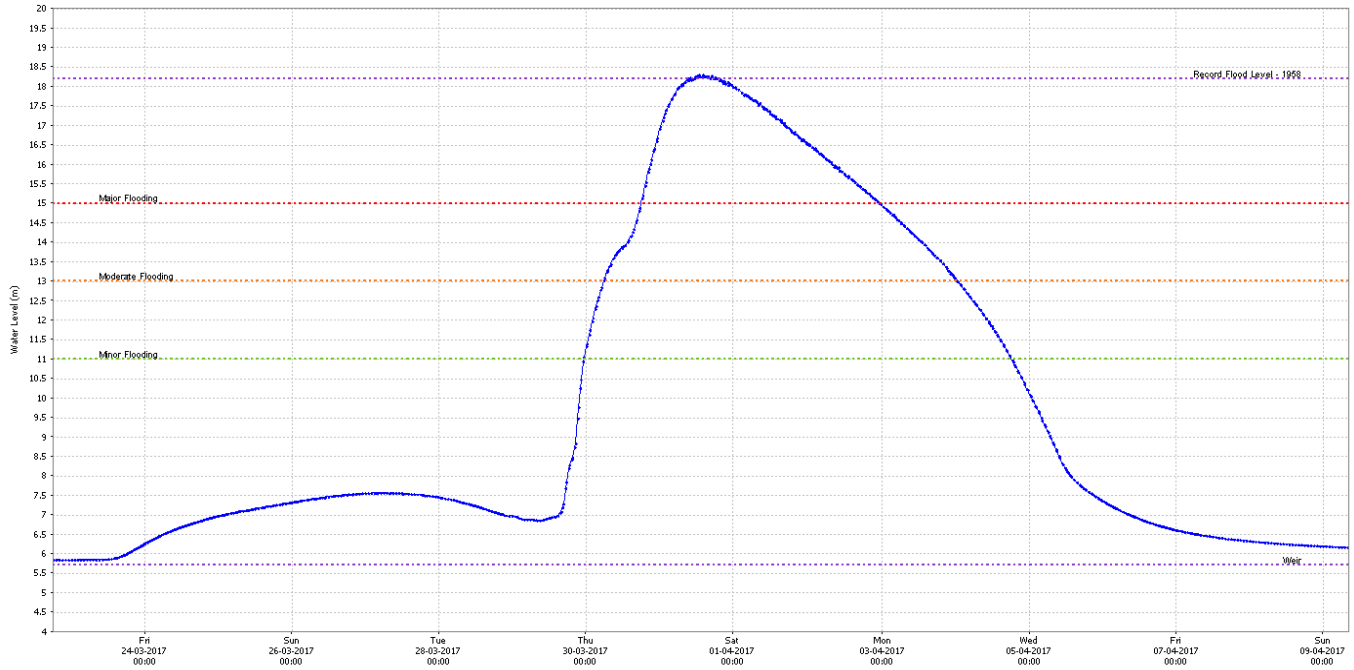
Pioneer River at Whiteford's ALERT



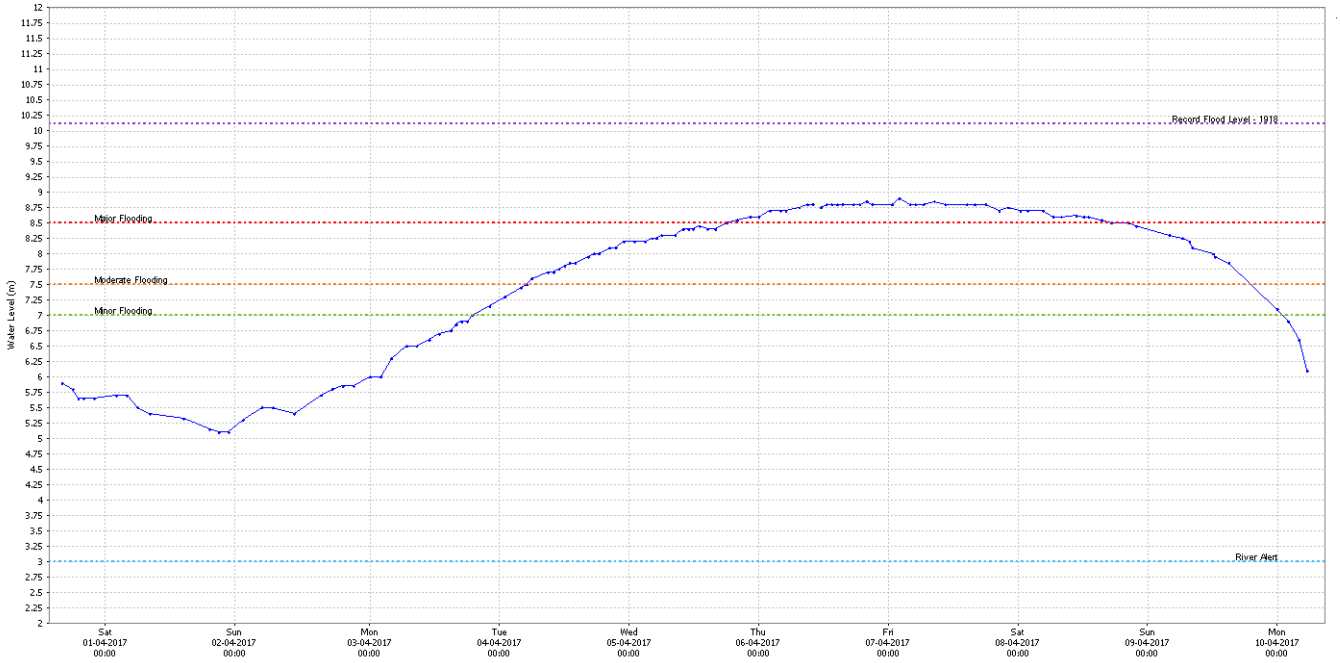
Isaac River at Yatton



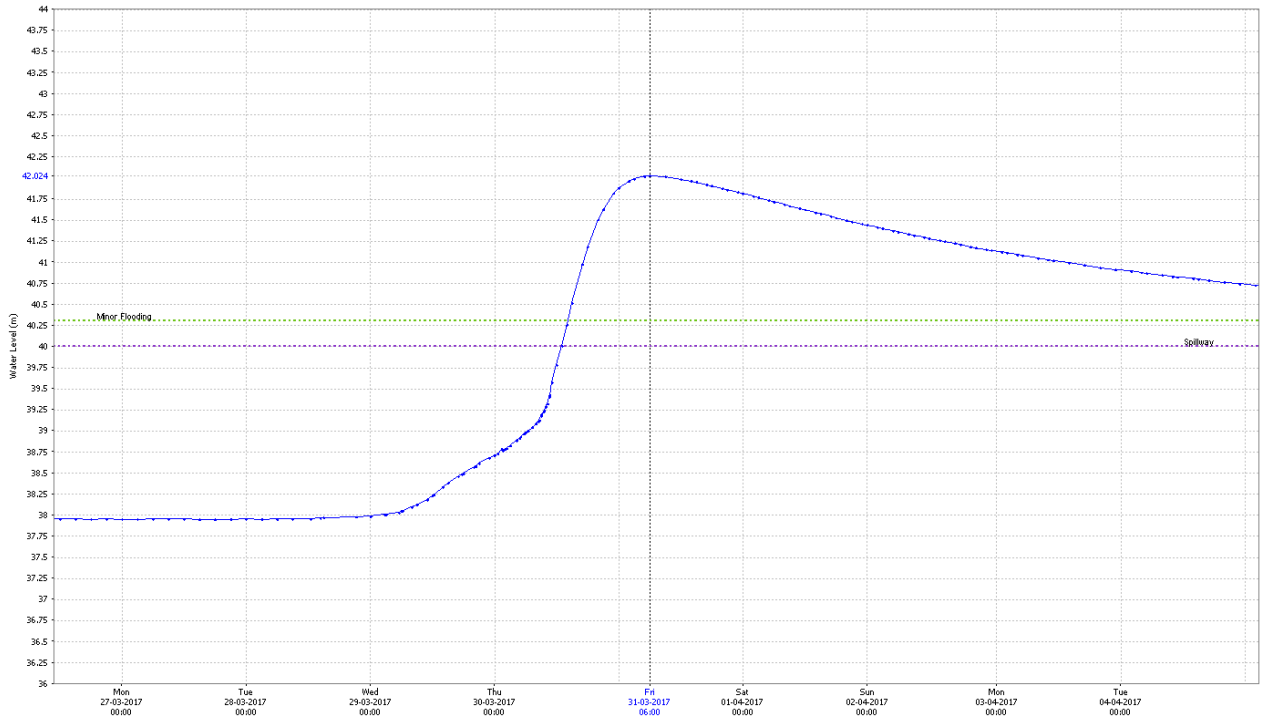
Mackenzie River at Tartrus



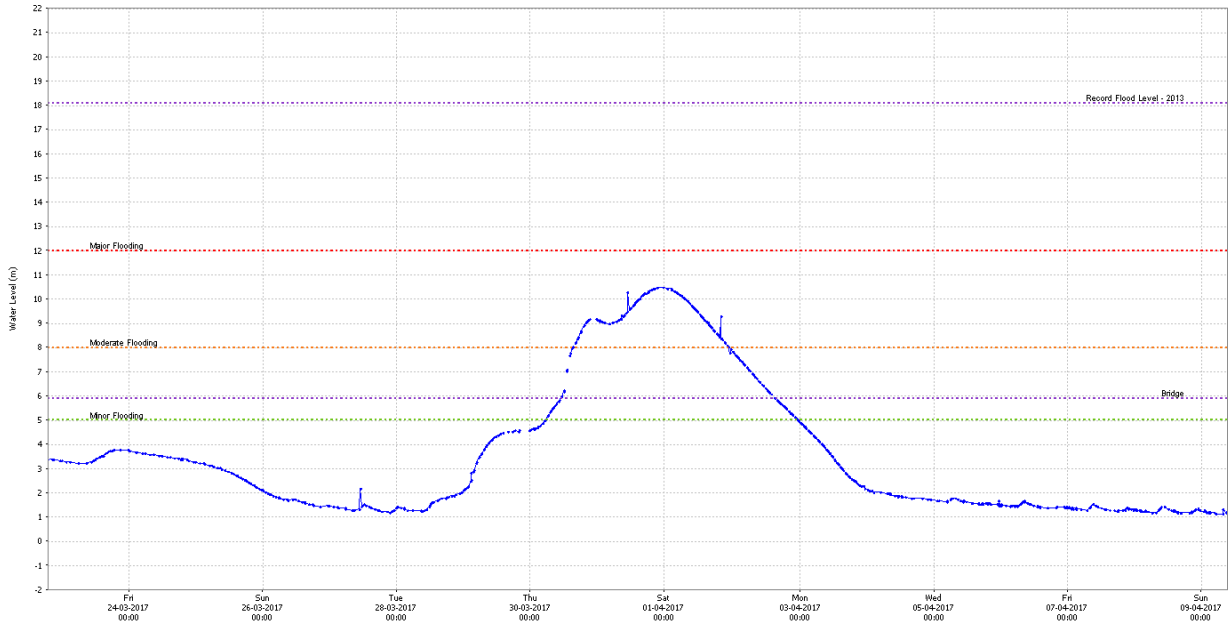
Fitzroy River at Rockhampton



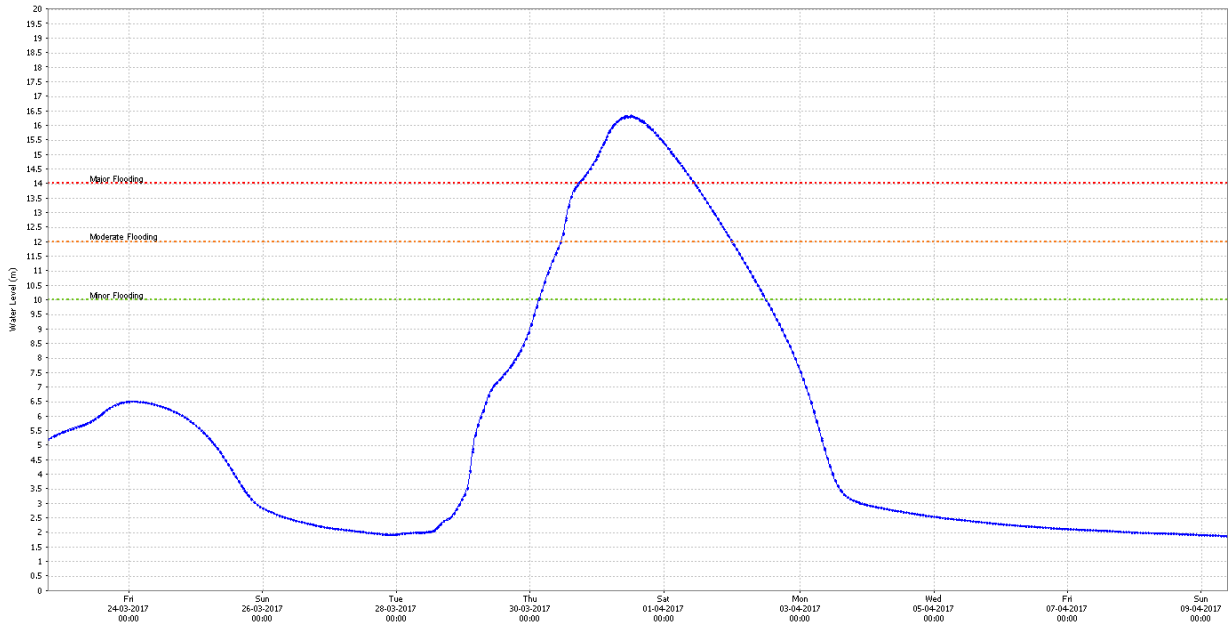
Boyne River, Awoonga Dam



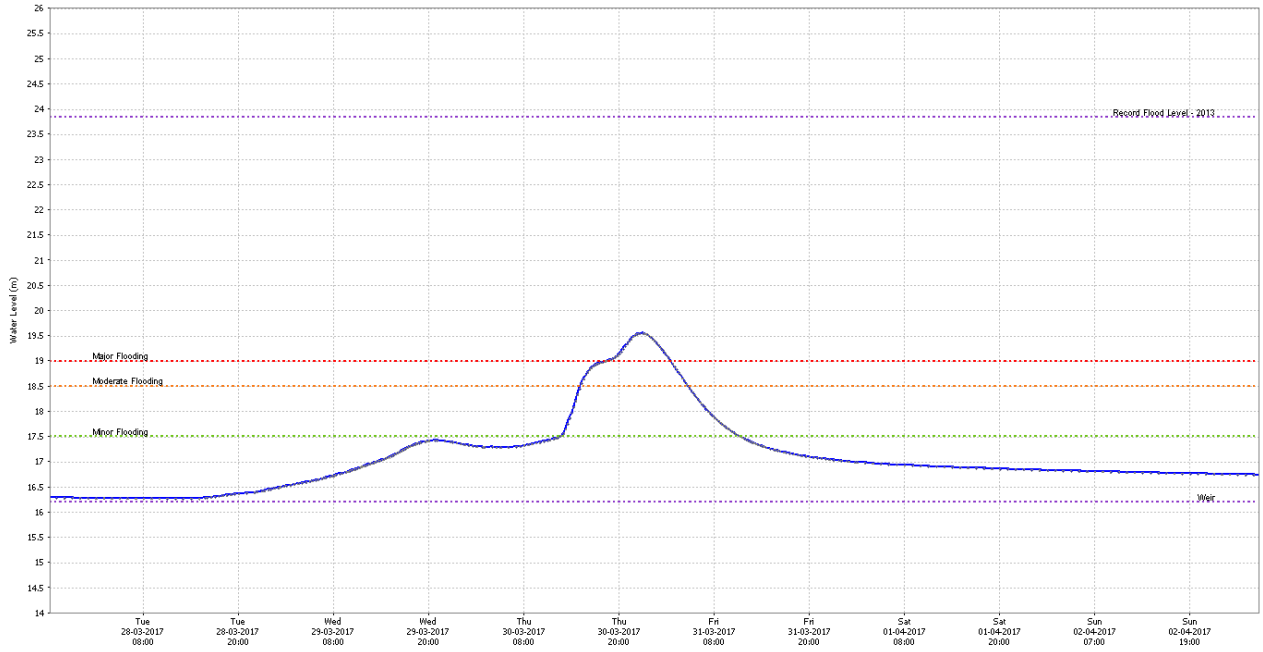
Baffle Creek at Essendean Bridge



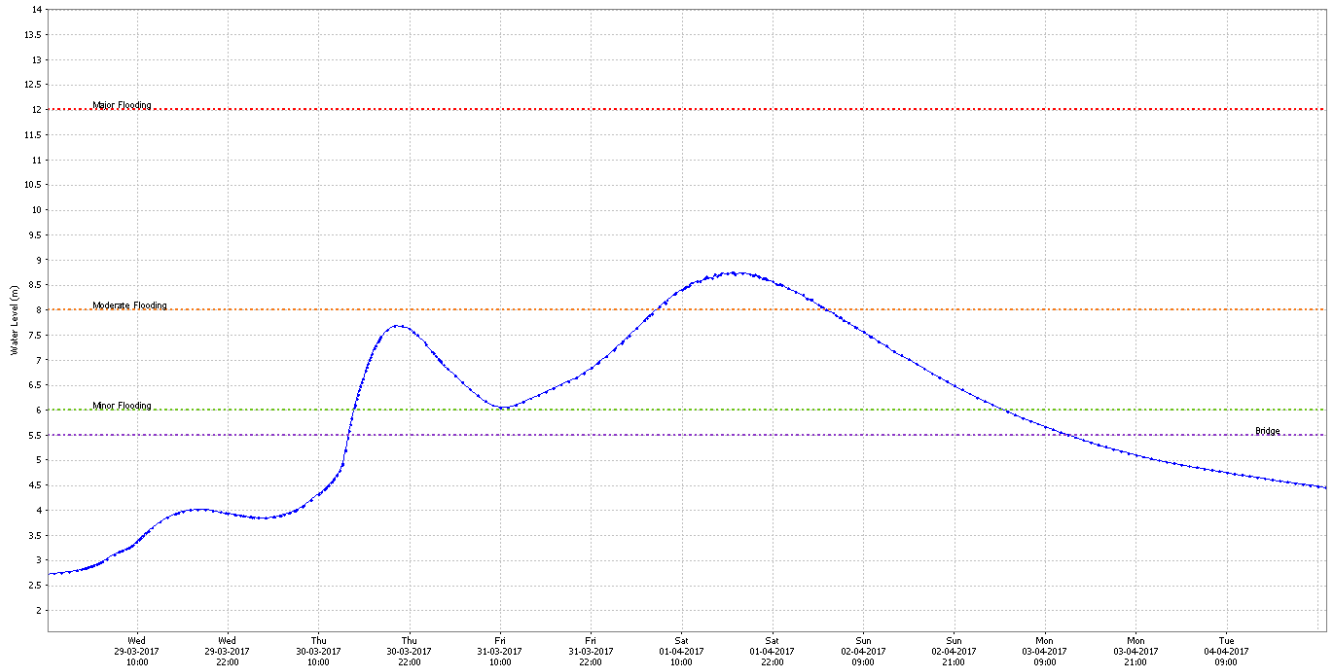
Baffle Creek at Mimdale TM



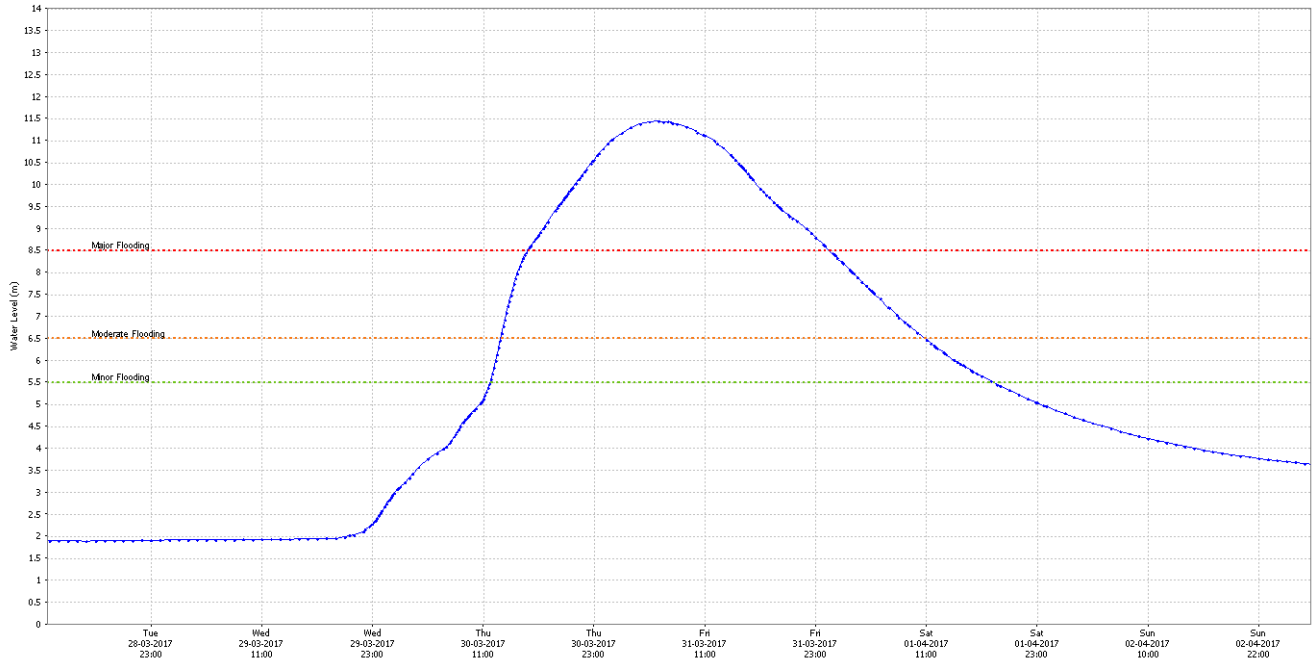
Kolan River at Bucca Weir HW TM



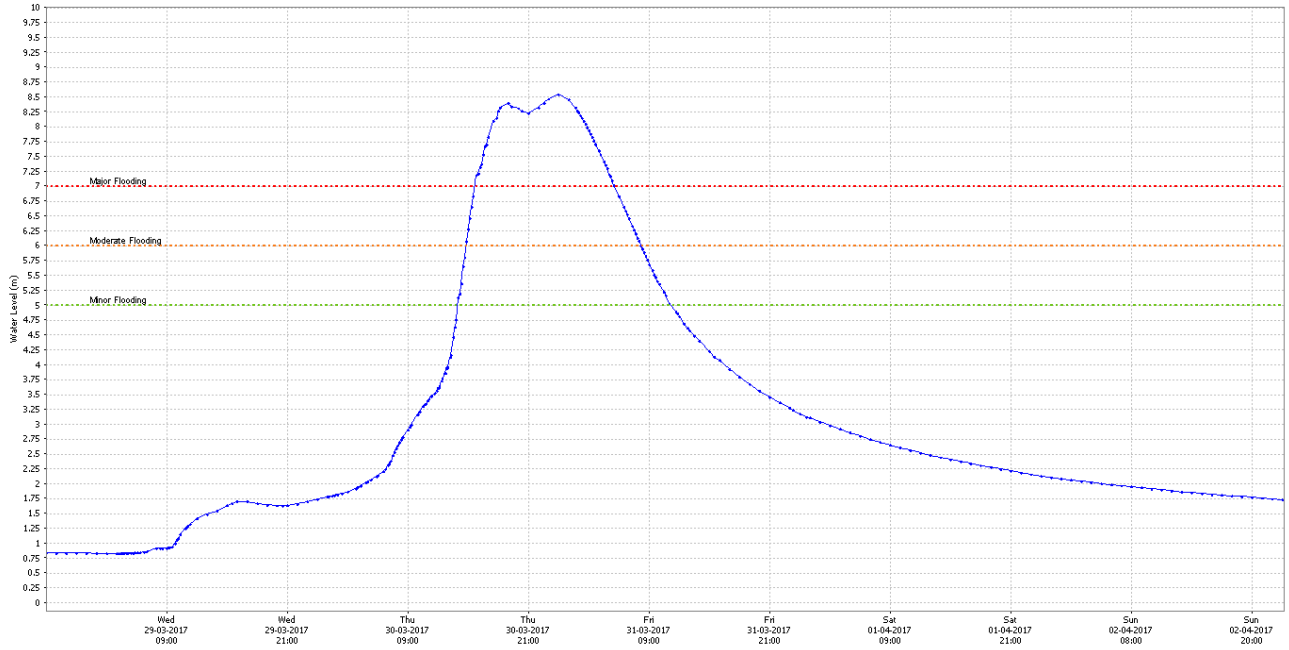
Burnett River at Walla TM



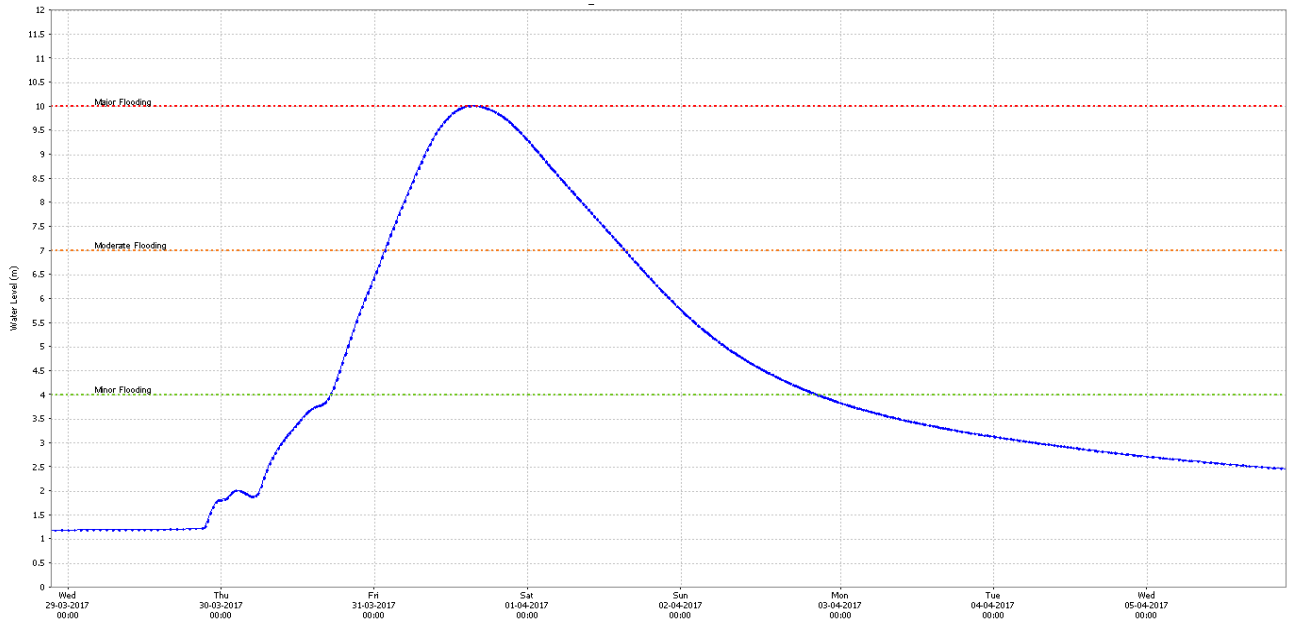
Burnett River at Ceratodus TM



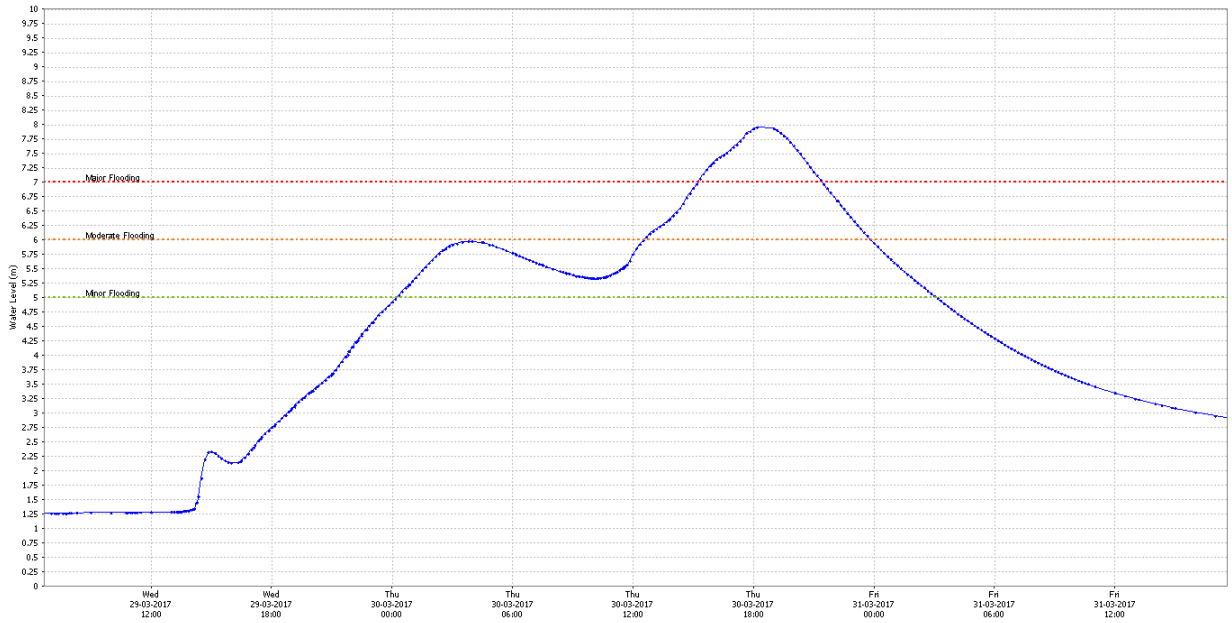
Deligbo Creek at Coringa TM



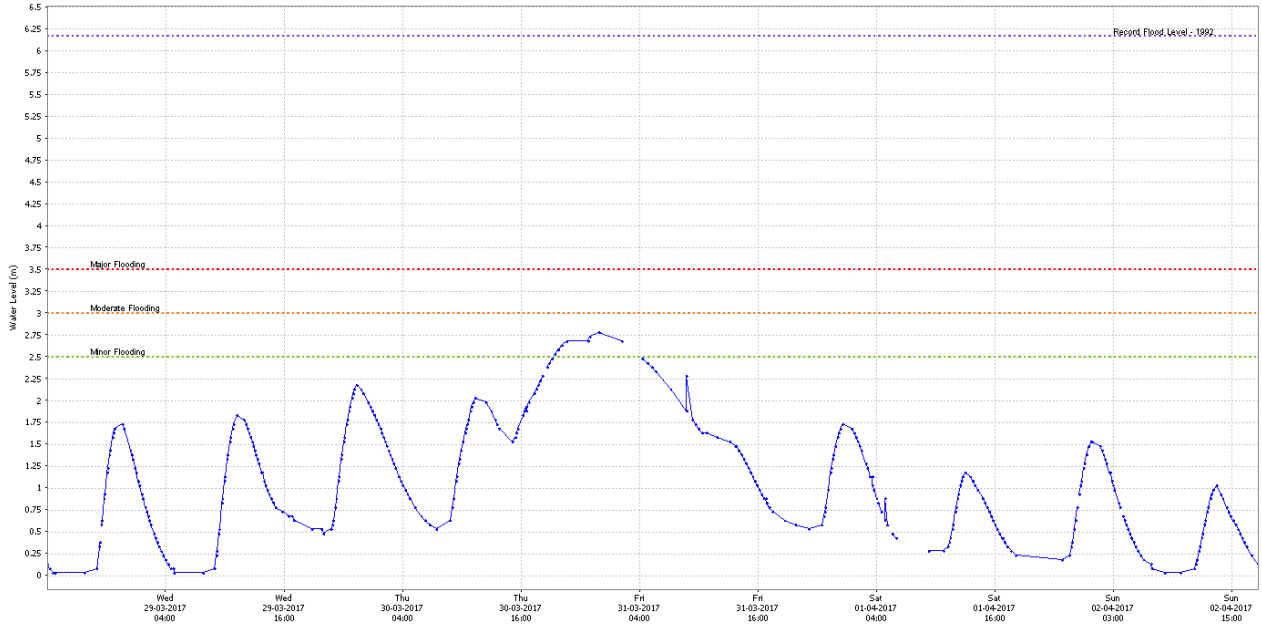
Burnett River at Marriages TM



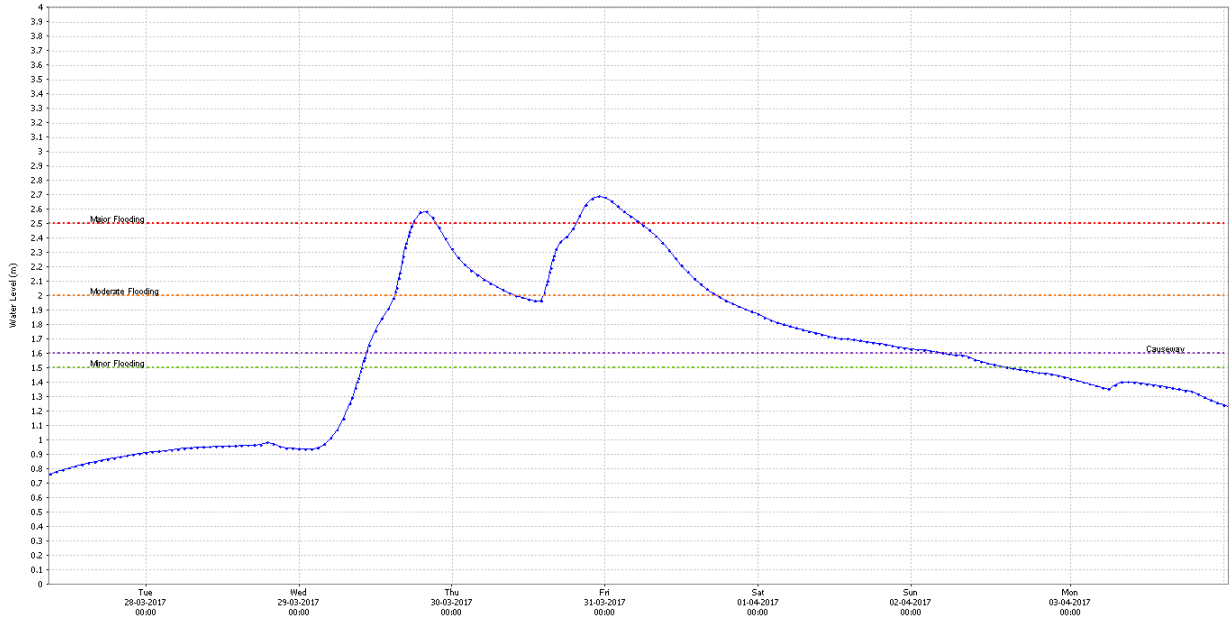
Burnett River at Yarrol TM



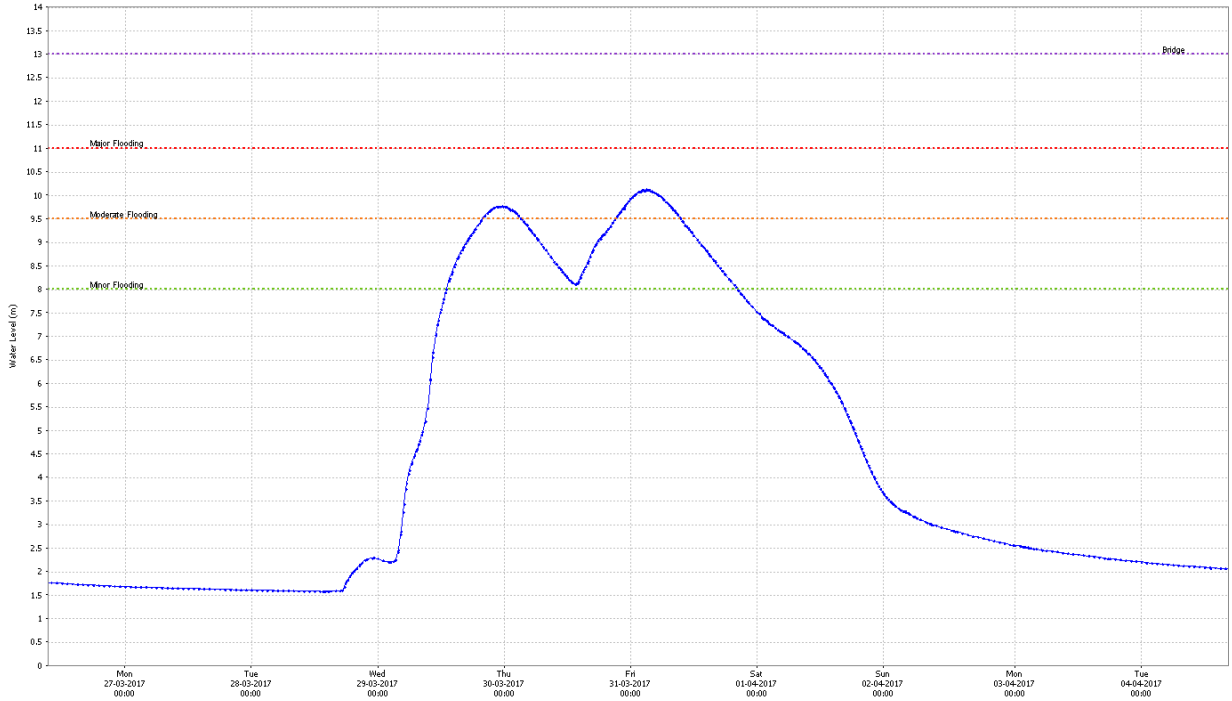
Cherwell River at Pacific Haven ALERT



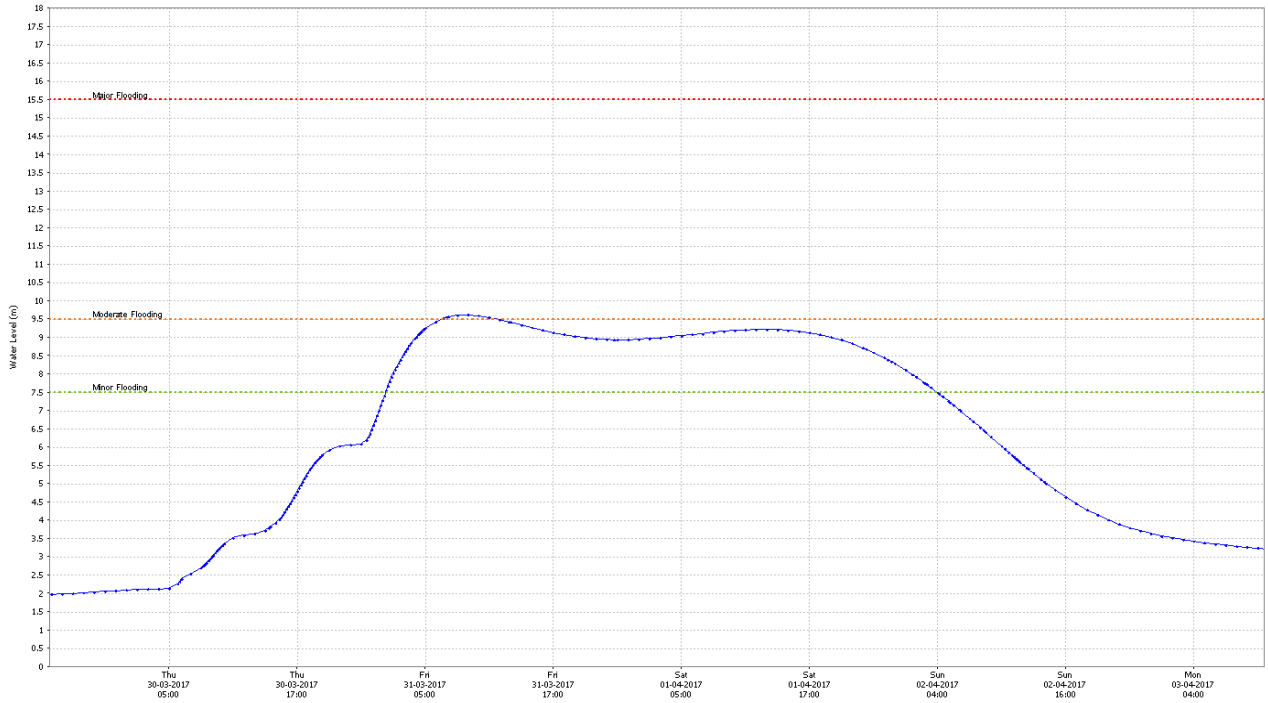
Elliot River at Dr Mays Crossing



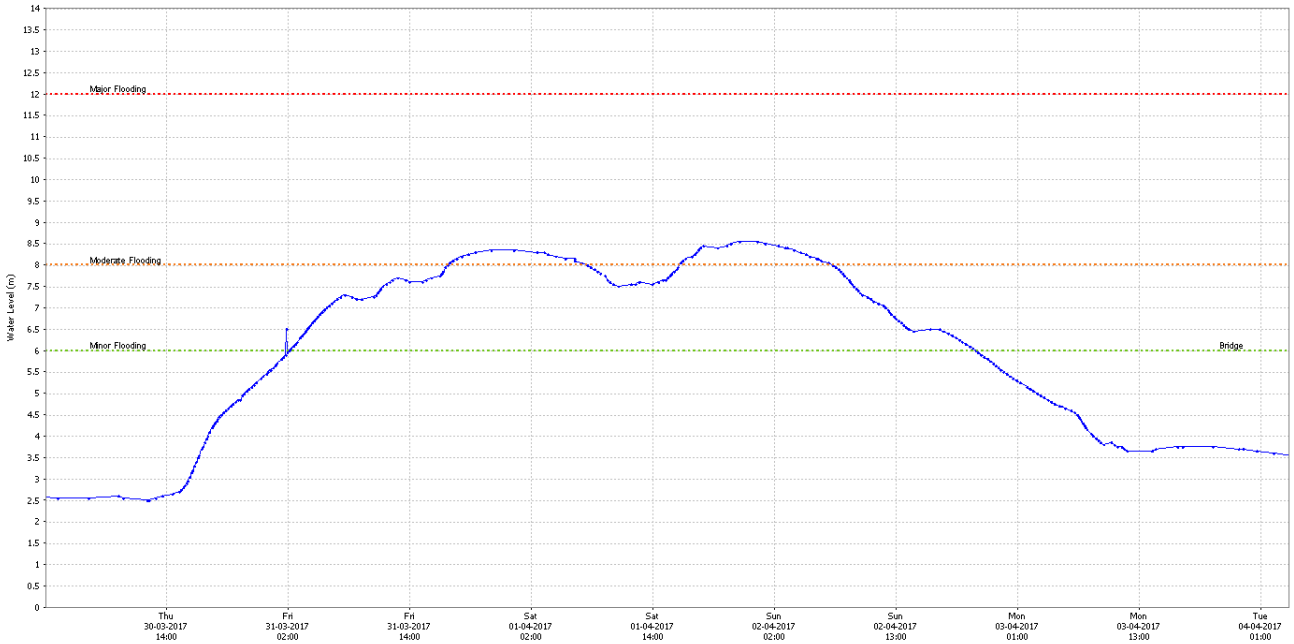
Gregory River at Burrum Highway



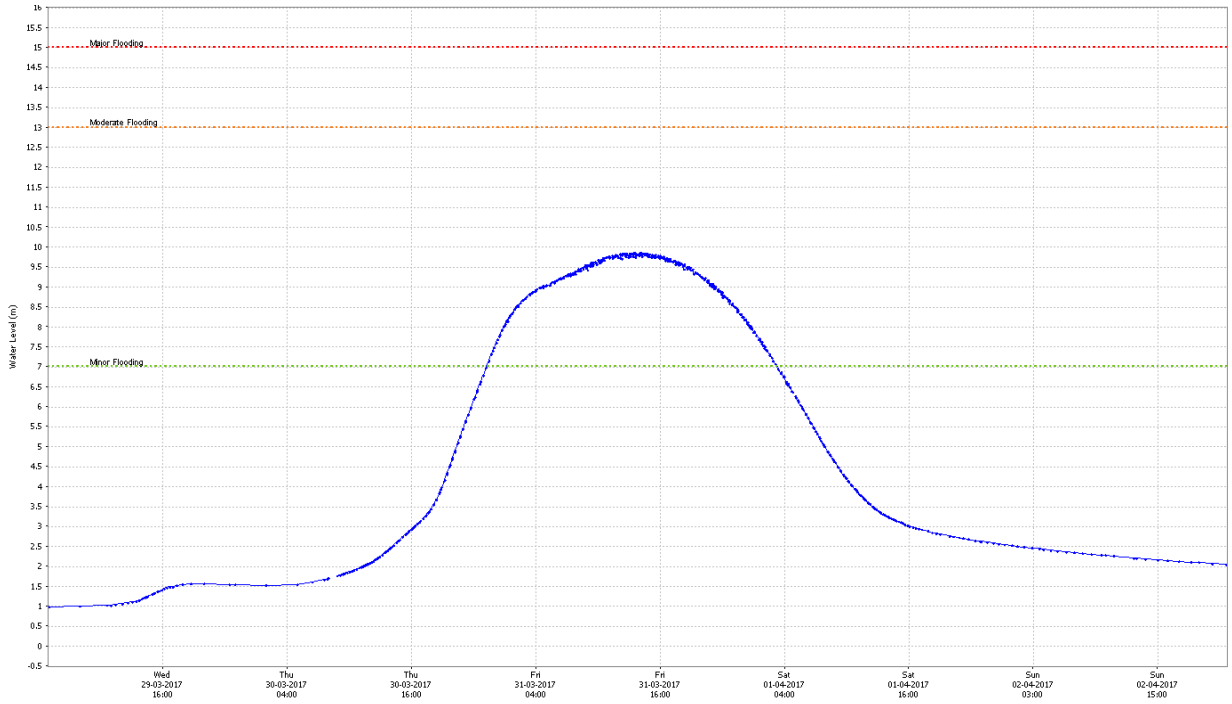
Mary River at Miva TM



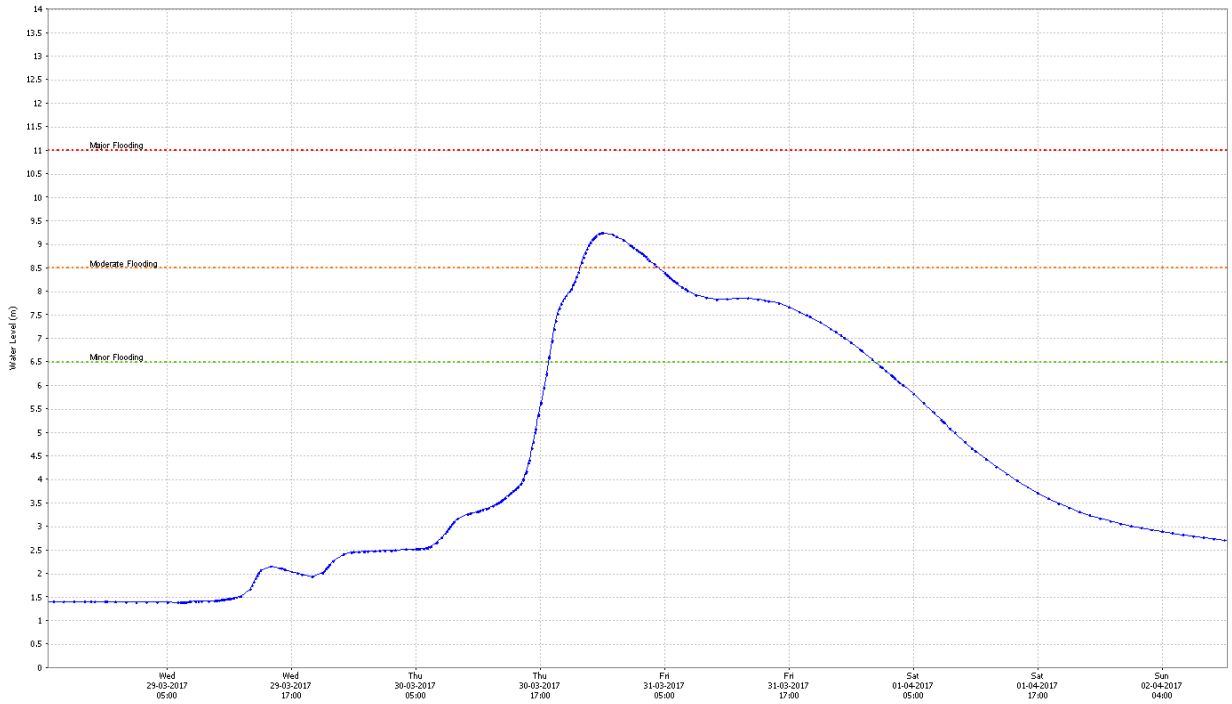
Mary River at Tiaro ALERT



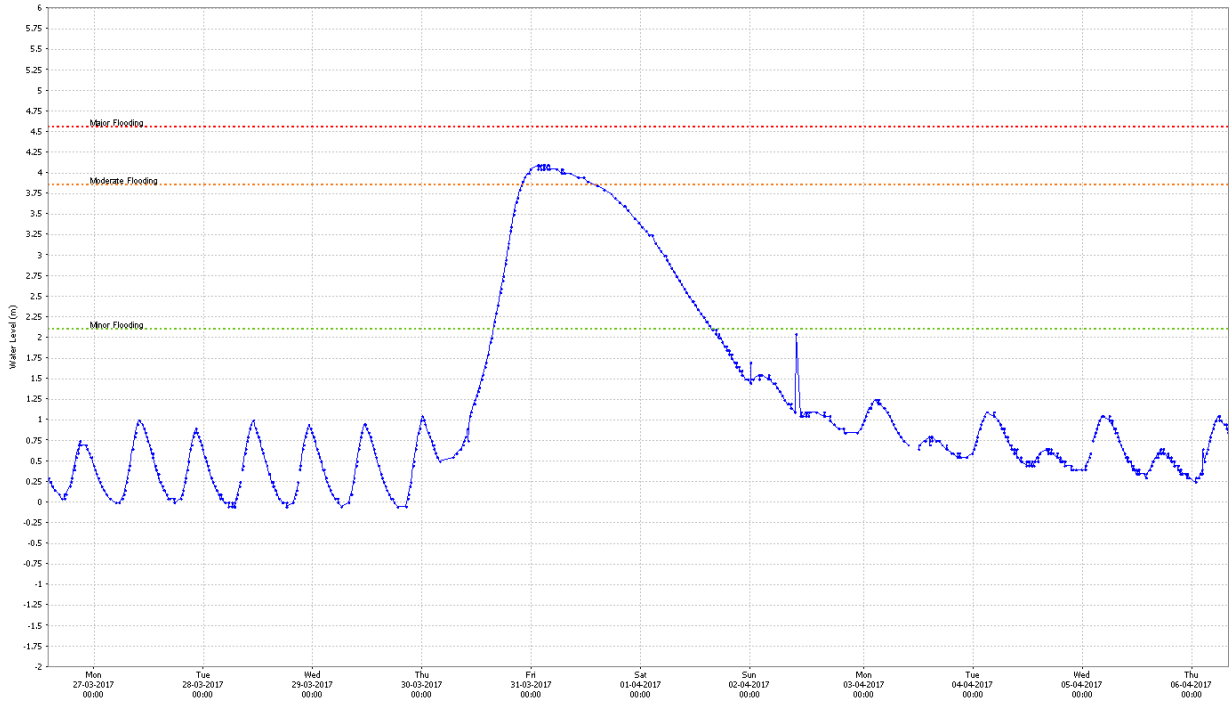
Mary River at Dagun Pocket



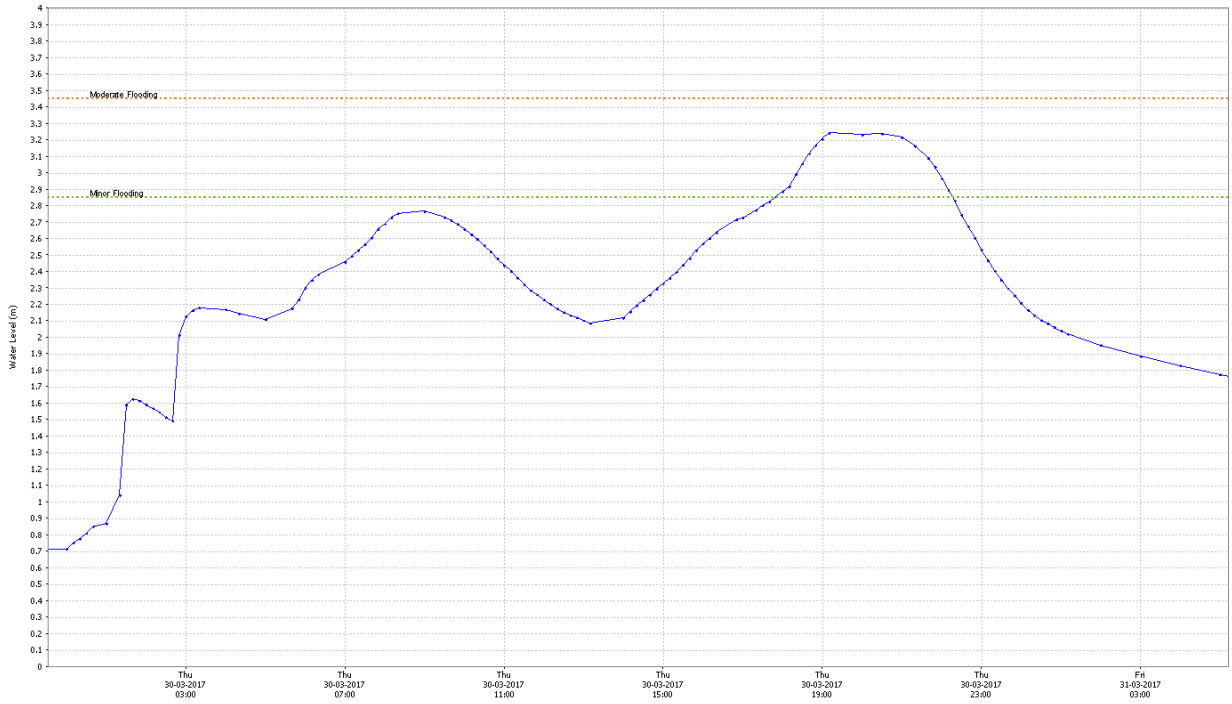
Six Mile Creek at Cooran TM



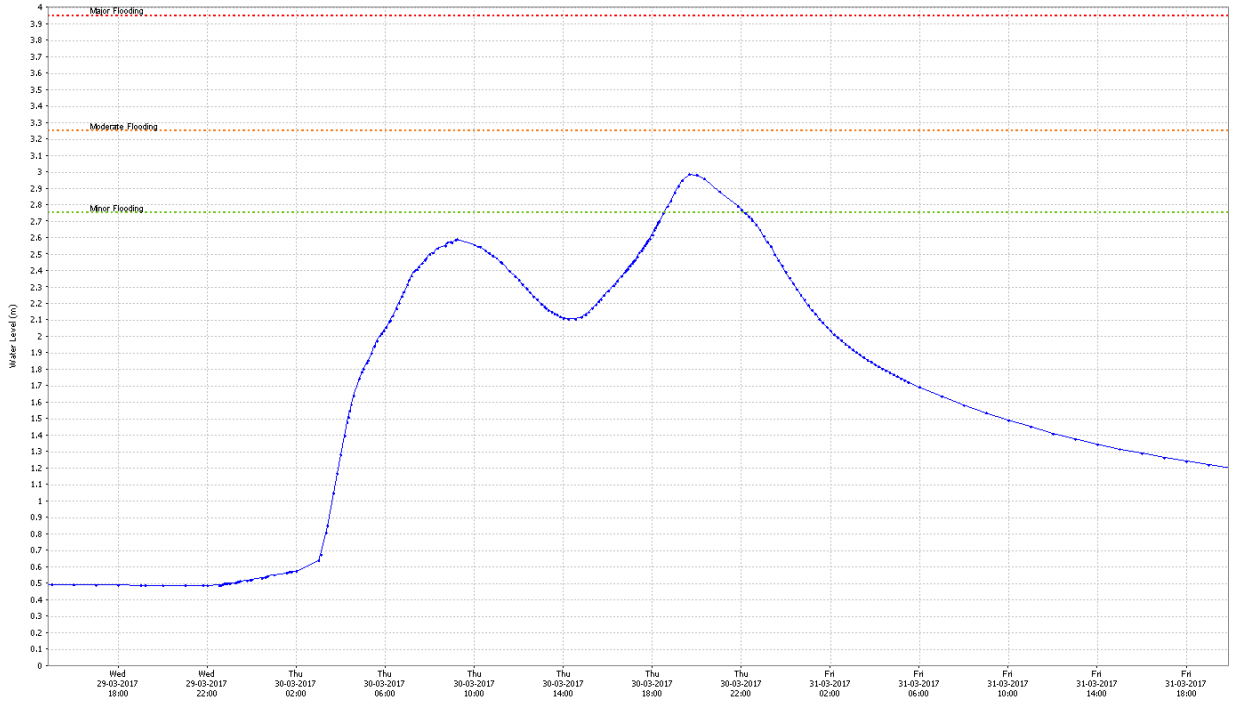
Mooloolah River at Palmview ALERT



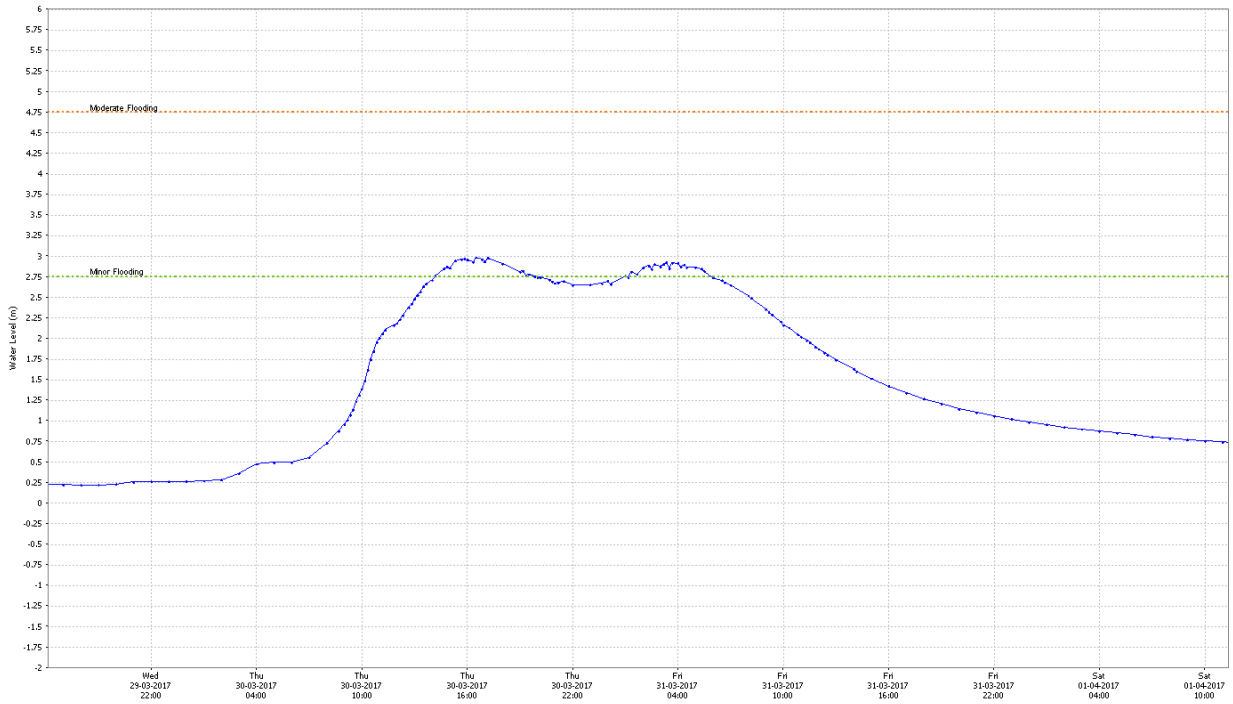
Upper Maroochy River at Kiamba



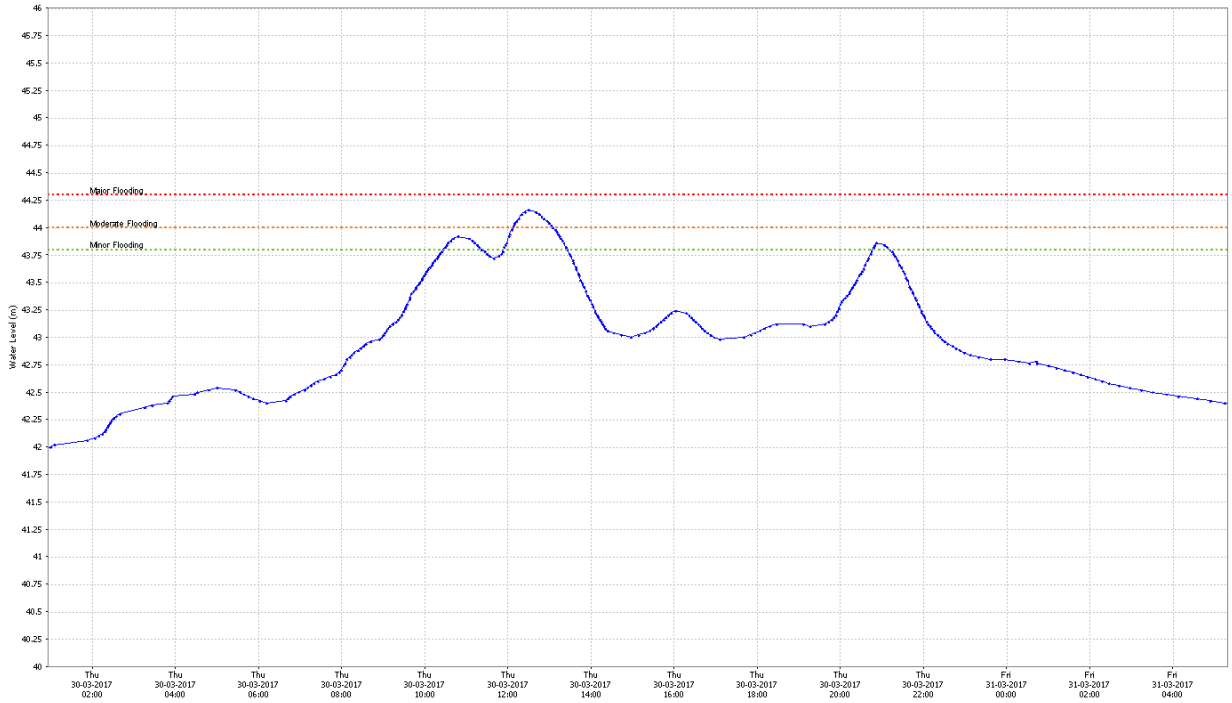
Upper Maroochy River at Yandina



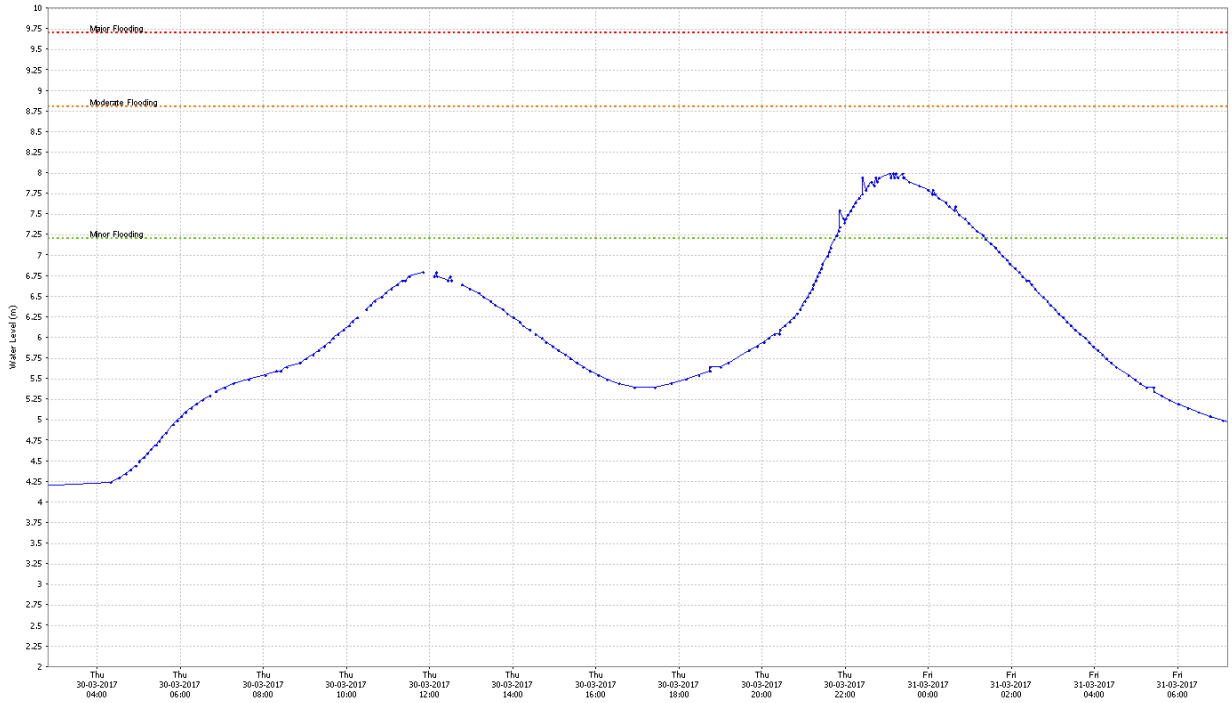
Coochin Creek at Mawsons Road



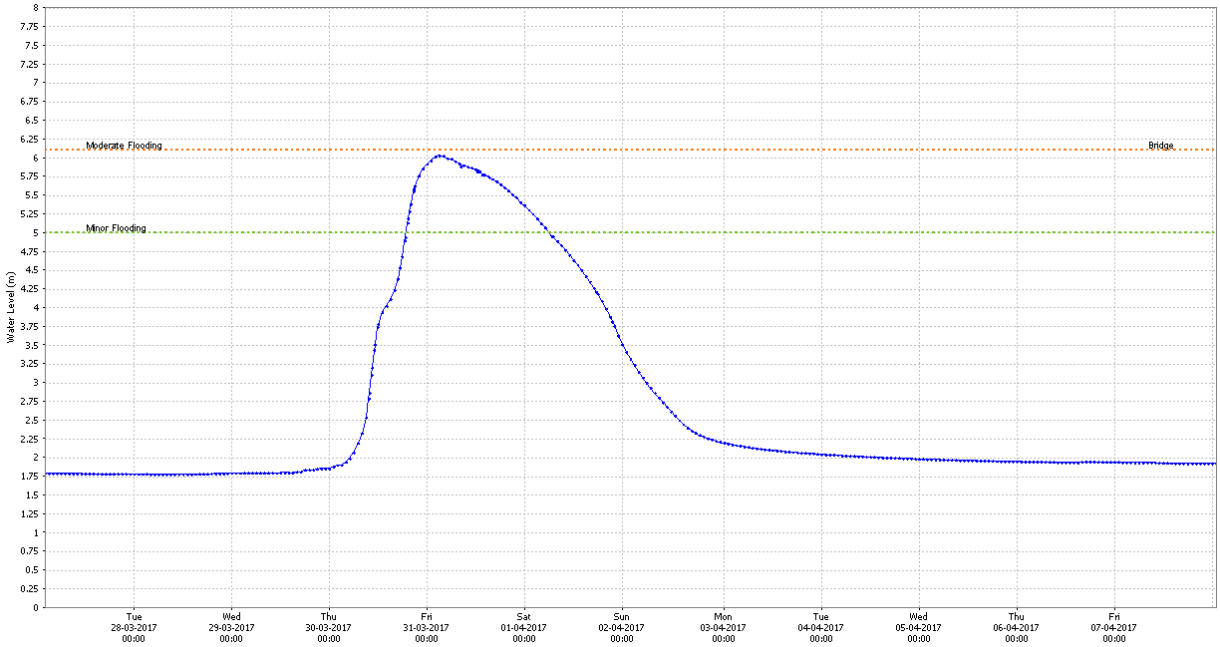
Little Cabbage Patch Creek at Everton Hills ALERT



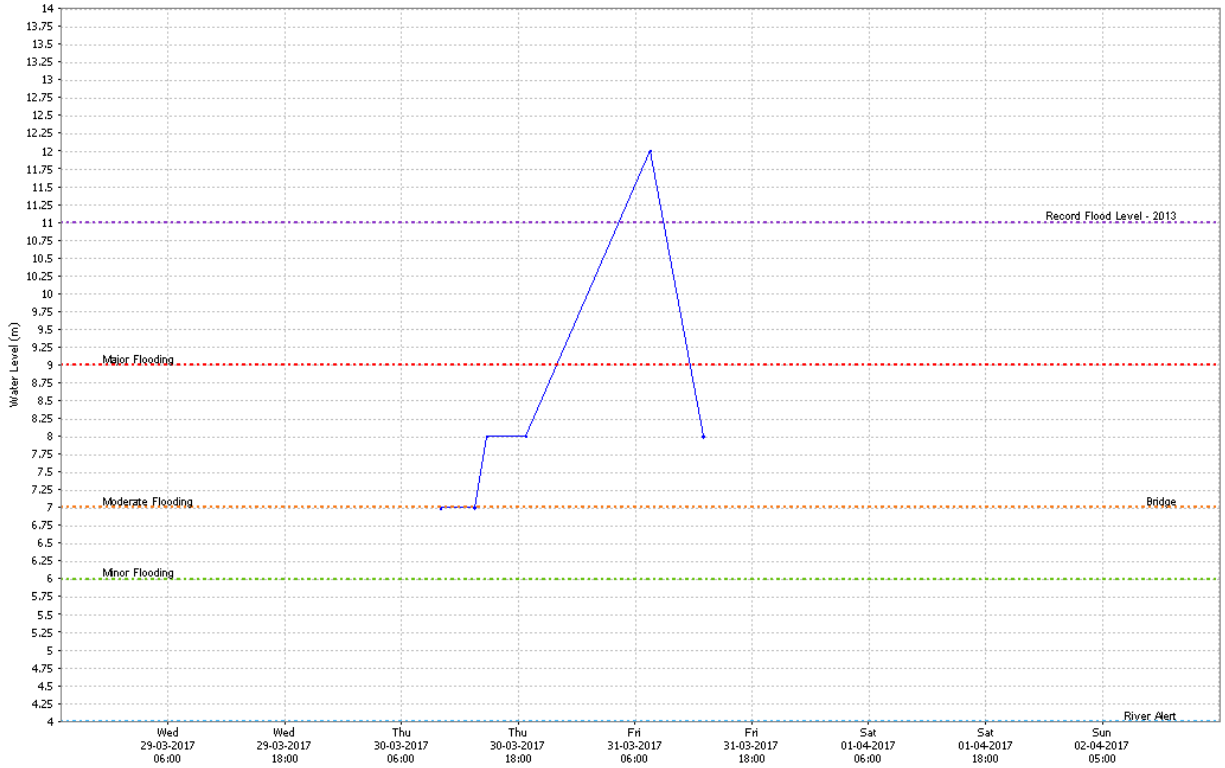
Caboolture River at Caboolture WTP ALERT



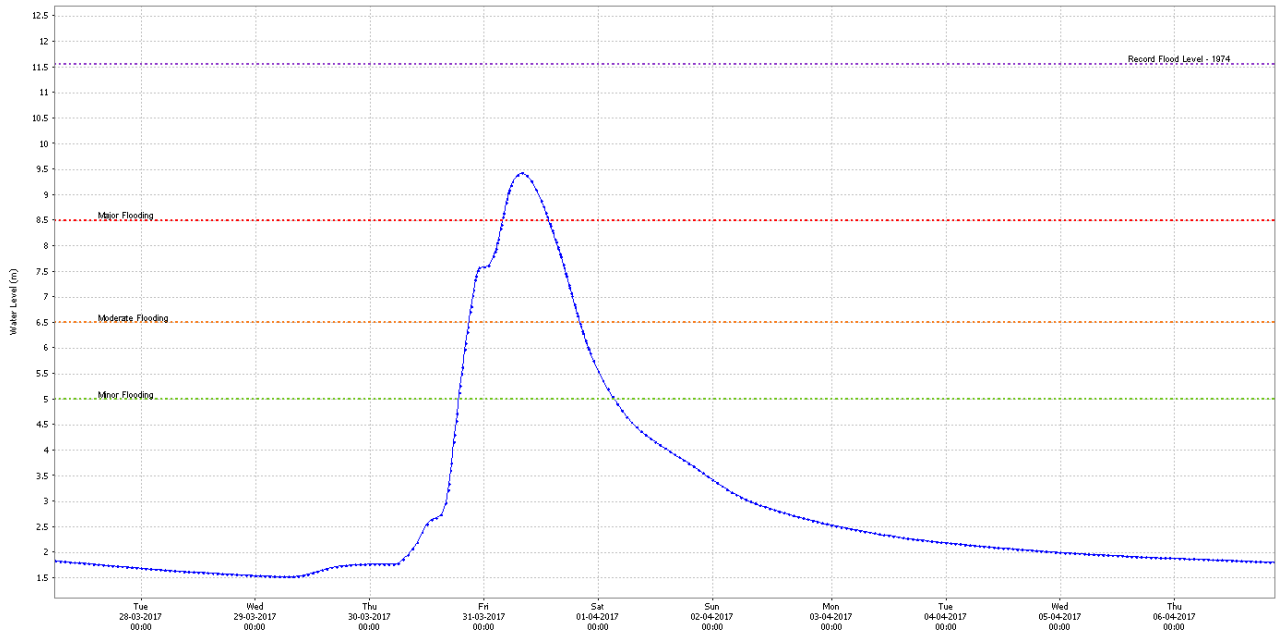
Upper Brisbane River, Stanley River at Woodford



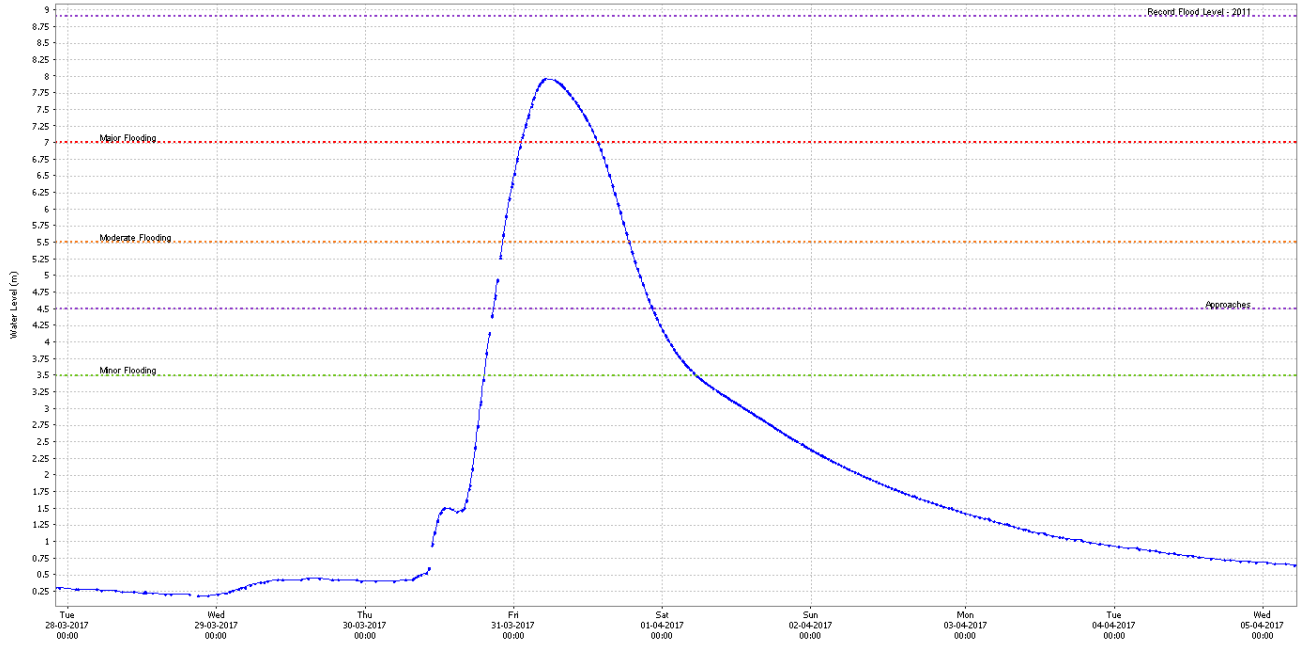
Lower Brisbane River, Warrill Creek at Kalbar



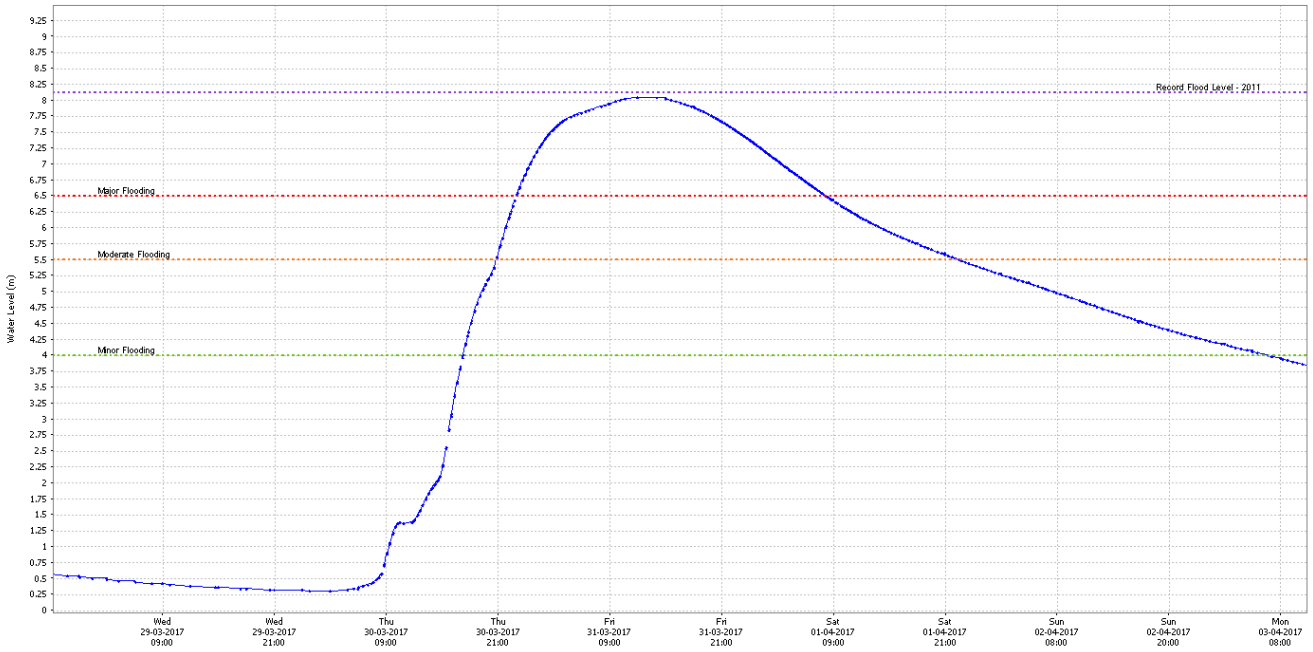
Bremer River at Walloon TM



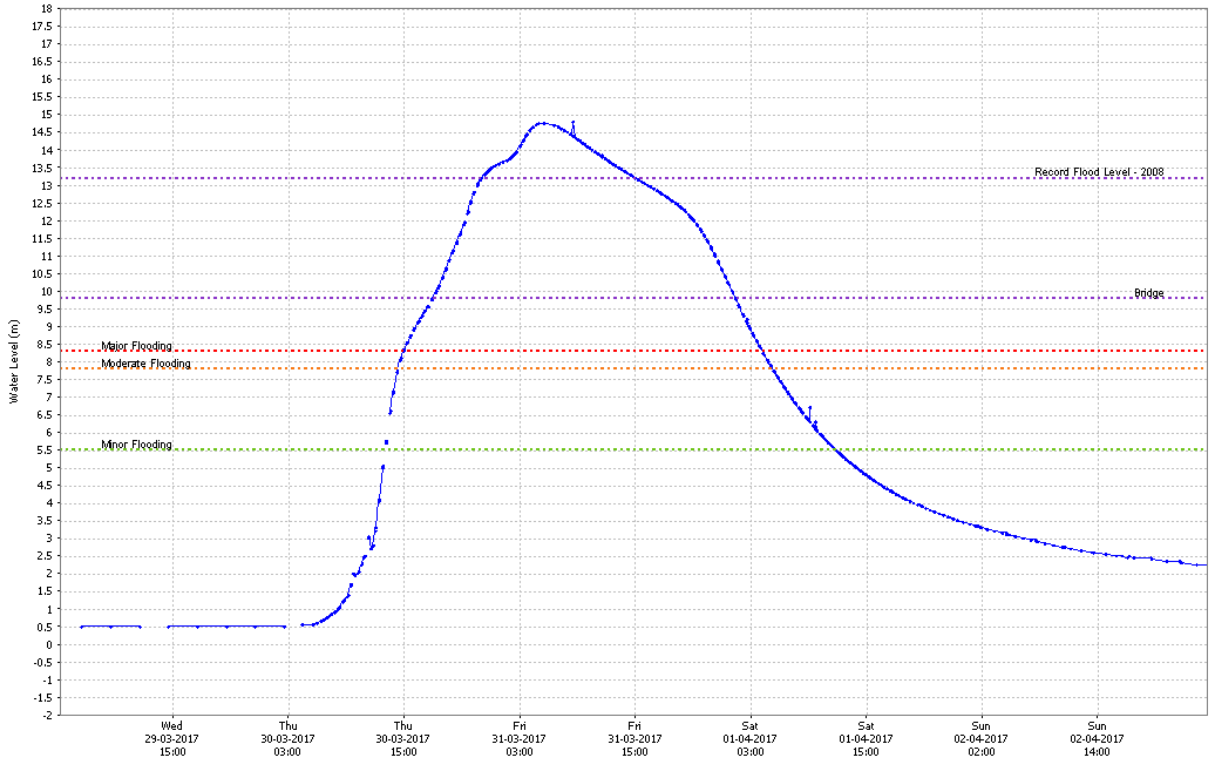
Bremer River at Five Mile Bridge ALERT



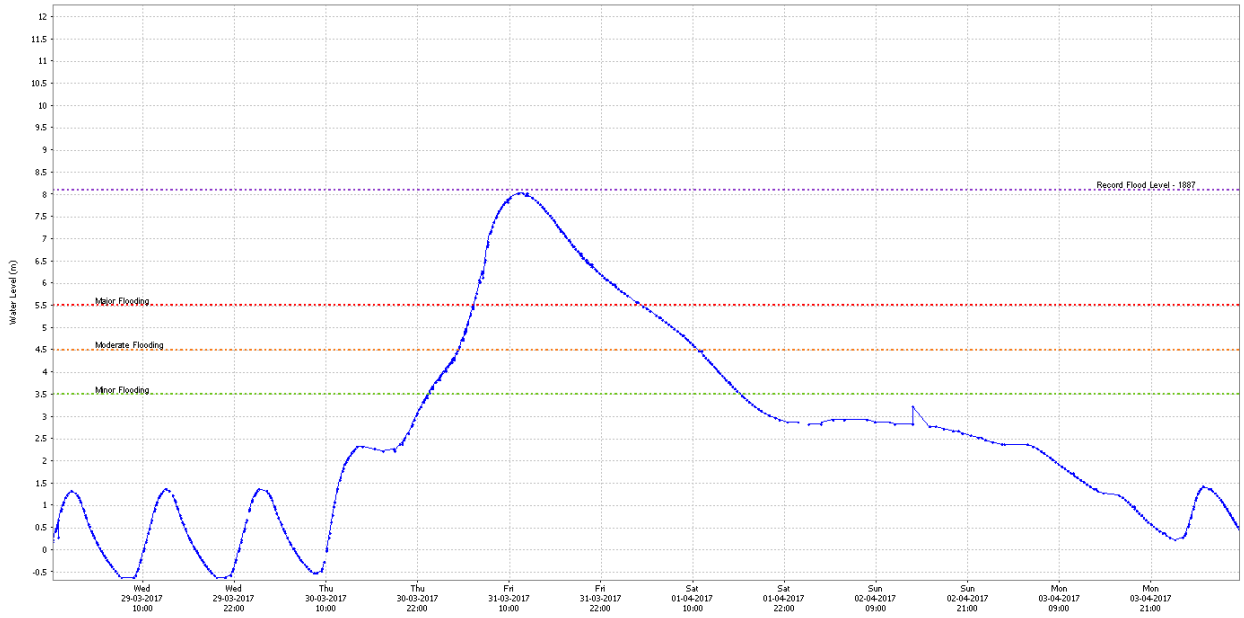
Warril Creek at Amberely ALERT



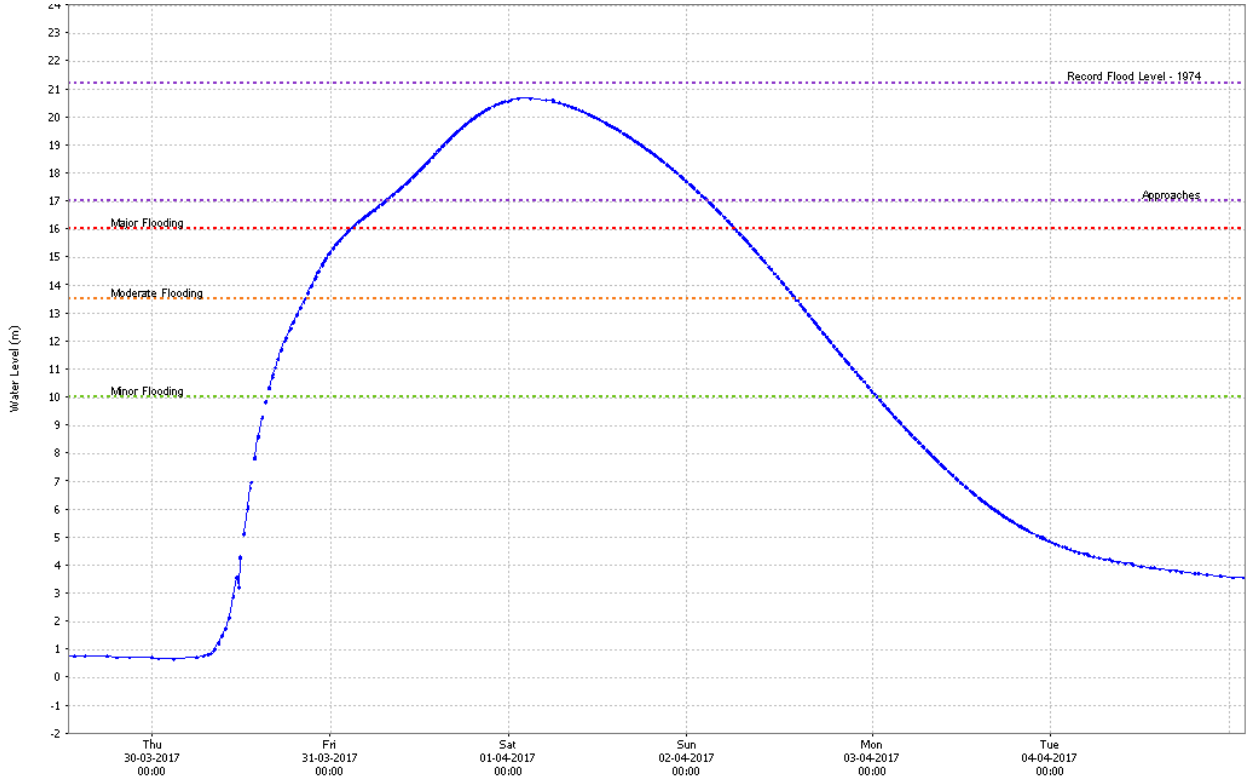
Logan-Albert Rivers, Logan River at Beaudesert ALERT



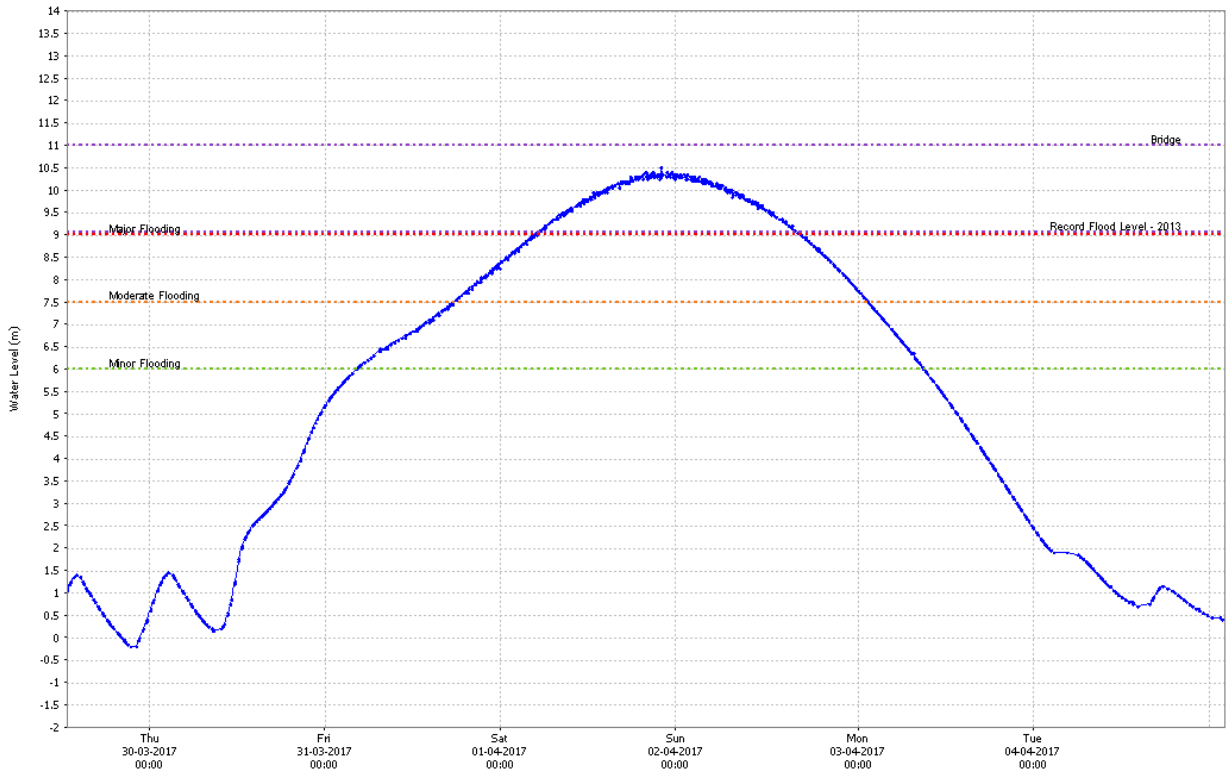
Logan River at Beenleigh ALERT



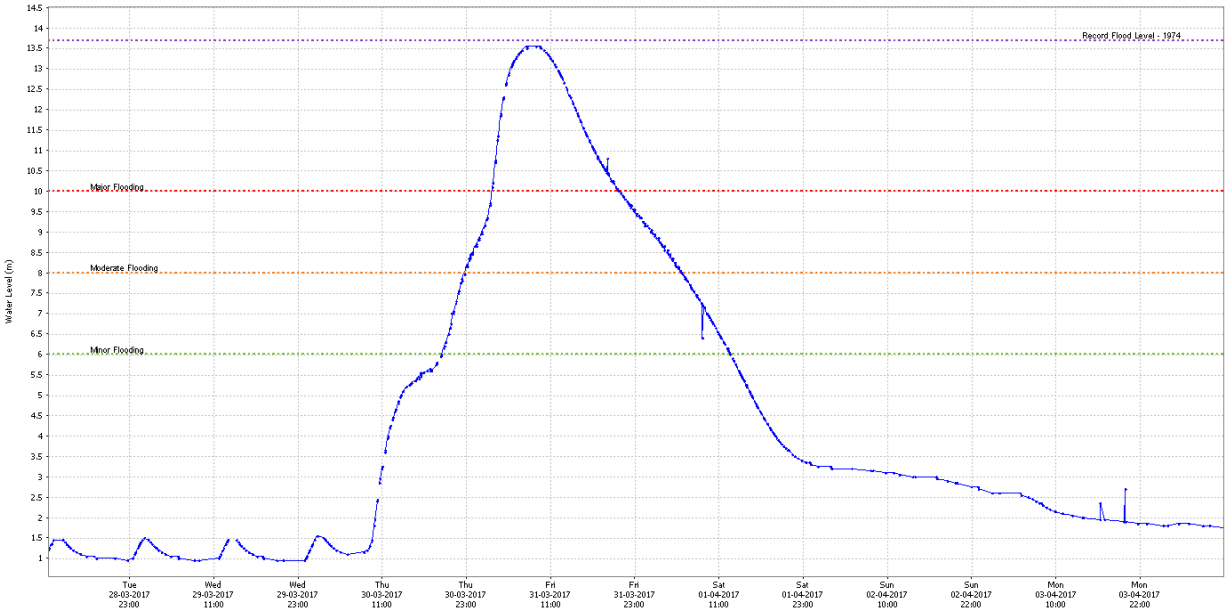
Logan River at Maclean Bridge ALERT



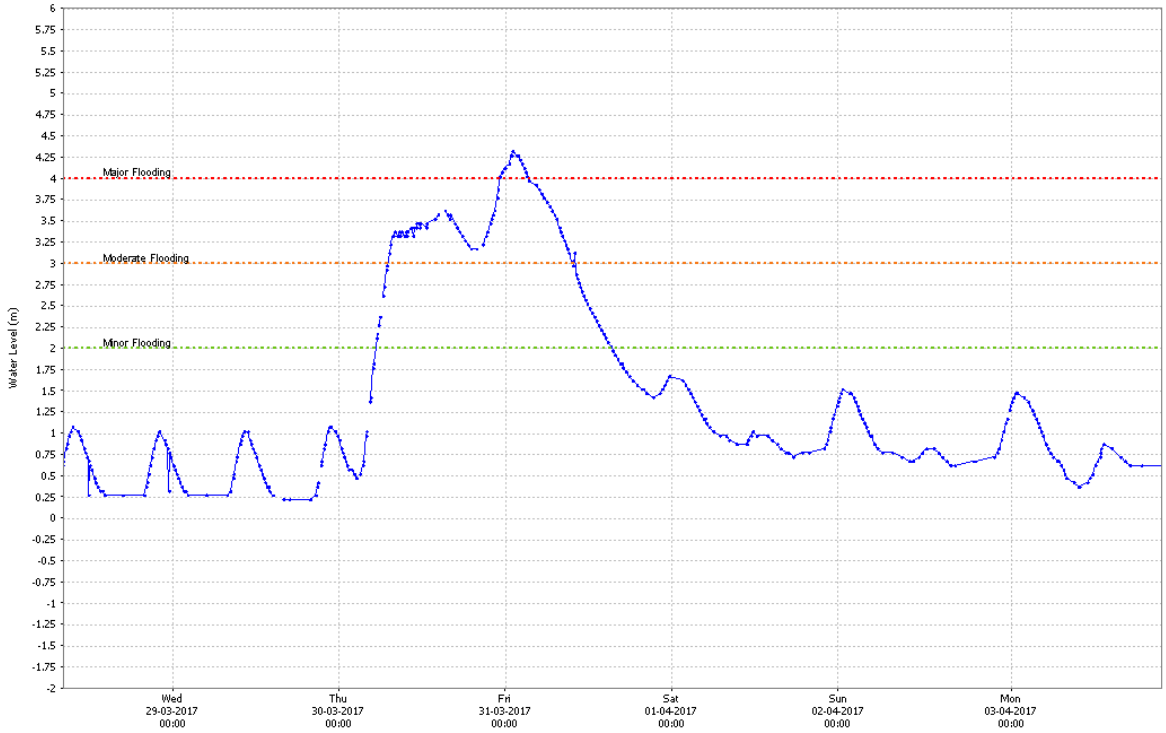
Logan River at Waterford ALERT



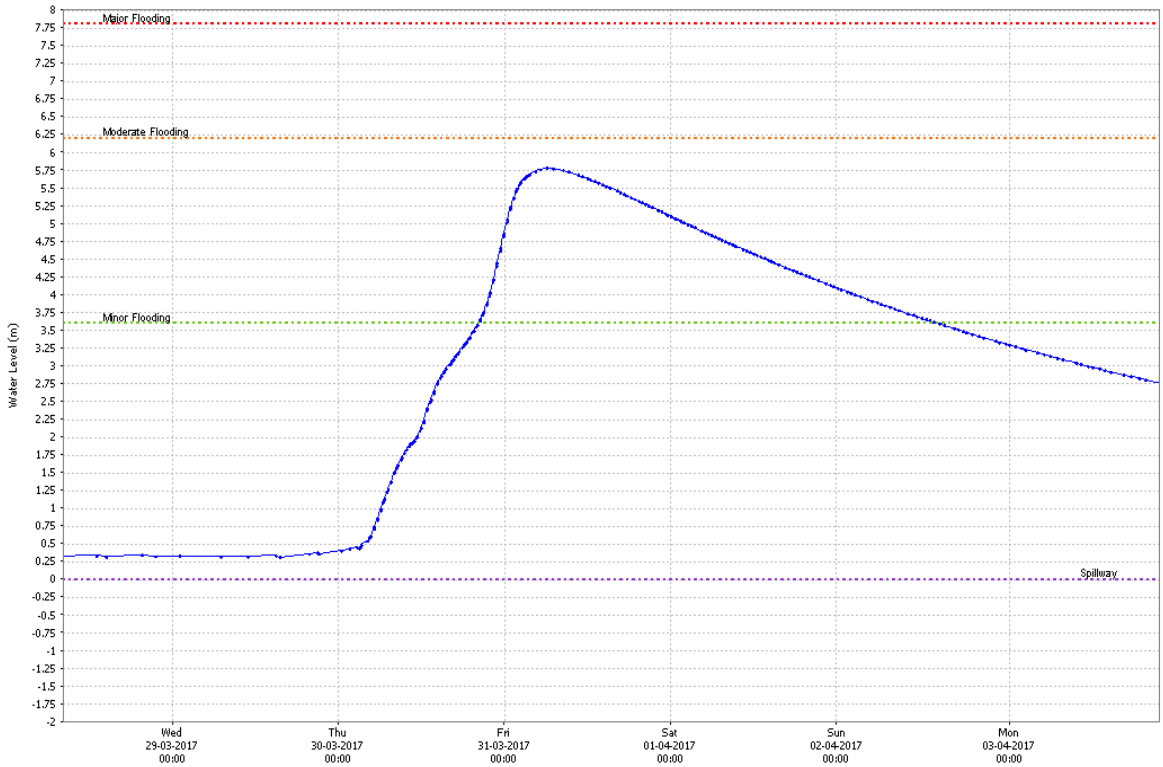
Albert River at Wolffdene ALERT



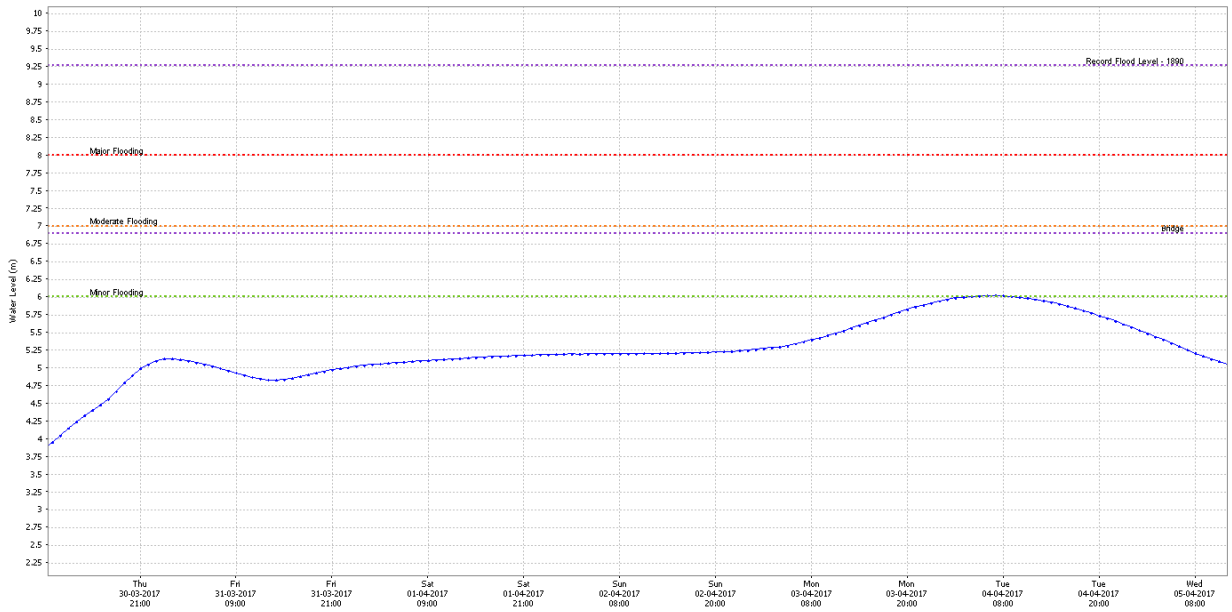
South Coast Rivers, Tallebudgera Creek at Coplicks Bridge ALERT



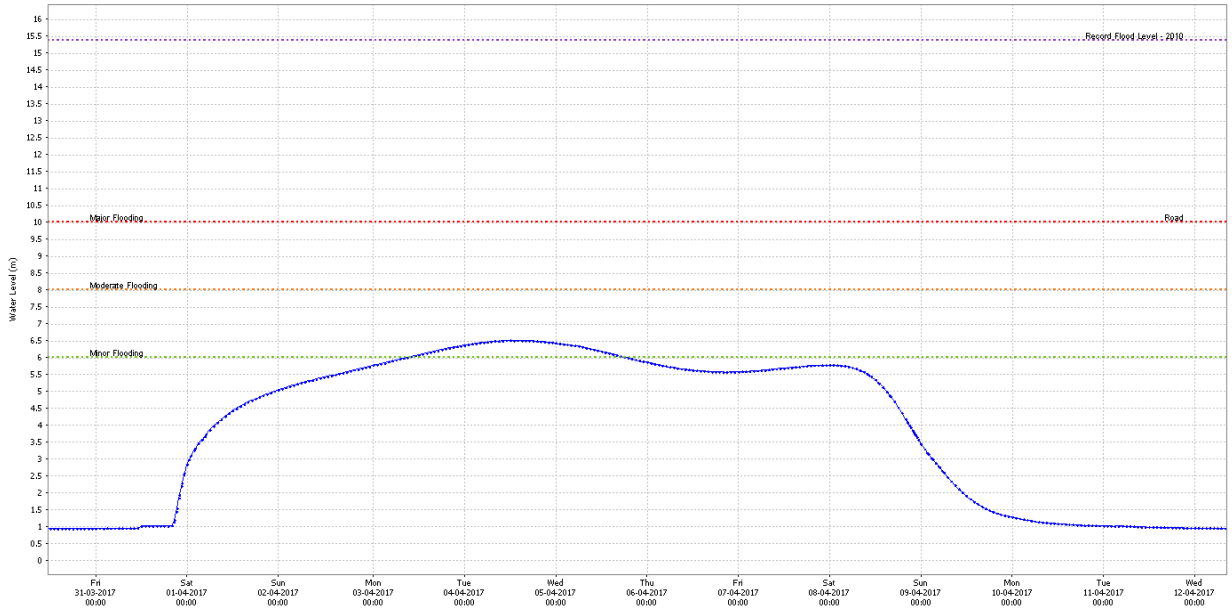
Nerang River at Hinze Dam TM



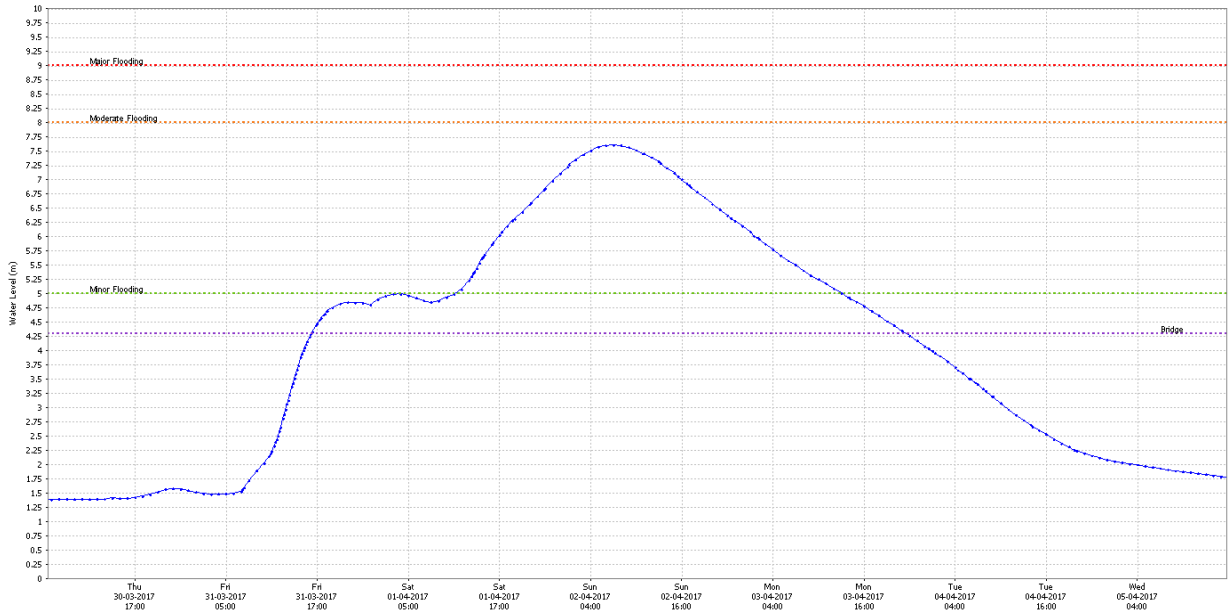
Condamine River at Cecil Plains TM



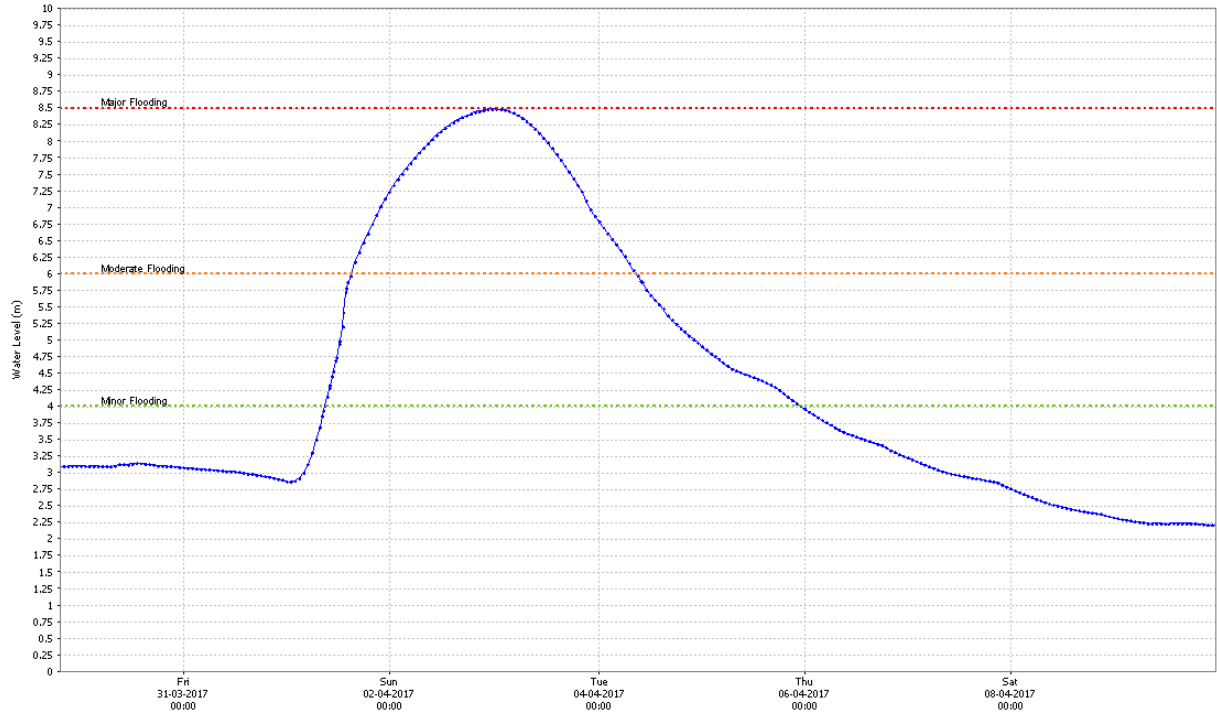
Condamine River at Chinchilla Weir



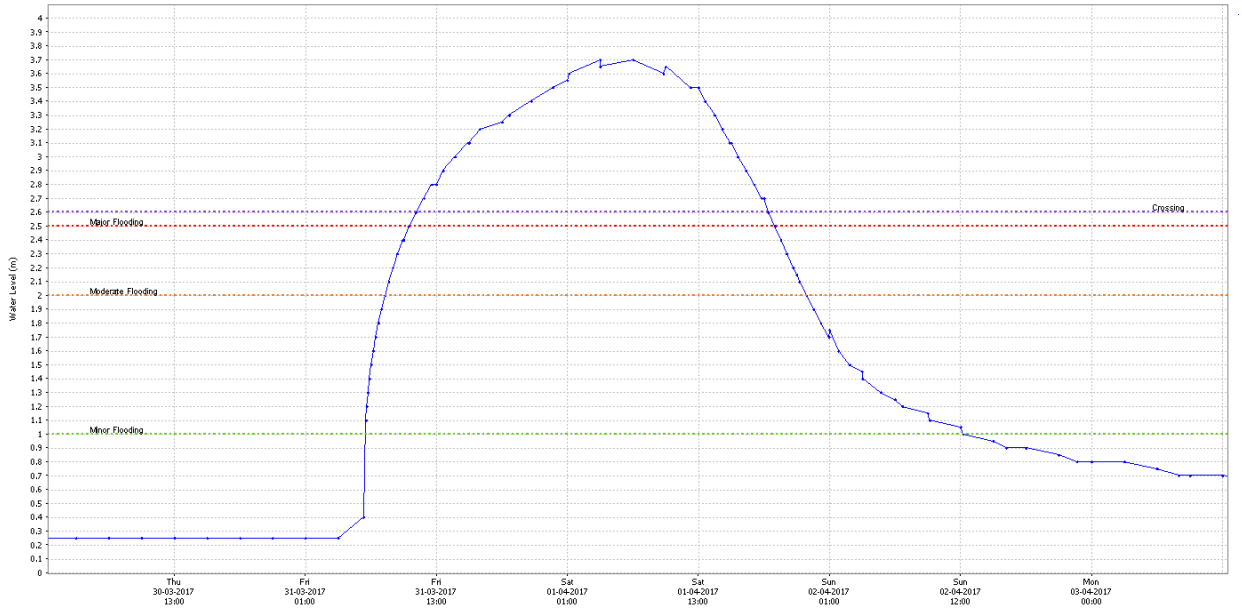
Condamine River at Tummaville TM



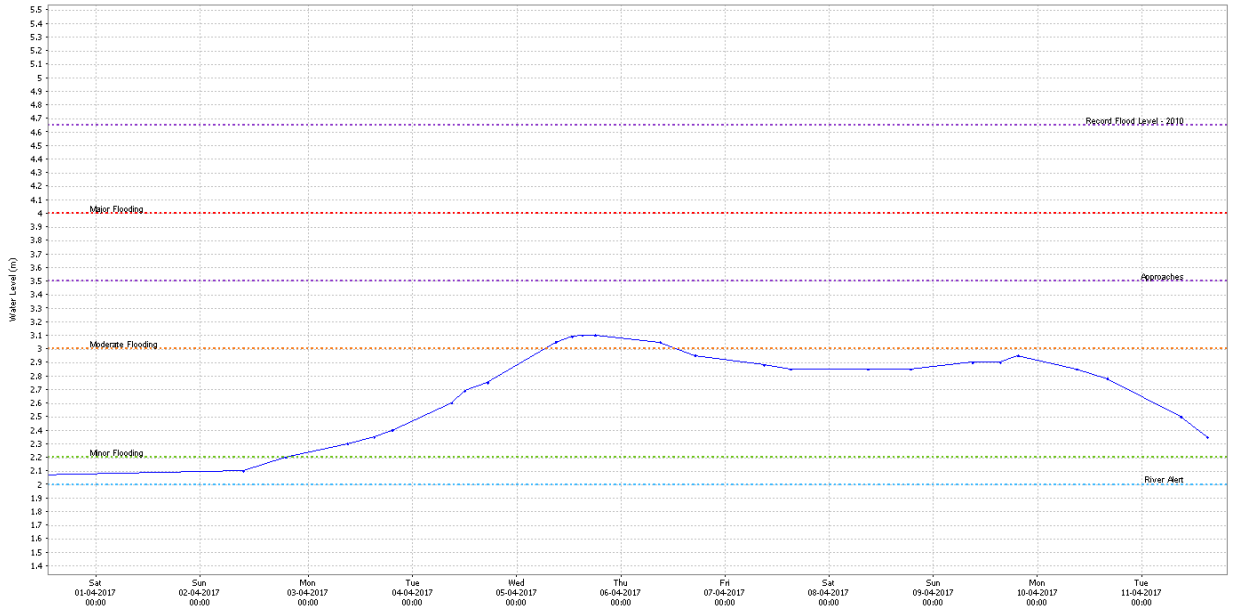
Border River, Macintyre River at Goondiwindi



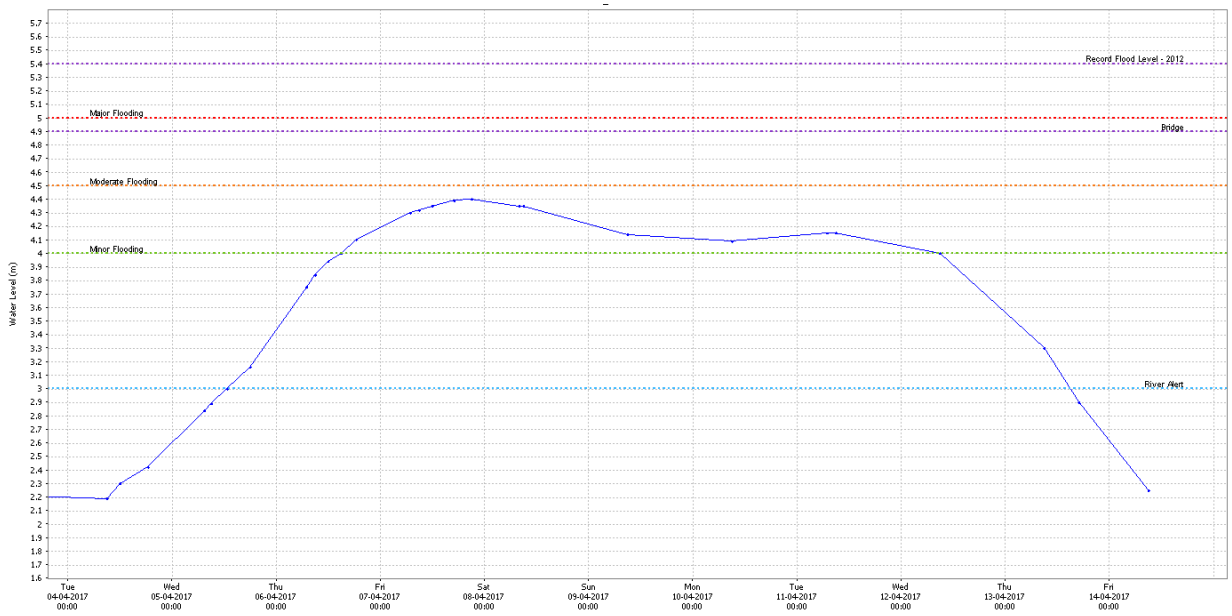
Weir River at Kilbronae TM



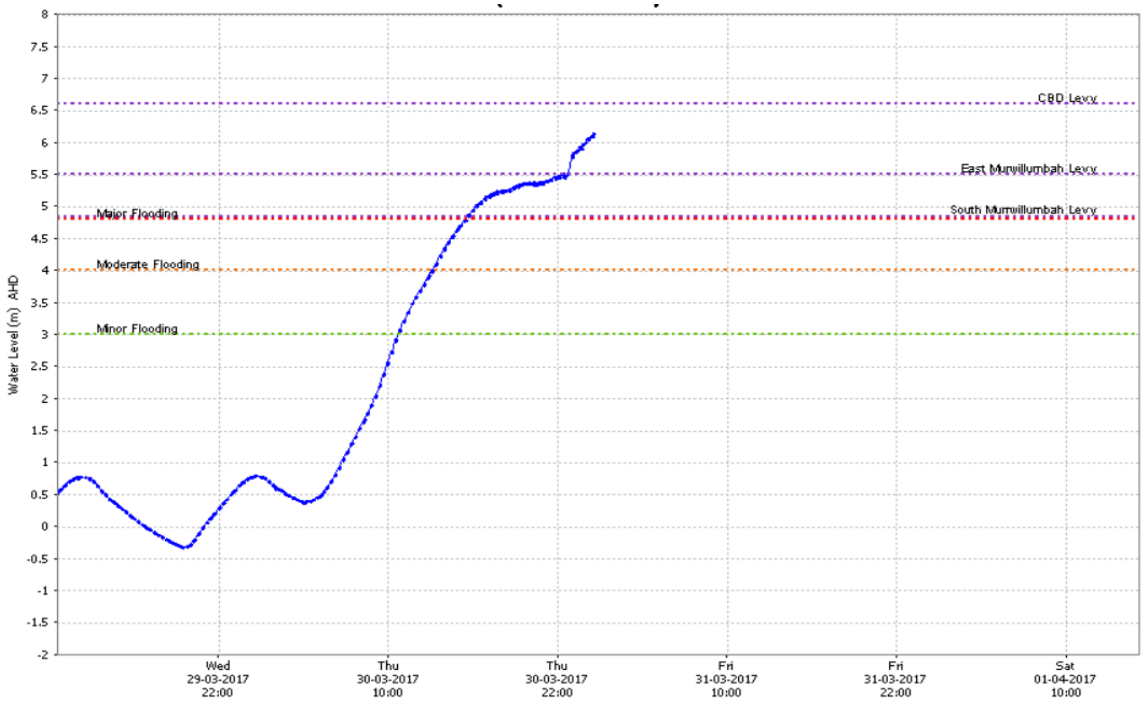
Moonie River at Nindigully



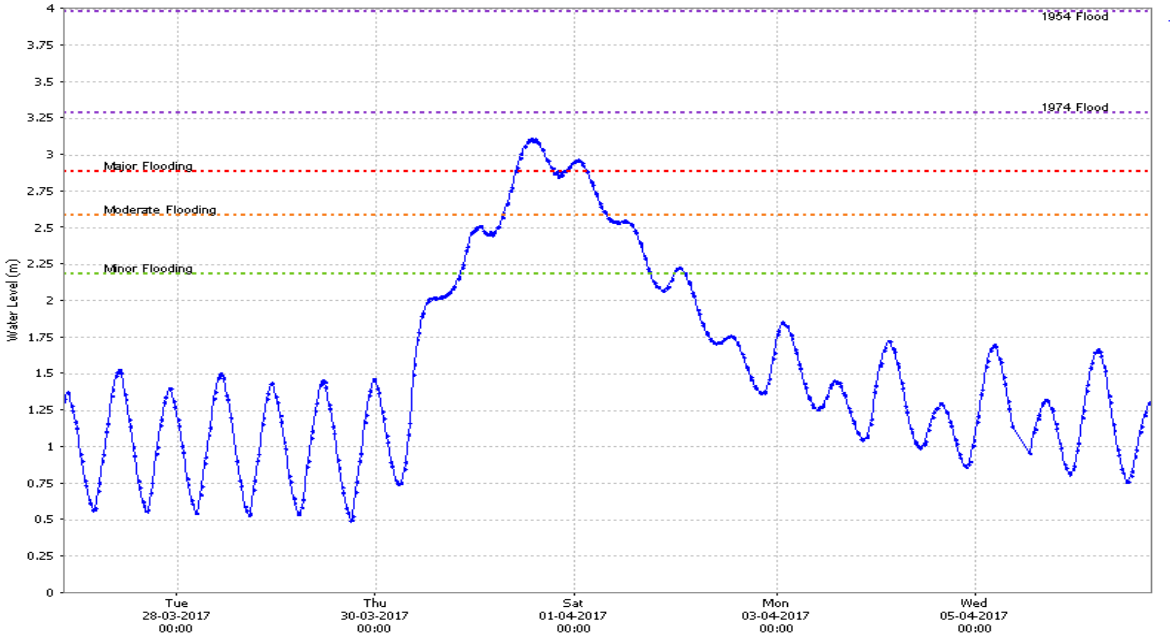
Moonie River at Thallon Bridge



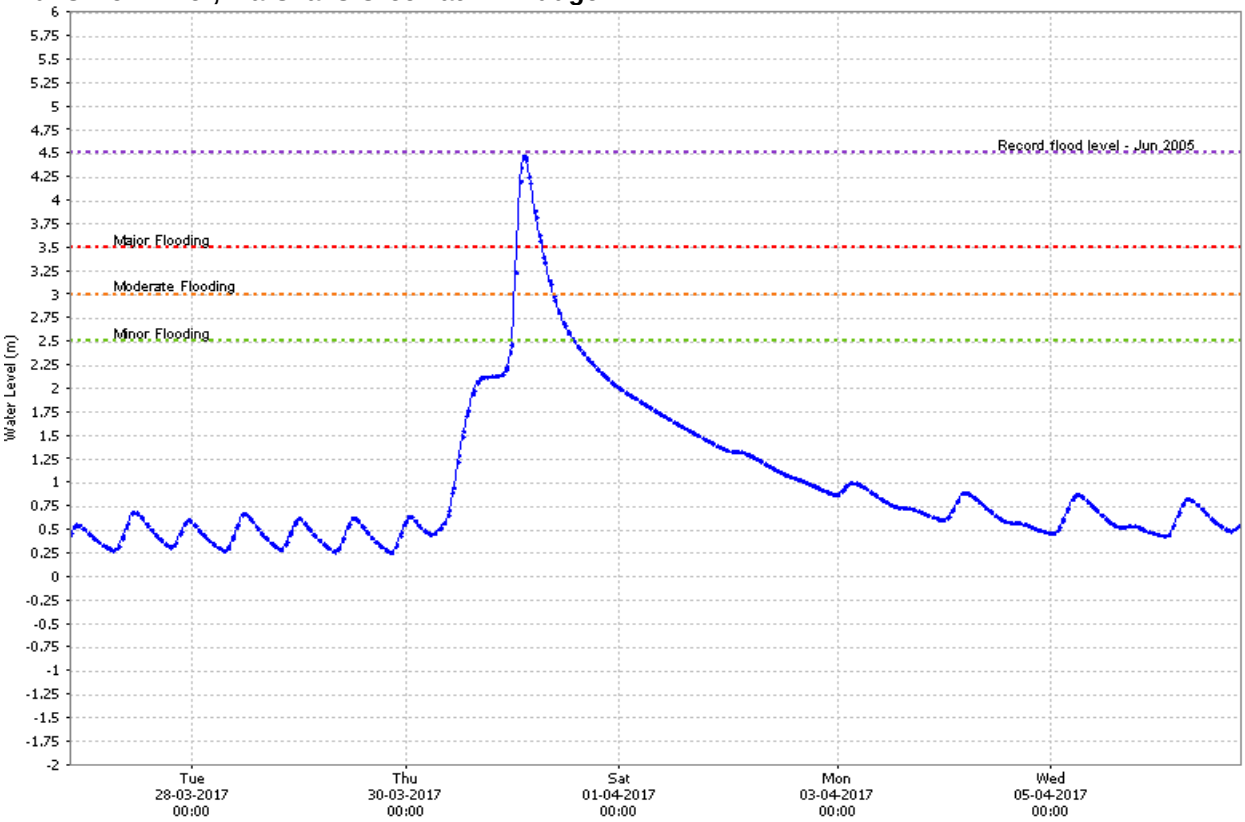
Tweed River at Murwillumbah



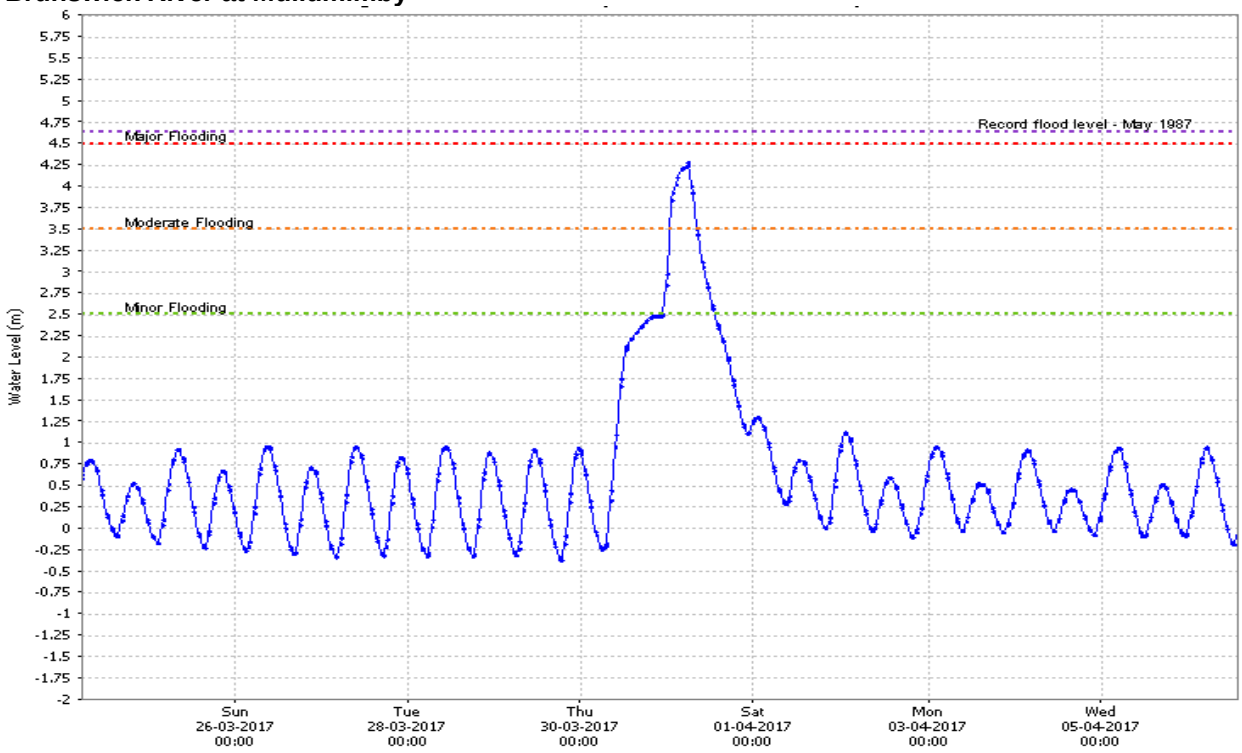
Tweed River at Chinderah



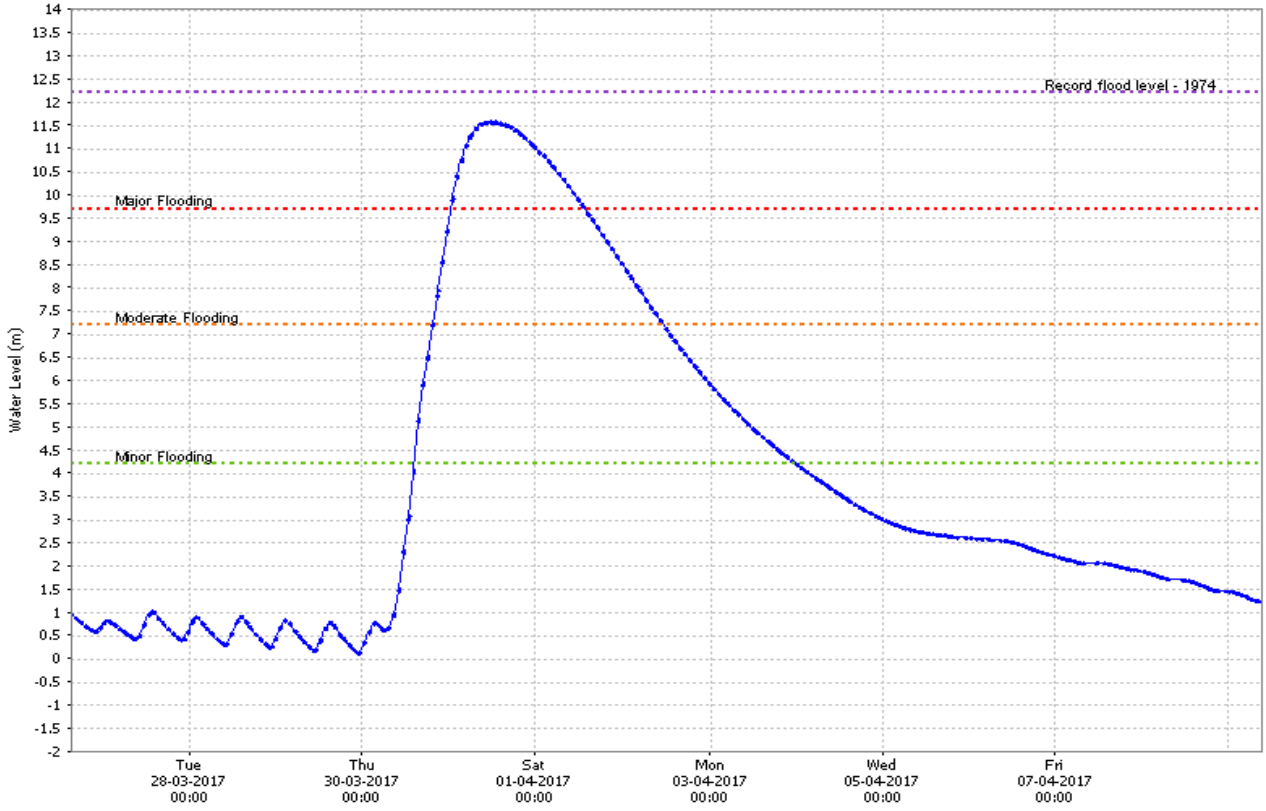
Brunswick River, Marshalls Creek at Billinudgel



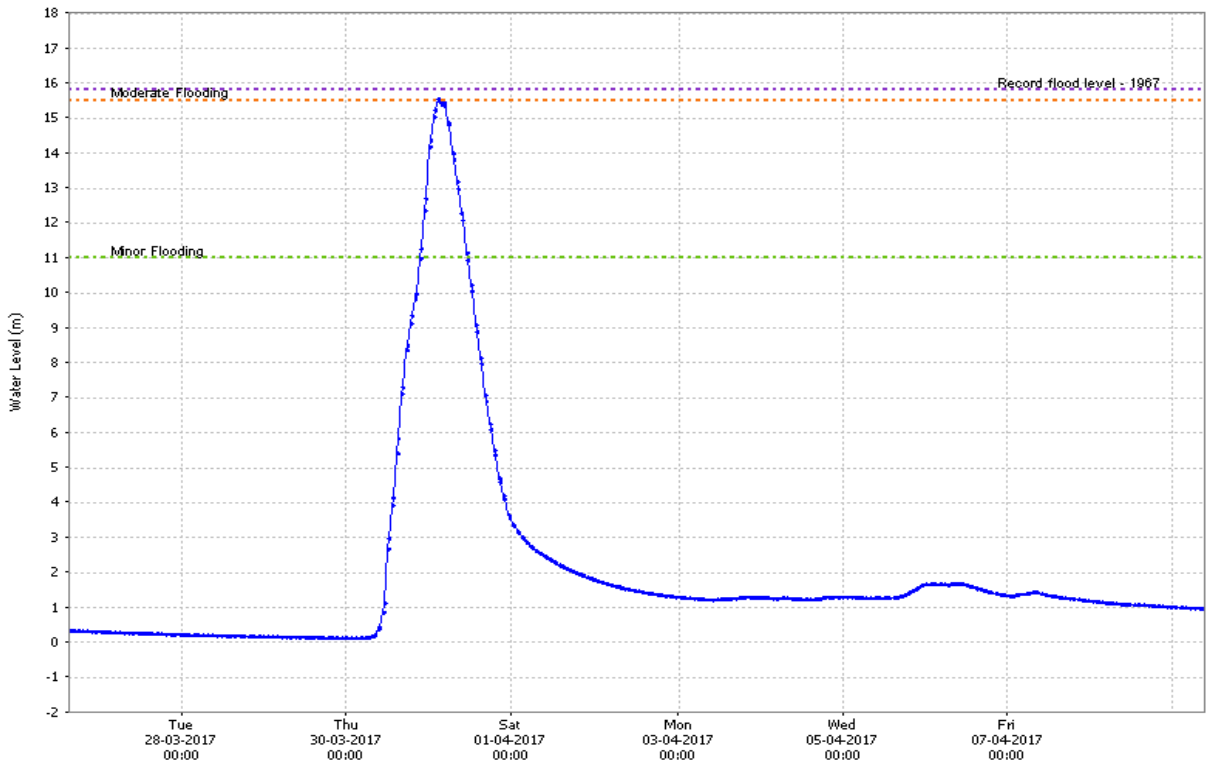
Brunswick River at Mullumimby



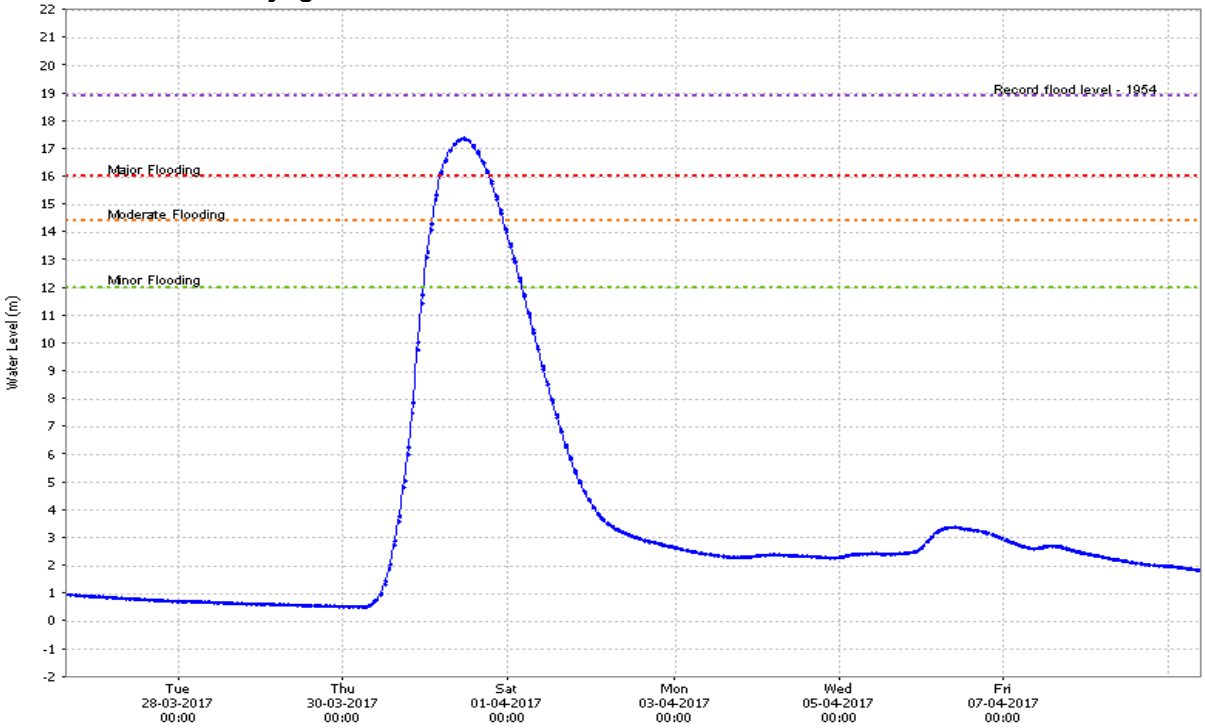
Wilsons River at Lismore



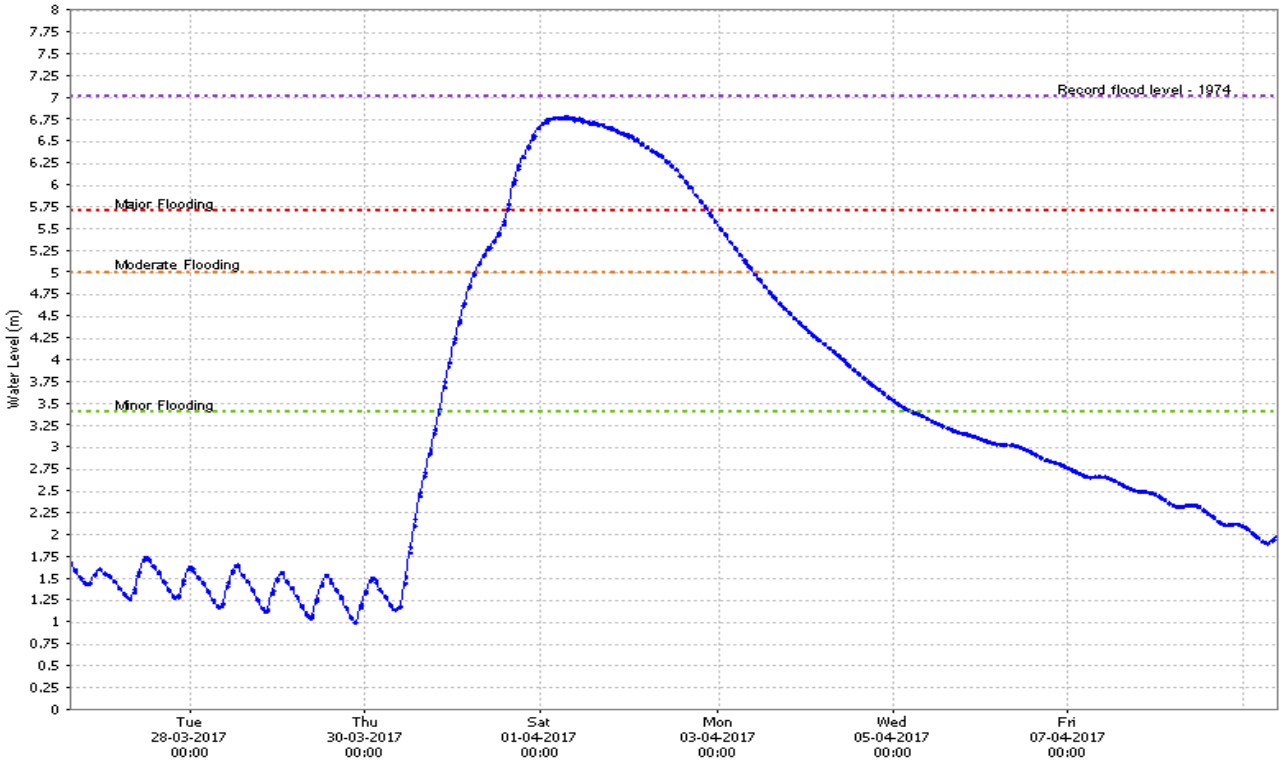
Richmond River at Wiangaree



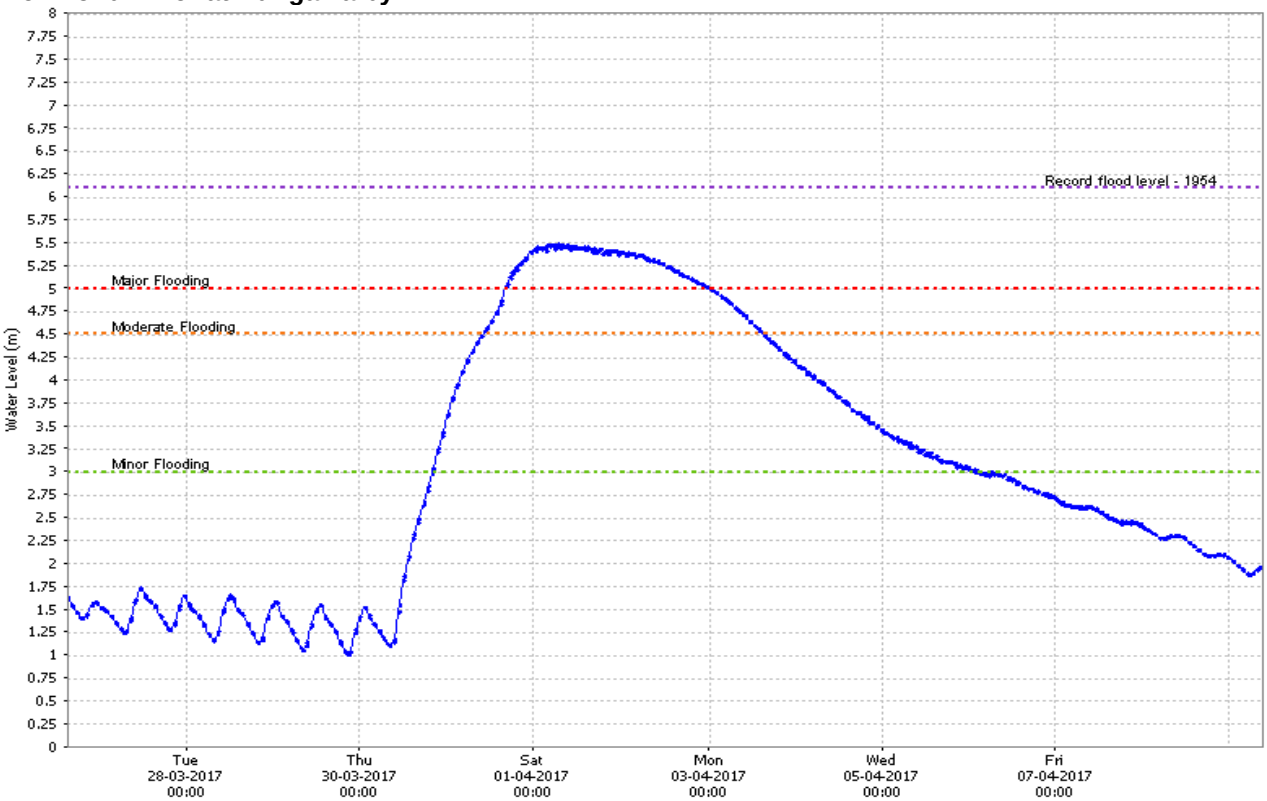
Richmond River at Kyogle



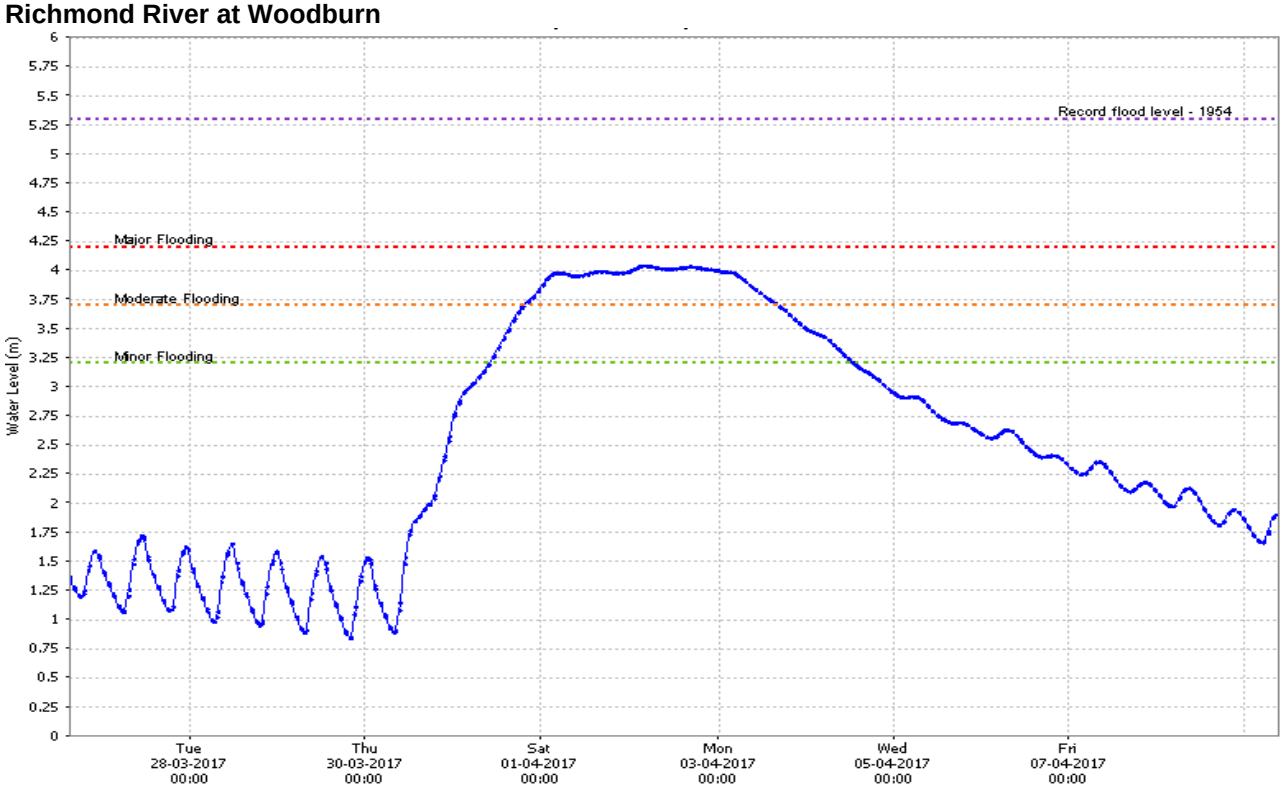
Richmond River at Coraki



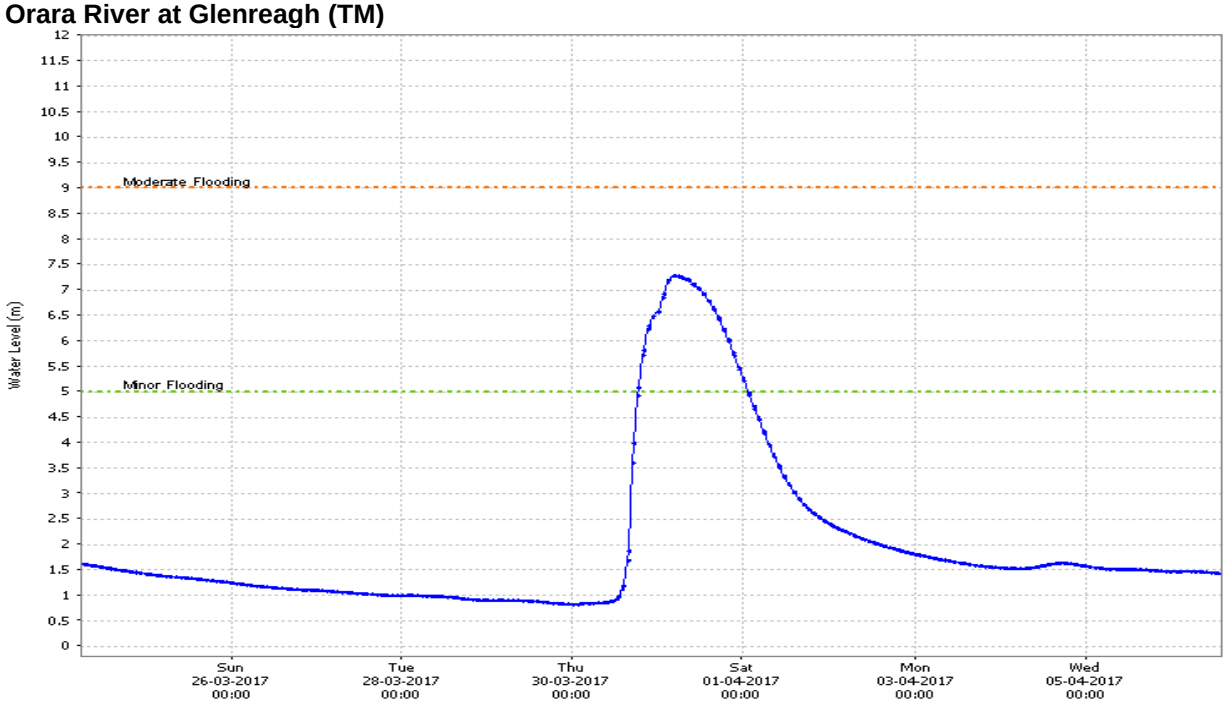
Richmond River at Bungawalbyn



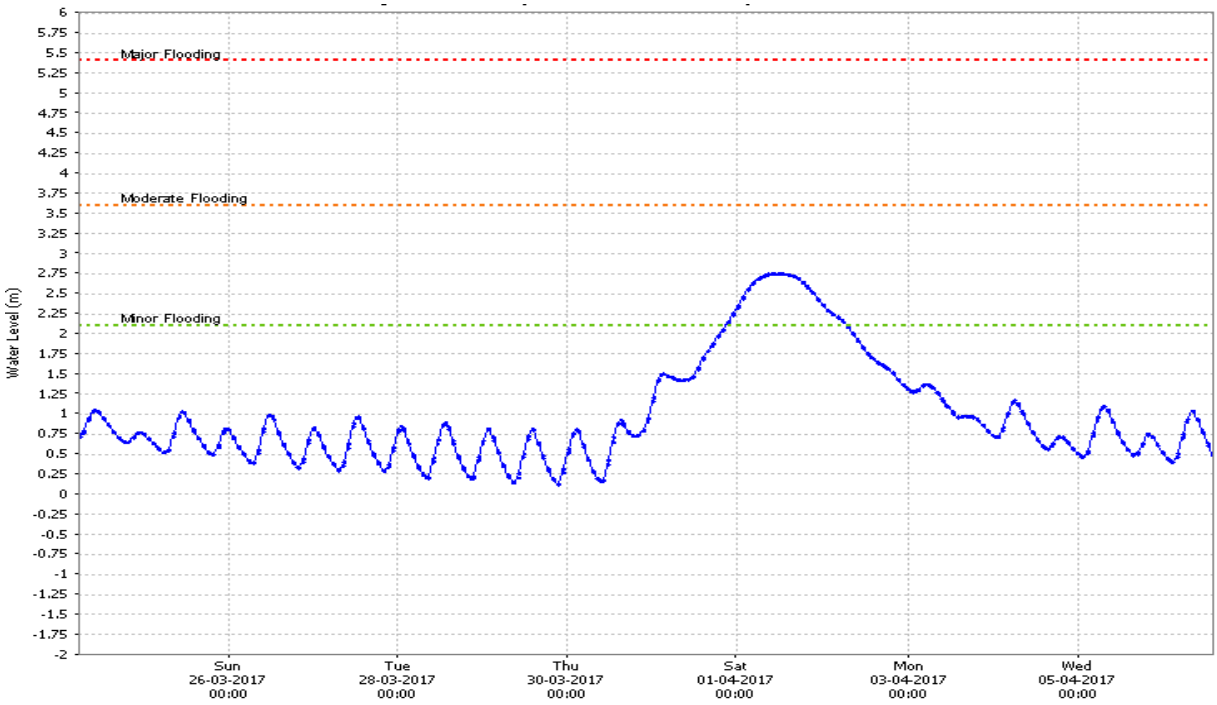
Richmond River at Woodburn



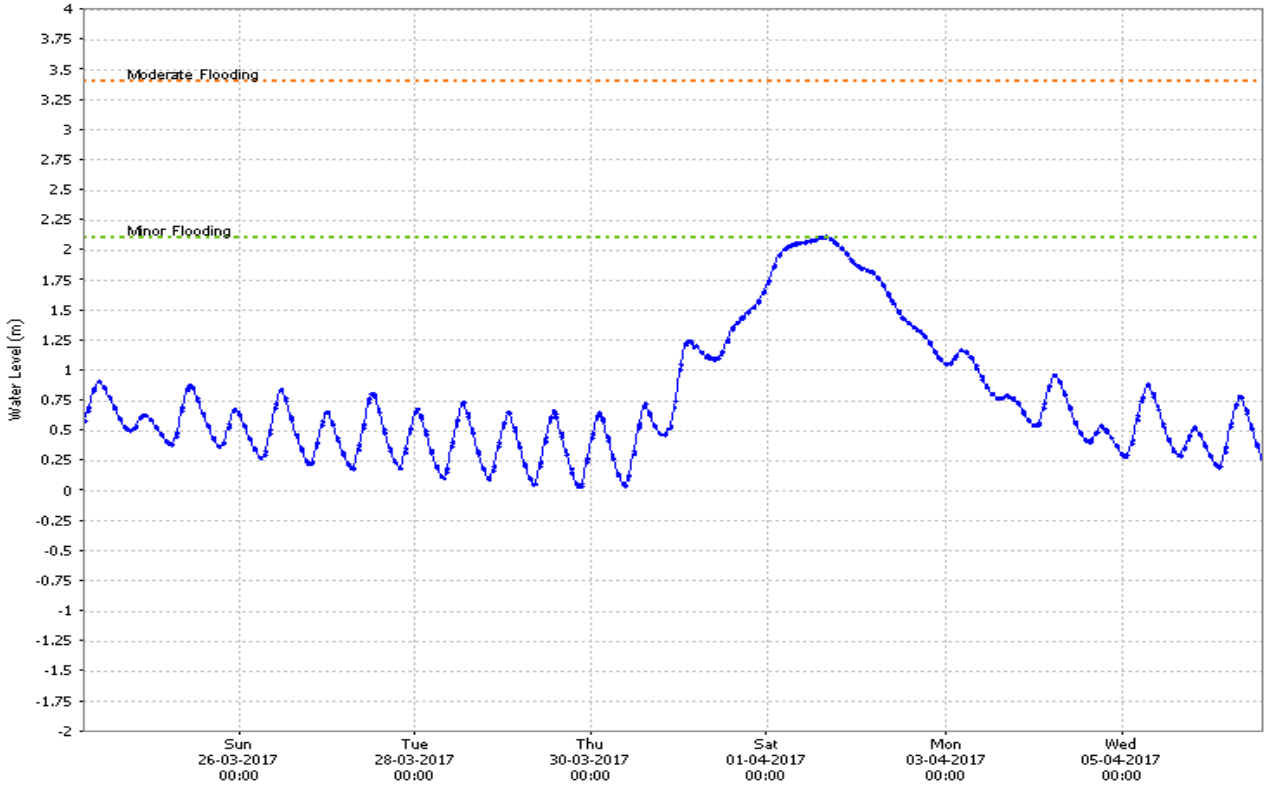
Orara River at Glenreagh (TM)



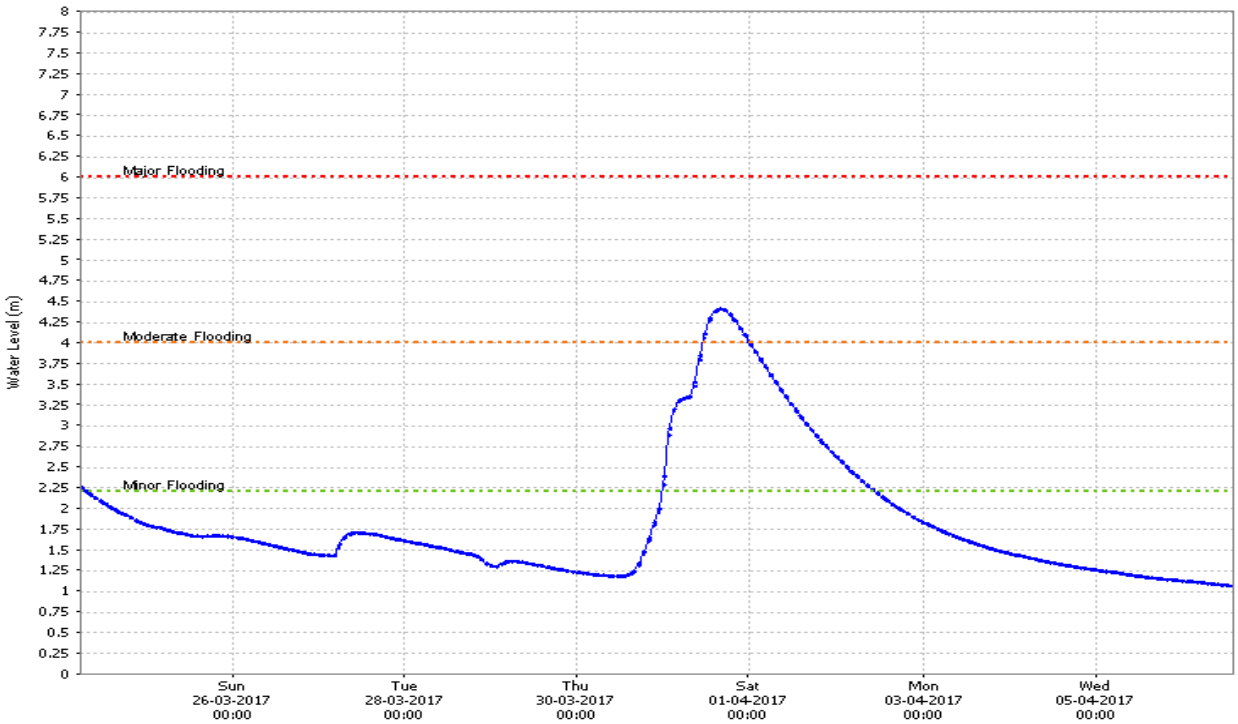
Clarence River at Grafton



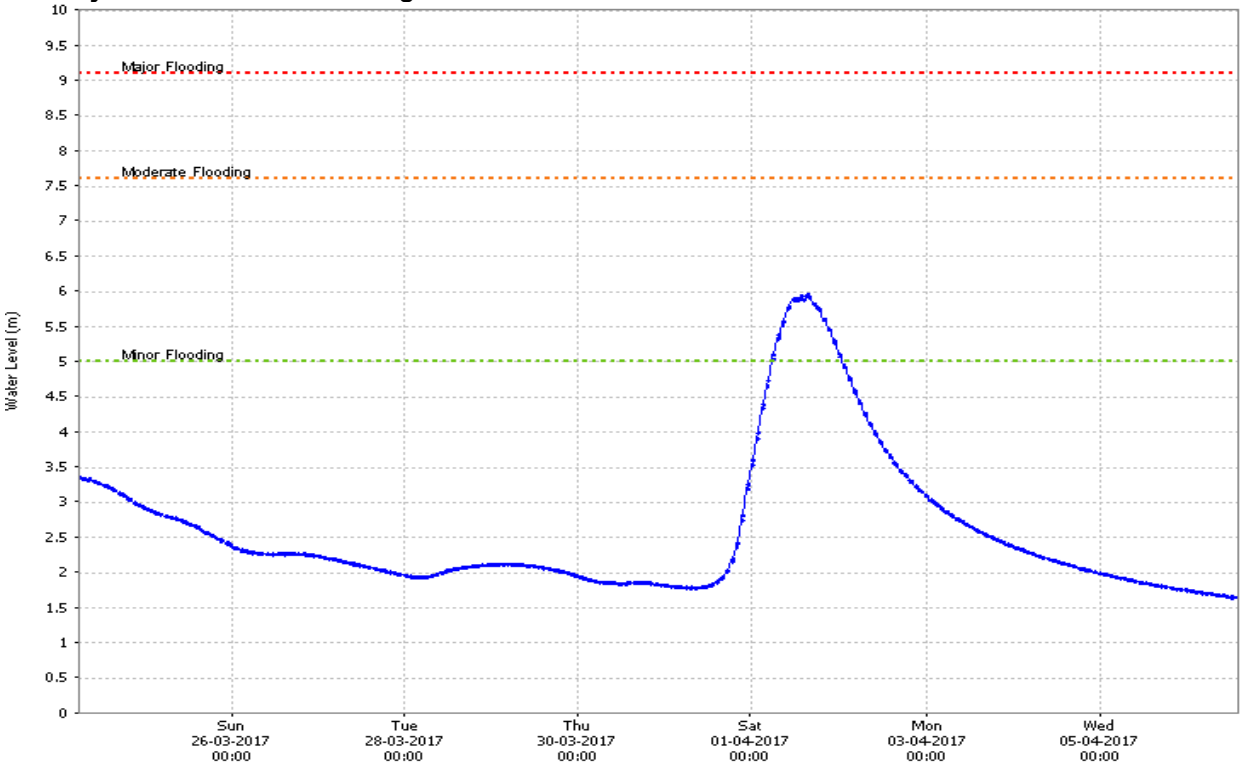
Clarence River at Ulmarra



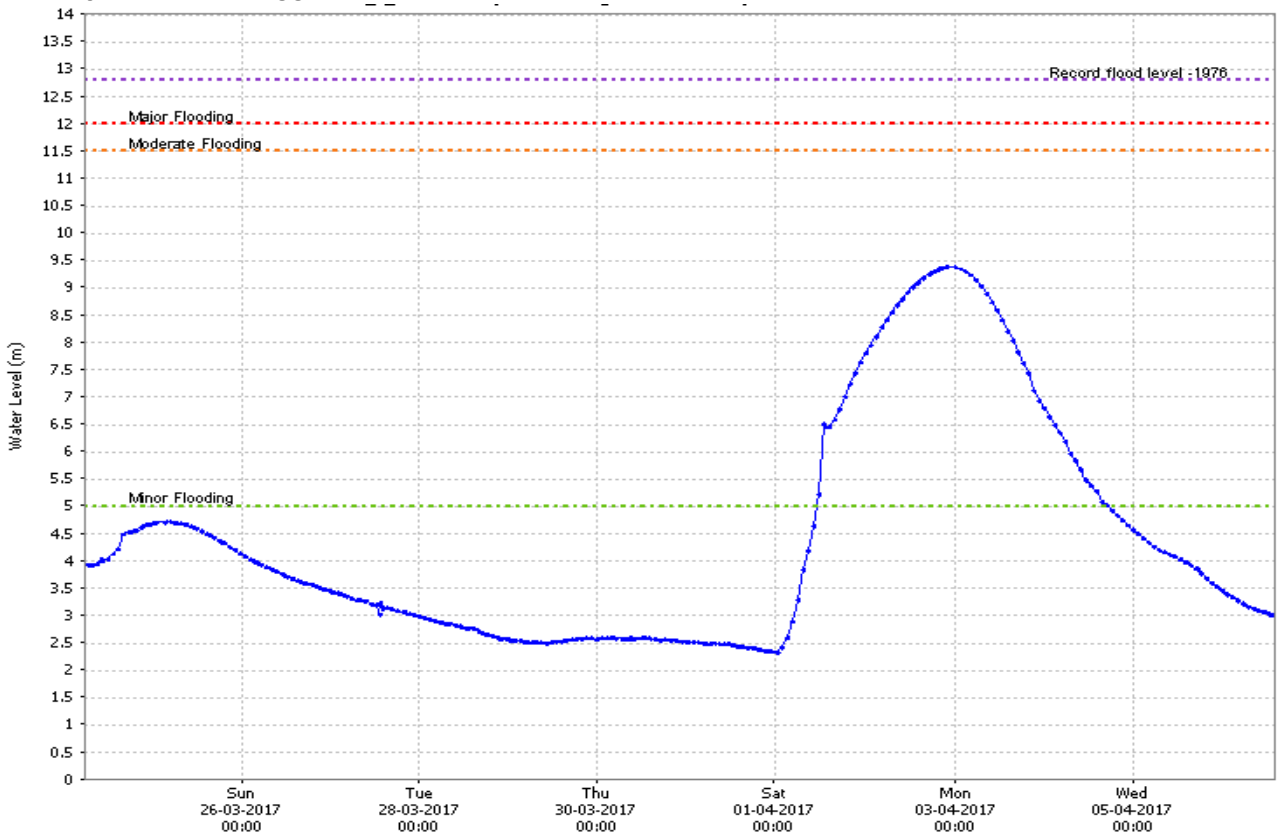
Macintyre River, Severn River at Ashford



Macintyre River at Yetman Bridge



Macintyre River at Boggabilla



4.3 Peak height tables

Burdekin River peak heights

Data is from 24 March to 5 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Alpha	No data available							58	10.26	Apr 1990
St Anns TM	5.69	31/03/2017 11:00am	4	6.5	10	Minor	25	19	10.20	Feb 1974
Taemas	No significant flood peak							11	9.91	Mar 1954
Sellheim	No data available							120	21.79	Mar 1946
Burdekin Dam	No significant flood peak							47	6.82	Feb 1991
Dalbeg	No data available							63	23.09	Apr 1958
Clare	No data available							122	18.39	Apr 1958
Inkerman Bridge ALERT	9.31	30/03/2017 1:59am	7	10	12	Minor	10	27	12.62	Apr 1958

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Clare TM [1]	12.16	30/03/2017 2:00am	9	13	17	Minor	6	43	14.30	Mar 2012
Clare HW TM [1]	24.51	30/03/2017 12:25am	23	27	31	Minor	6	13	29.57	Feb 2009
Dalbeg ALERT [2]	12.94	29/03/2017 1:45pm	10	15	20	Minor	13	27	19.95	Feb 1991
Dalbeg TM [2]	13.03	29/03/2017 1:45pm	10	15	20	Minor	13	42	20.10	Feb 1991
Jacks Creek ALERT	20.01	29/03/2017 2:27am	9	19	21	Moderate	**1**	25	*19.42**	*Jan 1970**
Jacks Creek TM	19.97	29/03/2017 2:27am	9	19	21	Moderate	**1**	10	*13.00**	*Mar 2012**
Groper Creek	3.09	30/03/2017 6:49am	3	3.5	4	Minor	7	18	4.54	Feb 2008
Millaroo ALERT	12.55	29/03/2017 10:08pm	9	13	17	Minor	21	27	19.40	Feb 1991
Myuna ALERT	12.67	29/03/2017 9:21am	5	13	15	Minor	4	27	15.72	Apr 1940
Rita Island ALERT	1.9	30/03/2017 2:30am	1	2	3	Minor	8	19	3.70	Feb 2008
Strathbogie ALERT	8.52	29/03/2017 11:02pm	8.5	10.5	11.5	Minor	9	27	11.41	Feb 2008

[1] Not the forecast location. Data was available for gauge which is located downstream of forecast location. Cannot directly correlate with forecast location. Information displayed for significance and/or reference only.

[2] Not the forecast location. Data was available for gauge which is located upstream of forecast location. Cannot directly correlate with forecast location. Information displayed for significance and/or reference only.

* Record broken in current event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Don River peak heights

Bowen Pump Station is the forecast location in the catchment and reached both moderate and major flood levels. Information locations all reached Major flood levels with some secondary peaks above the moderate flood level recorded.

Data is from 24 March to 30 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Bowen Pump Station	5.75	28/03/2017 11:17pm	2.5	4	5.5	Major	5	28	7.25	Jan 1970
	5.45	29/03/2017 10:55pm				Moderate	9			

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Ida Creek TM	5.87	29/03/2017 9:40pm	2.5	4	5.5	Major	3	28	8.27	Jan 1980
	4.68	29/03/2017 8:30pm				Moderate	8			
Mt Dangar ALERT	8.5	28/03/2017 9:46pm	2.5	4	5.5	Major	2	28	19.4	Feb 2008
	6.55	29/03/2017 8:06pm				Major	5			
Reeves TM	7.83	28/03/2017 10:30pm	3	5	7	Major	3	33	10.38	Jan 1980
	6.73	29/03/2017 10:00pm				Moderate	6			

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Proserpine River peak heights

There are no forecast locations in the Proserpine River catchment and none of the information locations reached significant river levels.

Pioneer River peak heights

Forecast locations in the catchment generally reached minor or below minor river peak levels. Information locations in the catchment reached Moderate and Major flood levels, with record flood levels recorded at Mirani Weir and Sarich's ALERT stations.

Data is from 24 March to 30 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Mirani	No data available – expected above Major (9.0m)							68	16.46	Feb 1958
Mackay	7.4	29/03/2017 1:04pm	7	8	9	Minor	49	12	9.14	Feb 1958

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Dumbleton Rocks ALERT	21.2	29/03/207 2:17pm	17.3	20	21	Major	**1**	12	*19.75**	*Mar 2011*
Finch Hatton ALERT	5.26	28/03/2017 9:28pm	3	4	5	Major	2	17	5.3	Dec 2010
Finch Hatton TM	5.3	28/03/2017 9:33pm	3	4	5	Major	**1**	13	5.05	Mar 2010
Gargett TM	8.29	29/03/2017 12:00am	5.5	8	9	Moderate	5	31	10.7	Apr 1989
	8.17	29/03/2017 8:30pm				Moderate	6			
Hospital Bridge	10.6	29/03/2017 1:57pm	7	10.5	11.5	Moderate	3	17	11.84	Jan 1970
Mirani Weir ALERT	12.49	29/03/2017 2:26am	7	9	10	Major	**1**	22	*12.11**	*Mar 2011*
Mirani Weir HW TM	52.35	29/03/2017 11:15am	49.5	50.5	51	Major	**1**	17	*51.78**	*Mar 2011*
	51.82	29/03/2017 9:30pm				Major	2			
Sarich's ALERT	13.93^	29/03/2017 11:02am	6.5	8	9.5	Major	**1**	22	*11**	*Feb 2008*
Sarich's TM	14.02^	29/03/2017 11:00am	6.5	8	9.5	Major	n/a	45	14.78	Jan 1970
Whiteford's TM	10.09	29/03/2017 10:02am	5	6.5	7.5	Major	2nd=2	24	11.25	Mar 1988
Whiteford ALERT	9.94	29/03/2017 10:03am	8	6.5	7.5	Major	**1**	22	*8.74**	*Mar 2011*

^Cannot verify this is as a peak height. However, this was the highest recorded verifiable water level.

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Fitzroy River peak heights

All of the forecast locations in the Isaac, Mackenzie and Fitzroy Rivers exceeded the major flood level. Information locations in the catchment mostly exceeded the moderate and major flood levels.

Data is from 30 March to 10 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Yatton	19.68	30/03/2017 9:00pm	7.5	9.5	16.5	Major	**1**	29	*19.62**	*Mar 1988*
Tartrus TM	18.29	31/03/2017 1:00pm	11	13	15	Major	**1**	29	*18.10**	*Jan 1991*
Emerald	No data available							94	16.05	Dec 2010
Taroom	No significant peak recorded							52	14.78	Mar 1890
Theodore	No data available							93	14.70	Jan 2011
Moura	No data available – expected Below Minor							55	12.90	Feb 1956
Baralaba	No data available – expected Below Minor							93	15.85	Apr 1928
Yaamba	16.10	06/04/2017 12:00am	9	12	15	Major	7	118	17.32	Jan 1918
Rockhampton	8.9	07/04/2017 2:00am	7	7.5	8.5	Major	7	90	10.11	Jan 1918

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Beckers TM	6.14	01/04/2017 8:00am	5	8.5	10.5	Minor	83	24	19.47	Dec 2010
	5.30	02/04/2017 2:00pm				Minor	91			
Bingegang H/W TM	10.69	31/03/2017 11:15am	9.5	12.5	15.5	Minor	8	22	13.78	Dec 1975
Bingegang Weir HW ALERT	10.68	31/03/2017 7:40am	9.5	12.5	15.5	Minor	2	7	18.17	2011
Braeside TM	7.66	28/03/2017 8:00pm	7	9	11	Minor	26	22	*11.50**	*Dec 1990**
	11.57	29/03/2017 2:40pm				Major	**1**			
Cardowan	10.9^	28/03/2017 6:00pm	9	11	15	Minor	n/a	64	19.10	Mar 1988
Coolmaringa TM	22.84	01/04/2017 12:30pm	15	17	19	Major	**1**	22	*22.38**	*Jan 1991**
Deverill TM	9.97	29/03/2017 10:00pm	7	9	11	Moderate	12	22	11.43	Mar 1988
Funnel Creek TM	9.34^	28/03/2017 5:30pm	7	8	9	Major	n/a	22	14.59	Dec 1990
Goovigen TM	9.91	30/30/2017 11:00pm	6.5	9	10.5	Moderate	11	85	11.03	Jan 2013
	10.36	31/03/2017 4:00pm				Moderate	6			
Kingsborough TM	8.31	30/03/2017 10:50am	5	6	7	Major	6	24	10.70	Jan 2013

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Knebworth TM	12.66	01/04/2017 8:30am	5	11	14	Moderate	7	13	17.84	Dec 2010
	12.74	02/04/2017 3:30pm				Moderate	6			
Laurel Bank	8.25	06/04/2017 1:41pm	4	6	8	Major	2	19	8.94	Jan 1991
Mt Bridget TM	19.94	29/03/2017 4:31am	9	10.5	15.5	Major	2	23	20.18	Mar 1988
Pink Lagoon TM	15.96	30/03/2017 5:00am	6.5	9	14.5	Major	3	22	16.43	Mar 1988
Rannes TM	10.06	31/03/2017 2:00am	6	8	11	Moderate	10	32	14.05	Jan 2013
	8.00	01/04/2017 12:00pm				Moderate	23			
Riverslea TM	26.33	03/04/2017 2:30pm	15	21	24	Major	7	101	31.48	Jan 1918
The Gap TM	18.35	05/04/2017 9:30pm	10	14	16	Major	6	13	23.51	Jan 1918
Wattlebank TM	21.42	05/04/2017 10:25pm	12	16	19	Major	2	22	24.6	Feb 1954
Wowan Westwood Rd ALERT	3.65	30/03/2017 8:24am	3	4	5	Minor	N/A	3	None	
Wura TM	6.03	30/03/2017 12:50am	4	6	8	Moderate	11	21	12.01	Feb 2015
	8.41	30/03/2017 8:30am				Major	6			

^Cannot verify this is as a peak height. However, this was the highest recorded verifiable water level

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Boyne River peak heights

There are no forecast locations in the Boyne River catchment, but the information location in the catchment did exceed the minor flood level.

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Awoonga Dam	42.02	31/03/2017 6:00am	40.3	n/a	n/a	Minor	4	17	48.3	Jan 2013

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Baffle River peak heights

Data is from 30 March to 1 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Essendean Bridge ALERT	9.17	30/03/2017 9:29pm	5	8	12	Moderate	2	6	*6.02**	*Jan 2015*
	10.47	31/03/2017 9:46pm				Moderate	**1**			

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Hills Road ALERT	4.68	30/03/2017 7:09pm	3	4	5	Moderate	2	6	9.13	2013
	3.33	01/04/2017 6:01am				Minor	3			
Mimdale ALERT	16.3	31/03/2017 9:25am	10	12	14	Major	**1**	6	*11.65**	*Jan 2015*
Mimdale TM	16.32	31/03/2017 10:20am	10	12	14	Major	8	17	22.33	Jan 2013

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Kolan River peak heights

Data is from 30 March to 31 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Bucca Weir ALERT	19.61	30/03/2017 10:27pm	17.5	18.5	19	Major	4	21	23.84	Jan 2013
Bucca Weir HW TM	19.55	30/03/2017 11:00pm	17.5	18.5	19	Major	4	21	23.84	Jan 2013

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Gin Gin Creek ALERT	9.44	30/03/2017 6:40pm	5	7	9	Major	**1**	6	*7.90**	*Feb 2015*
Gin Gin Creek TM	9.35	30/03/2017 6:50pm	5	7	9	Major	5	24	16.00	Jan 2013
Gooburrum PS TM	7.08	31/03/2017 1:45am	4.5	5.5	6	Major	4	13	10.65	Jan 2013
Gooburrum PS ALERT	7.16	31/03/2017 1:45am	4.5	5.5	6	Major	**1**	3	*4.36**	*Feb 2015*
Moolboolaman ALERT	6.85	30/03/2017 4:34pm	4	7	9	Minor	**1**	3	*6.2**	*Feb 2015*
Springfield ALERT	9.66	30/03/2017 6:05pm	7	5	10	Moderate	**1**	6	*9.56**	*Feb 2015*

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Burnett River peak heights

Data is from 30 March to 1 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Dunollie	4.60	30/03/2017 8:30pm	2.5	6.5	8	Minor	7	69	9.56	Feb 2015
Eidsvold Bridge	10.20	31/03/2017 10:00am	6	9	12	Moderate	11	62	22.21	Jan 2013
Mundubbera	9.62	31/03/2017 4:21pm	7	11	18	Minor		3	23.62	Feb 1942
Gayndah	No data available								19.46	Feb 1942
Stonelands	No significant peak								11.62	Jan 1974
Brian Pastures	No data available								15.27	1954
Walla ALERT	7.71	30/03/2017 7:52pm	6	8	12	Minor	4	6	10.11	Feb 2015
	8.76	01/04/2017 3:44pm				Moderate	3			
Walla TM	7.69	30/03/2017 8:00pm	6	8	12	Minor	34	107	23.50	Jan 2013
	8.75	01/04/2017 4:40pm				Moderate	25			
Bundaberg	No significant peak								9.53	Jan 2013

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Abercorn	6.97	31/03/2017 7:00pm	5	6	8	Moderate	26	69	11.15	Jan 2013
Abercorn ALERT	7.47	31/03/2017 12:41pm	5	6	8	Moderate	2	3	9.21	Feb 2015
Abercorn TM	7.52	31/03/2017 1:00pm	5	6	8	Moderate	14	43	11.15	Jan 2013
Brovinia ALERT	8.11	30/03/2017 4:53pm	5	7	9	Moderate	**1**	3	*4.21**	*Jan 2015*
Brovinia TM	8.09	30/03/2017 11:00pm	5	7	9	Moderate	8	26	14.65	Feb 1971
Carters TM	4.55	31/03/2017 9:00am	4	5	6	Minor	15	18	8.91	Jan 2011
Ceratodus TM	11.44	31/03/2017 6:00am	5.5	6.5	8.5	Major	13	57	20.08	Jan 2013
Cooranga TM	7.13	30/03/2017 8:00pm	4	6	7	Major	11	22	15.48	Jan 2013
	7.05	31/03/2017 1:00am				Major	12			
Coringa ALERT	8.96	30/03/2017 6:27pm	5	6	7	Major	N/A	6	None	
	9.16	30/03/2017 11:29pm					N/A			
Coringa TM	8.39	30/03/2017 7:00pm	5	6	7	Major	7	26	15.17	Jan 2013

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
	8.54	31/03/2017 12:00am				Major	4			
Eidsvold TM	8.86	31/03/2017 10:00am	4	7.5	10	Moderate	10	43	20.82	Jan 2013
Ettiewyn TM	7.87	31/03/2017 12:00am	7	8	9	Minor	30	24	11.39	Jan 2013
	8.61	31/03/2017 4:00pm				Moderate	18			
Fig Tree ALERT	8.12	01/04/2017 09:58am	6	8	12	Moderate	3	6	9.07	Jan 2015
Fig Tree TM	8.15	01/04/2017 1:00pm	6	8	12	Moderate	16	20	22.60	Jan 2013
Gayndah Flume ALERT	7.25	31/03/2017 10:53pm	5.5	8.5	15.5	Minor	3	3	8.05	Jan 2015
Gayndah Flume TM	7.26	31/03/2017 10:50pm	5.5	8.5	15.5	Minor	20	39	14.2	Feb 1971
Glenmore TM	3.02	02/04/2017 2:00am	2.8	3	3.5	Moderate	30	30	6.66	Jan 2011
John Goleby Weir HW TM	3.28	31/03/2017 5:15am	2.5	4	10	Minor	6	18	9.49	Jan 2013
Marriages ALERT	10.27	31/03/2017 2:45pm	4	7	10	Major	**1**	3	*7.32**	*Feb 2016*
Mt Lawless ALERT	6.11	01/04/2017 3:28am	5	6	8	Moderate	3	6	7.57	Feb 2015
Mt Lawless TM	5.95	01/04/2017 3:00am	5	6	8	Minor	29	47	17.98	Jan 2013
Mundubbera HW TM	3.32	31/03/2017 4:50pm	1.5	5	11	Minor	16	22	16.17	Jan 2013
Mundubbera TW TM	8.79	31/03/2017 6:10pm	6.3	10.3	17.3	Minor	12	36	18.29	Dec 2010
Paradise Dam ALERT	2.21	01/04/2017 7:39am	1.5	2.5	3.5	Minor	3	3	2.55	Feb 2015
Paradise Dam HW TM	2.2	01/04/2017 10:45am	1.5	2.5	3.5	Minor	9	8	8.70	Jan 2013
Proston	4.86	31/03/2017 10:00am	4	5.5	7	Minor	23	44	12.42	Jan 2013
Walla Weir ALERT	21.94	30/03/2017 8:07pm	20.5	21.5	23	Moderate	4	6	22.79	Feb 2015
	22.19	01/04/2017 3:33pm				Moderate	3			
Walla Weir HW TM	21.97	30/03/2017 9:00pm	20.5	21.5	23	Moderate	14	16	29.11	Dec 2010
	22.22	01/04/2017 6:15pm				Moderate	11			
Yarrol	5.97	30/03/2017 3:58am	5	6	7	Minor	15	26	12.45	Jan 2013
	7.95	30/03/2017 6:10pm				Major	6			

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Burrum-Cherwell River peak heights

Data is from 29 March to 31 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Howard	6.26	30/03/2017 7:27pm	6	8	10	Minor	11	22	13.40	1955
Pacific Haven	2.78	30/03/2017 11:53pm	2.5	3	3.5	Minor	9	22	6.16	1992

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Dr Mays Crossing	2.58	29/03/2017 8:00pm	1.5	2	2.5	Major	13	24	4.53	Jan 2013
	2.69	30/03/2017 11:00pm				Major	2nd = 12			
Bruce Highway	8.59	31/03/2017 2:00am	8	10	12	Minor	15	24	14.29	Jan 2013
Burrum Highway	9.76	29/03/2017 11:00pm	8	9.5	11	Moderate	17	24	13.60	Jan 2013
	10.13	31/03/2017 3:00am				Moderate	12			

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Mary River peak heights

Data is from 30 March to 1 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Moy Pocket	No significant peak – below minor							42	16.80	Feb 1999
Dagun Pocket ALERT	9.84	31/03/2017 12:30PM	7	13	15	Minor	3	6	16.90	Jan 2013
Dagun Pocket TM	9.84	31/03/2017 1:06pm	7	13	15	Minor	60	28	18.43	Feb 1999
Gympie	No data available							147	25.45	Feb 1893
Miva TM	9.61	31/03/2017 9:00am	7.5	9.5	15.5	Moderate	35	47	20.80	Jan 1974
	9.21	01/04/2017 12:00pm				Minor	39			
Tiaro	8.25	01/04/2017 7:00pm	6	8	12	Moderate	98	124	21.95	Feb 1893
Tiaro ALERT	8.35	31/03/2017 10:02pm	6	8	12	Moderate	3	3	12.30	Feb 2015
	8.55	01/04/2017 10:32pm				Moderate	2			
Maryborough	No data available							142	12.27	Feb 1893

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Home Park	8.56	31/03/2017 5:30pm	7	9	13	Minor	31	35	23.14	Jan 2013
	8.91	01/04/2017 5:00pm				Minor	29			
Conondale	3.15	30/03/2017 7:24pm	2.8	4.2	6.3	Minor	3	4	4.45	Feb 2015
Cooran ALERT	9.27	30/03/2017 10:39pm	6.5	8.5	11	Moderate	8	15	11.12	Feb 2012
Cooran TM	9.24	30/03/2017	6.5	8.5	11	Moderate	24	28	11.94	Feb 1992
Fishermans Pocket	11.11	01/04/2017 3:00am	7	13	18	Minor	36	42	23.68	Feb 1999
Kilkivan	5.49	30/03/2017 6:00pm	4.5	5.5	7.5	Minor	8	43	8.99	Jan 2011
Lake Macdonald Drive	4.25	31/03/2017 12:18am	4	5	5.5	Minor	13	15	6.90	Feb 2012
Marodian	9.61	31/03/2017 9:00am	8	8	12	Moderate	21	43	16.08	Mar 1955
Tagigan Road	5.25	31/03/2017 8:00am	4	4.5	5	Major	27	24	8.92	Mar 2012

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Sunshine Coast peak heights

Data is from 30 March, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Tewantin	No significant peak recorded							29	2.00	Jan 1968
Dunethin Rock	No significant peak recorded							23	3.65	Feb 1999
Picnic Point	1.25	30/03/2017 11:32pm	1.25	1.5	1.65	Minor	10	29	3.51	1893

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Doonan Creek ALERT	4.10	30/03/2017 1:04pm	4.05	4.15	4.4	Minor	8	21	4.45	Jan 2011
Jordan St ALERT	5.15	30/03/2017 7:22pm	4	5.05	5.55	Moderate	2nd = 5	14	5.35	Jan 2011
Kiamba ALERT	3.24	30/03/2017 7:05pm	2.85	3.45	5.55	Minor	2nd = 15	23	4.39	Jan 2013
Kiamba TM	3.24	30/03/2017 7:10pm	2.85	3.45	5.55	Minor	20	17	5.79	Jun 1967
Mawsons Road ALERT	2.92	30/03/2017 3:35pm	2.75	4.57	8.2	Minor	12	7	8.38	May 2015
	2.87	31/03/2017 2:56am				Minor	13			
Mawsons Road TM	2.98	30/03/2017 4:30pm	2.75	4.57	8.2	Minor	10	11	8.5	May 2015
	2.92	31/03/2017 3:40am				Minor	11			
Mooloolah ALERT	5.1	30/03/2017 11:23am	4.55	5.05	5.85	Moderate	5	14	5.65	May 2015
	4.8	30/03/2017 10:13pm				Minor	2nd = 12			
Mooloolah TM	5.05	30/03/2017 12:00pm	4.55	5.05	5.85	Moderate	32	17	5.83	Apr 1989
	4.80	30/03/2017 11:00pm				Minor	43			
Palmview ALERT	4.09	31/03/2017 1:27am	2.1	3.85	4.55	Moderate	13	14	5.04	Jan 2011
Yandina ALERT	2.97	30/03/2017 7:20pm	2.75	3.25	3.95	Minor	2nd = 19	23	4.03	Jan 1999
Yandina TM	2.99	30/03/2017 7:40pm	2.75	3.25	3.95	Minor	2nd = 21	24	5.15	Jun 1983
Yandina Creek ALERT	5.24	30/03/2017 7:08pm	5	5.35	5.75	Minor	8	21	5.61	Aug 2007

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Pine and Caboolture Rivers peak heights

Data is from 30 March 2017, with historical comparisons included.

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Aspley ALERT	29.13	30/03/2017 12:19pm	29	29.5	30.5	Minor	4	23	29.71	Mar 2001
Burpengary (Dale St) ALERT	9.54	30/03/2017 1:00pm	9	10	10.4	Minor	12	19	11.19	Jan 2011
	9.44	30/03/2017 11:39pm				Minor	13			
Burpengary (Rowley Rd) ALERT	18.96	30/03/2017 9:51pm	18.5	19.2	20.2	Minor	5	19	20.2	Feb 1999
Caboolture WTP ALERT	7.99	30/03/2017 11:04pm	7.2	8.8	9.7	Minor	6	19	10.94	Jan 2011
Everton Hills ALERT	43.92	30/03/2017 10:47am	43.8	44	44.3	Minor	9	23	44.44	Jun 2016
	44.16	30/03/2017 12:29pm				Moderate	8			
	43.86	30/03/2017 8:51pm				Minor	10			
Zillmere ALERT	12.26	30/03/2017 1:13pm	12	12.8	13.5	Minor	5	23	12.78	Mar 2001

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Upper Brisbane River peak heights

Data is from 31 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Woodford	No data available							127	11.73	Feb 1893
Woodford TM	6.03	31/03/2017 3:00am	5	6.1	8.5	Minor	4	7	7.36	Feb 2015
Woodford ALERT-B	6.06	31/03/2017 2:34am	5	6.1	8.5	Minor	2nd=9	15	7.81	Jan 2013
Woodford ALERT-P	6.08	31/03/2017 2:54am	5	6.1	8.5	Minor	11	15	9.38	Jan 2011
Gregor Creek	No data available							55	14.56	Jan 2011

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Peachester ALERT	7.21	31/03/2017 12:56am	5	8	9	Minor	16	22	9.04	Jan 2011
Peachester WRC TM	7.19	31/03/2017 01:00am	5	8	9	Minor	32	33	9.75	Jul 1954

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Lower Brisbane River peak heights

Data is from 31 March to 1 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Gatton	No data – expected below minor							88	16.33	Feb 1893
Laidley	No data available							35	8.95	Jan 2013
Lowood	No data available							108	26.39	Feb 1893
Mt Crosby	No significant peak – below minor							123	32.00	Feb 1893
Rosewood	6.62	31/03/2017 2:00am	4	5	6	Major	5	108	7.62	Jan 1974
Five Mile Bridge	7.96	31/03/2017 4:59am	3.5	5.5	7	Major	3	23	8.90	Jan 2011
Walloon	9.44	31/03/2017 7:24am	5	6.5	8.5	Major	5	23	11.56	Jan 1974
Ipswich	12.35^	31/03/2017 1:00pm	7	9	11.7	Major	13	147	24.50	Feb 1893
Kalbar	12.00	31/03/2017 7:30am	6	7	9	Major	**1**	59	*11.00**	*Jan 2013*
Amberley	8.04	31/03/2017 11:55am	4	5.5	6.5	Major	2	23	8.12	Jan 2011
Harrisville	5.86	31/03/2017	3	5	4	Major	7	127	8.33	Feb 1893
Moggill	No significant peak – below minor							29	24.50	Feb 1893
Jindalee	No data available							42	17.90	Feb 1893
Brisbane City	No significant peak – below minor							23	8.43	1841

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Adams Bridge ALERT	4.68	30/03/2017 7:09pm	4	5	6	Moderate	3	23	5.23	Jan 2013
Adams Bridge TM	3.33	01/04/2017 6:01am	4	5	6	Moderate	2nd=46	24	5.29	Feb 1971
Beatty Road ALERT	6.54	31/03/2017 10:09am	6.2	6.99	8.16	Minor	5	28	9.18	Jan 2011
Blackstone Bridge ALERT	20.04	31/03/2017 1:53am	19	20	21	Moderate	5	26	21.5	1974
Brassall ALERT	14.33	31/03/2017 1:02pm	8	10	12	Major	3	19	22.6	Jan 1974
Brisbane Road ALERT	5.97	31/03/2017 1:32pm	4	5	6	Moderate	**1**	25	*5.82**	*May 2015*
Bundamba School ALERT	16.41	31/03/2017 3:11am	14.5	16	17.5	Moderate	7	26	20.6	1974
Churchbank Weir ALERT	3.55	31/03/2017 5:05am	1	2	3	Major	**1**	15	*3.47**	*Jan 2011*

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Churchbank Weir TM	3.53	31/03/2017 5:21am	1	2	3	Major	95	22	15.38	Dec 2010
Churchill ALERT	18.49	31/03/2017 11:19am	15.54	17.54	19.54	Moderate	**1**	19	*15.74**	*Jun 2016*
Coopers Plains ALERT	7.24	30/03/2017 12:09pm	7	7.97	8.5	Minor	18	28	10.96	Jan 1974
Corinda High ALERT	4.05	31/03/2017 12:44am	3.45	4.53	6.05	Minor	2nd=3	25	9.33	Jan 2011
Durack King Ave ALERT	8.36	30/03/2017 03:16pm	8.23	8.77	9.23	Minor	4	28	9.29	May 1996
East Brisbane ALERT	2.73	30/03/2017 12:33pm	2	2.8	3.5	Minor	4	23	3.66	Mar 2001
Enoggera Dam ALERT	76.6	31/03/2017 01:28am	75.5	77	79	Minor	9	23	79.56	May 1996
Glenore Grove ALERT	9.26	31/03/2017 12:01pm	8	11	13	Minor	16	23	15.34	Jan 2011
Grandchester ALERT	4.9	31/03/2017 8:16pm	3	4	5	Moderate	4	18	5.43	Jan 2011
Harding Street ALERT	25.32	31/03/2017 12:55am	24	25	26	Moderate	**1**	26	*25.2**	*1974*
Holland Park West ALERT	17.58	31/03/2017 08:40pm	17.5	17.9	18.3	Minor	8	23	18.49	Mar 2001
Junction View ALERT	2.11	31/03/2017 9:39pm	1	2	3	Moderate	N/A	5	None	
Kelvin Grove ALERT	5.21	30/03/2017 01:15pm	5.15	5.93	6.68	Minor	4	23	6.82	May 2009
Loamside ALERT	8.2	31/03/2017 03:01am	5	6.5	8	Major	4	18	9.26	Jan 1974
Loamside TM	8.16	31/03/2017 03:00am	5	6.5	8	Major	3	22	8.19	May 2009
Lyons Bridge ALERT-P	10.82	31/03/2017 05:59pm	10	11.5	13	Minor	14	12	17.25	Jan 2011
Mansfield ALERT	10.60	30/03/2017 09:38pm	10.2	11.5	12.5	Minor	5	23	12.02	Mar 2001
Marshall Road ALERT	4.69	30/03/2017 12:54pm	3	5	7	Minor	5	10	9.17	Jan 2011
Moon Road ALERT	3.5	30/03/2017 08:54pm	2	4	5	Minor	4	5	5.85	Jan 2011
Mulgowie ALERT	9.31	30/03/2017 08:54pm	5	6	7	Major	**1**	6	*9.11**	*Jan 2013*
Mulgowie TM	9.35	30/03/2017 09:20pm	5	6	7	Major	N/A	27	None	
Muriel Ave ALERT	5.68	30/03/2017 12:11pm	4.2	6.3	7.8	Minor	3	10	8.96	Jan 2011
New Beith ALERT	5.44	31/03/2017 12:24am	4	5	6	Moderate	2	23	6.95	1974
New Beith TM	5.47	31/03/2017 01:00am	4	5	6	Moderate	**1**	41	*5.39**	*Jan 2013*
One Mile Bridge ALERT	18.9	31/03/2017 11:09am	10	12	14	Major	4	27	25.1	Jan 1974
Oxley Creek ALERT	42.68	31/03/2017 02:20am	39	40	41.5	Major	**1**	4	*42.13**	*May 2015*
Ransome ALERT	3.01	30/03/2017 09:55pm	2.8	3.2	3.5	Minor	3	18	3.48	1974

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Rifle Range Road ALERT	10.72	31/03/2017 07:17pm	10.5	12	13.5	Minor	3	5	16.7	Jan 2013
Rifle Range Road TM	10.73	31/03/2017 08:00pm	10.5	12	13.5	Minor	21	40	17.42	1974
Showground Weir ALERT	9.28	31/03/2017 01:36am	6	7	7.8	Major	3	23	9.36	Dec 2010
Showground Weir HW TM	9.27	31/03/2017 01:38am	6	7	7.8	Major	**1**	33	*9.25**	*Jan 2013*
Spressers Bridge ALERT	5.65	31/03/2017 01:41am	4	4.4	4.8	Major	4	16	7.17	Jan 2011
Tenthill ALERT	6.57	31/03/2017 12:11am	4.5	5	6.5	Major	4	23	9.9	May 1996
Tenthill TM	6.50	31/03/2017 12:00am	4.5	5	6.5	Major	6	24	8.03	Feb 1971
Upper Brookfield TM	3.17	30/03/2017 11:00pm	2	3	4	Moderate	8	15	4.22	Apr 1989
Warrego Highway ALERT	6.09	31/03/2017 08:29am	4.5	5.2	5.5	Major	**1**	6	*5.61**	*Feb 2013*
Warrego Highway TM	5.98	31/03/2017 10:00am	4.5	5.2	5.5	Major	77	26	7.41	Jan 2013

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Logan-Albert Rivers peak heights

Data is from 31 March to 2 April 2017, with historical comparisons included

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Beaudesert	14.76	31/03/2017 4:55am	5.5	7.8	8.3	Major	**1**	15	*13.90**	*Feb 1991*
Beenleigh	8.02	31/03/2017 11:09am	3.5	4.5	5.5	Major	3	11	8.10	Jan 1887
Maclean Bridge	20.5	01/04/2017 12:00am	10	13.5	16	Major	3	11	22.30	Jan 1887
Eagleby	No data available							n/a	7.58	Jan 1887
Maclean Bridge ALERT	20.66	01/04/2017 1:16am	10	13.5	16	Major	**1**	15	*15.02**	*Jan 2008*
Waterford Bridge	No data available							n/a	13.70	Jan 1887
Waterford ALERT	10.5	01/04/2017 10:00pm	6	7.5	9	Major	**1**	12	*9.05**	*Jan 2013*
Wolffdene ALERT	13.55	01/04/2017 7:33am6	6	8	10	Major	2	18	13.70	Jan 1974

* New record set with this event

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Bahrs Scrub ALERT	7.95	30/03/2017 11:19am	7.5	8	8.5	Minor	3	5	*8.55**	*May 2015*
	7.91	30/03/2017 9:57pm				Minor	4			
	9.85	31/03/2017 9:42am				Major	**1**			
Bayes Rd ALERT	7.77	30/03/2017 12:04pm	7.6	8	8.4	Minor	5	3	*8.47**	*May 2015*
	7.92	30/03/2017 9:18pm				Minor	4			
	12.02	01/04/2017 9:04pm				Major	**1**			
Benobble ALERT	7.84	30/03/2017 3:25pm	3	4.5	6	Major	3	15	*8.05**	*Jan 2008*
	8.19	30/03/2017 11:36pm				Major	**1**			
Benobble TM	7.87	30/03/2017 3:30pm	3	4.5	6	Major	3	16	8.09	Jan 2008
	8.02	31/03/2017 12:40am				Major	2			
Boonah ALERT	7.6	30/03/2017 10:09pm	4	5	6	Major	2	12	7.65	May 2015 & Apr 2015
Bromfleet ALERT	17.41	31/03/2017 2:20am	9	12	16	Major	**1**	12	15.71	Jan 2013

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Carbrook (Riedel Road) ALERT	2.05	31/03/2017 2:11pm	2	3	4	Minor	2	12	None	
	2.15	0104/2017 2:54am				Minor	**1**			
Croftby ALERT	4.61	30/03/2017 11:38am	3	4.5	6	Moderate	3	15	*5.54**	*Jan 2008*
	7.36	30/03/2017 8:38pm				Major	**1**			
Croftby TM	4.60	30/03/2017 12:00pm	3	4.5	6	Moderate	18	51	*6.96**	*Feb 1971*
	7.28	30/03/2017 8:51pm				Major	**1**			
Dieckmans Bridge ALERT	6.98	30/03/2017 3:34pm	3	4.5	6	Major	4	15	8.26	Jan 2008
	7.13	30/03/2017 5:52pm				Major	3			
	7.53	30/03/2017 10:42pm				Major	2			
	6.83	31/03/2017 2:39am				Major	5			
Dieckmans Bridge TM	6.96	30/03/2017 3:55pm	3	4.5	6	Major	8	24	8.25	Jan 2008
	7.15	30/03/2017 6:28pm				Major	6			
	7.36	30/03/2017 10:36pm				Major	5			
	6.80	31/03/2017 3:00am				Major	9			
Flagstone Creek (Jimboomba) ALERT	7.45	31/03/2017 1:13am	5	6	8	Moderate	2	3	*4.8**	*May 2015*
	10.40	31/03/2017 9:42pm				Major	**1**			
Forest Home TM	3.91	30/03/2017 12:00pm	3	5	7	Minor	19	100	7.83	Feb 1991
	7.15	30/03/2017 9:30pm				Major	2			
Henderson Creek ALERT	3.9	30/03/2017 1:41pm	2.1	2.4	2.6	Major	N/A	2	None	
	9.2	31/03/2017 10:49pm				Major				
Logan Village ALERT	15.91	01/04/2017 11:36am	6	9	11	Major	**1**	5	*14.16**	*Jan 2013*
Lower Quinzeh ALERT	4.7	30/03/2017 10:47pm	4.7	6.5	8	Minor	3	3	*5.65**	*May 2015*
	8.0	01/04/2017 2:21pm				Major	**1**			
Lumeah ALERT	9.86	30/03/2017 3:32pm	5	7	9	Major	2	15	*8.78**	*Mar 2004*
	9.91	31/03/2017 12:43am				Major	**1**			
Lumeah TM	9.80	30/03/2017 3:50pm	5	7	9	Major	6	17	9.98	Apr 1989
	9.90	31/03/2017 12:50am				Major	3			

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Maroon Dam HW ALERT	2.38	31/03/2017 7:26am	1.8	2.2	2.5	Moderate	2	8	2.68	Jan 2013
Marsden (First Ave) ALERT	10.7	30/03/2017 11:23pm	9	10	11	Moderate	2	12	11.5	May 2015
Parklands ALERT	6.19	02/04/2017 2:06am	2.5	4	5	Major	**1**	4	*2.84**	*May 2015*
Rathdowney ALERT	13.96	30/03/2017 11:56pm	3	6	9	Major	**1**	13	*12.25**	*Jan 2013*
Rathdowney TM	13.93	30/03/2017 11:50pm	3	6	9	Major	3	44	14.5	1947
Round Mountain ALERT	16.66	31/03/2017 2:00am	6	9.5	13	Major	**1**	15	*15.37**	*Jan 2008*
Round Mountain TM	16.64	31/03/2017 2:20am	6	9.5	13	Major	3	60	16.98	Feb 1976
Rudds Lane ALERT	7.13	30/03/2017 2:56pm	4	5.5	6.5	Major	3	15	*7.33**	*Jan 2012*
	7.43	30/03/2017 11:09pm				Major	**1**			
Schmidts Rd ALERT	4.22	30/03/2017 12:55pm	4	5	6	Minor	3	3	*5.62**	*May 2015*
	12.02	01/04/2017 6:55pm				Major	**1**			
Slacks Creek (Loganlea Rd) ALERT	8.2	02/04/2017 12:33am	4	6	7.5	Major	2	12	10.5	Nov 2004
Slacks Creek Reserve Park ALERT	9.5	30/03/2017 9:28pm	8	9	10	Moderate	3	12	10.9	Mar 2001
	8.3	02/04/2017 1:49am				Minor	4			
Tamborine ALERT	15.94	31/03/2017 1:43am	10	11	15	Major	**1**	3	*11.55**	*May 2015*
Upper Quinzeh ALERT	2.65	30/03/2017 12:30pm	1.9	2.2	2.4	Major	N/A	2	None	
	2.8	30/03/2017 10:15pm				Major				
Yarrahappini ALERT	19.96	31/03/2017 3:26pm	10	14	16	Major	**1**	11	*17.42**	*Jan 2013*
Yarrahappini TM	19.97	31/03/2017 5:40pm	10	14	16	Major	2	48	20.75	Jan 1974

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

South Coast peak heights

Data is from 30 March to 31 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Clearview	No significant peak recorded							n/a	10.22	Jan 1974
Evandale	No significant peak recorded							n/a	2.87	Feb 1954

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Canungra Army ALERT	6.25	30/03/2017 4:00pm	5	6	7	Moderate	5	13	8.6	Jan 2008
	8.50	31/03/2017 4:00pm				Major	2			
Canungra Army TM	6.23	30/03/2017 3:00pm	5	6	7	Moderate	8	55	*7.63**	*Apr 1989*
	8.47	31/03/2017 1:00am				Major	**1**			
Clagiraba Road ALERT	2.62	30/03/2017 1:59pm	0.5	1.5	2.5	Major	N/A	17	None	
	5.22	30/03/2017 11:11pm				Major				
Coplicks Bridge ALERT	3.62	30/03/2017 3:17pm	2	3	4	Moderate	3	16	4.16	Jun 2005
	4.32	31/03/2017 1:02am				Major	**1**			
Hinze Dam HW ALERT	5.78	31/03/2017 6:07am	3.6	6.2	7.8	Minor	**1**	26	2.94	May 1996
Hinze Dam HW TW	5.78	31/03/2017 6:10am	3.6	6.2	7.8	Minor	**1**	5	4.36	Jan 2013
Little Nerang Dam ALERT	2.46	30/03/2017 7:38am	1	2	3	Moderate	5	25	3.3	May 1996
	2.98	30/03/2017 1:18pm				Moderate	3			
	3.72	30/03/2017 11:47pm				Major	**1**			
Little Nerang Dam HW TM	2.44	30/03/2017 7:38am	1	2	3	Moderate	3	5	.948	Jun 2016
	2.98	30/03/2017 1:20pm				Moderate	2			
	3.72	31/03/2017 12:00am				Major	**1**			
Mudgeeraba ALERT	4.42	30/03/2017 7:40am	2.5	3.5	4.5	Moderate	2=3rd	26	9.98	Jan 2013
	5.28	31/03/2017 9:56am				Major	2			
Oxenford Weir ALERT	4.94	31/03/2017 1:05am	4	5	6	Minor	2	17	5.12	Feb 2010
Tallebudgera Creek Road TM	4.42	30/03/2017 7:40am	4	5	6	Minor	13	14	6.55	Jan 2008

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
	4.29	30/03/2017 10:50am				Minor	2nd=18			
	4.57	30/03/2017 2:10pm				Minor	11			
	6.29	30/03/2017 11:50pm				Major	2			

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Condamine-Balonne Rivers peak heights

Data is from 30 March to 8 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Cecil Plains	6.02	04/04/2017 7:00am	6	7	8	Minor	34	70	9.26	Mar 1890
Chinchilla Weir TW TM	6.5	04/04/2017 12:00pm	6	8	10	Minor	35	93	14.2	Apr 1988
Chinchilla	No significant peak							n/a	7.45	Jan 2011
Condamine	No significant peak							n/a	15.25	Jan 2011
Dalby	No significant peak							n/a	4.5	Feb 1981
Dirranbandi	No data available							n/a	5.45	Feb 2012
Hebel	No data available							n/a	2.37	Jan 2011
Mitchell	No data available							n/a	9.84	Feb 2012
Pratten	No data available							n/a	10.5	Feb 1976
Ranges Bridge	No data available							n/a	11.05	Feb 1976
Roma	No significant peak							n/a	8.4	Feb 2012
Springfield	No data available							n/a	11.38	Feb 2012
St George	4.25	07/04/2017 4:00am	4	5	6	Minor	78	19	13.95	Feb 2012
	4.14	08/04//2017 3:00pm				Minor	81			
Surat	7.15	03/04/2017 6:10pm	5	7	9	Moderate	99	87	12.75	Jan 2011
Tummaville	7.61	02/04/2017 7:00am	5	8	9	Minor	22	90	11.15	Dec 2010
Warkon	7.63	03/04/2017 9:00pm	7	8	9	Minor	81	16	12.61	Jan 1956
Warwick	6.21	31/03/2017 8:15am	5	6	7	Moderate	27	96	9.1	Feb 1976
Warroo	No data available							n/a	16.61	1890
Woodlands	No data available							n/a	7.8	Feb 2012

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Aides Bridge TM	4.86	31/03/2017 5:20am	4	4.5	5	Moderate	2nd=38	48	8.05	Feb 1976
Allora TM	6.80	31/03/2017 2:00am	3	5	5.5	Major	4	46	7.1	Jan 2011
Brigalow Bridge ALERT	8.26	03/04/2017 5:44pm	7.5	9	10	Minor	**1**	2	None	
	7.71	07/04/2017 5:55am				Minor				
Brigalow Bridge TM	8.17	03/04/2017 3:00pm	7.5	9	10	Minor	41	12	14.84	Dec 2010
	7.58	07/04/2017 8:00am				Minor	48			
Brosnans Barn TM	5.43	30/03/2017 10:00pm	3	4	5	Major	6	41	6.46	Jan 2013
	5.46	30/03/2017 10:30pm				Major	2nd=5			
Burncluith Bridge ALERT	1.78	31/03/2017 3:24pm	3	4	5	Minor	4	4	2.83	Dec 2014
Cotswold	7.35	03/04/2017 9:00am	7	10	11	Minor	56	51	17.82	Jan 2011
Elbow Valley ALERT	4.61	31/03/2017 2:16pm	2	4	6	Moderate	4	22	6.13	Jan 2008 & Dec 2010
Elbow Valley TM	4.62	31/03/2017 3:00pm	2	4	6	Moderate	10	13	6.68	Feb 1976
Emu Vale TM	7.22	30/03/2017 9:00pm	5	6	7	Major	3	13	8.89	Jan 2013
Fairview TM	5.53	01/04/2017 1:00am	4	5	6	Moderate	13	37	6.41	Nov 2008
Felton TM	2.51	31/03/2017 3:00am	2	2.3	2.5	Major	11	30	4.11	Feb 1994
Garrabarra	5.9	01/04/2017 1:00pm	4.5	6	8	Minor	2nd=26	17	10.5	Mar 2010
Glengallan Creek ALERT	4.65	31/03/2017 2:28am	3	4	5	Moderate	2nd=3	22	4.88	Jan 2001
Hastings TM	3.86	08/04/2017 5:00am	3.5	5	5.8	Minor	58	26	6.61	Feb 2012
Killarney ALERT	6.15	30/03/2017 10:31pm	4	5	6	Major	2nd=4	13	6.6	Jan 2008
Lone Pine TM	4.24	31/03/2017 12:00pm	3.5	4	5	Moderate	11	24	6.36	Dec 2010
Loudoun Bridge ALERT	4.26	01/04/2017 10:15am	2.5	3.5	5.5	Moderate	78	2	11.2	Dec 2010
	4.41	05/04/2017 8:32am				Moderate	79			
Loudoun Bridge TM	4.21	01/04/2017 1:00pm	2.5	3.5	5.5	Moderate	47	13	8.18	Dec 2010
	4.33	05/04/2017 10:00am				Moderate	42			
Millbrook ALERT	6.04	01/04/2017 1:40pm	4.5	5.5	6	Major	**1**	5	*5.82**	*Jan 2008*
Murrays Bridge ALERT	7.45	31/03/2017 3:03am	4	5	6.5	Major	2nd=5	13	8.95	Jan 2011
	6.55	31/03/2017 9:38pm				Major	7			

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Swanfels TM	3.86	30/03/2017 7:00pm	3.5	4	4.5	Minor	9	26	4.72	Jan 1947
Talgai Weir TW TM	6.08	01/04/2017 5:00am	4.5	5	6	Major	2	26	6.63	May 1996
Victoria Hill ALERT	3.95	31/03/2017 1:28pm	3	4	5	Minor	4	12	5.15	Jan 2011
Warra-Kogan Rd Bridge	7.4	03/04/2017 6:05am	7	8	9	Minor	35	14	15.00	Dec 2010
Warra ALERT	2	31/03/2017 5:40am	2	3	4	Minor	**1**	2	None	
Weribone TM	8.15	04/04/2017 3:00pm	5.8	7.8	9.8	Moderate	2nd=66	48	13.71	Mar 2010
Whyenbah	4.26	08/04/2017 9:00am	4	6	7	Minor	98	16	8.19	Feb 2012
	4.19	13/04/2017 9:00am				Minor	99			
Whyenbah TM	3.89	08/04/2017 5:00am	3.5	5	5.8	Minor	53	52	6.54	Mar 2010
	3.9	09/04/2017 8:00pm				Minor	54			
	3.78	13/04/2017 1:00pm				Minor	56			
Yarramalong TM	5.58	02/04/2017 7:25am	3.5	5.5	6	Moderate	6	26	8.77	Jan 2011

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Border Rivers peak heights

Data is from 30 March to 7 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Inglewood Bridge	No significant flood peak							n/a	12.5	Jan 1956
Texas	No significant flood peak							n/a	10.8	Feb 1976
Boggabilla	9.38	02/04/2017 9:30pm	5	11.5	12	Minor	53	123	12.83	Feb 1979
Goondiwindi	8.49	03/04/2017 12:00am	4	6	8.5	Moderate	58	13	10.64	Jan 2011

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Accommodation Creek ALERT	2.16	30/03/2017 10:39pm	1.7	2.2	2.7	Minor	2	8	4.2	Jan 2011
Accommodation Creek TM	2.15	31/03/2017 12:00am	1.7	2.2	2.7	Minor	3	10	2.46	May 2009
Artunga ALERT	3.61	31/03/2017 12:28am	3.5	4.5	5.5	Minor	2	4	4.51	Jan 2015
Ashford (Severn River)	4.41	31/03/2017 4:15pm	2.2	4	6	Moderate	26	84	9.55	Feb 1976
Ballandean ALERT	2.59	31/03/2017 9:09pm	2.2	3	3.7	Minor	4	8	5.47	Jan 2011
Ballandean TM	2.16	31/03/2017 9:00pm	2.2	3	3.7	Minor	10	15	3.31	Jan 2088
	2.34	31/03/2017 10:00pm	2.2	3	3.7	Minor	8			
Barongarook TM	3.18	30/03/2017 9:55pm	3	4.5	6	Minor	39	50	7.2	May 1995
Beardy Junction	4.6	31/03/2017 7:00am	4.5	7	8	Minor	=17	10	11.1	1921
	5.35	31/03/2017 5:30pm				Minor	8			
Bengalla TM	7.08	02/04/2017 1:33am	4	6	10	Moderate	7	13	10.94	Jan 2011
Booba Sands TM	4.01	31/03/2017 5:00pm	4	7	8	Minor	38	13	9.78	Apr 1988
	5.17	01/04/2017 9:00pm				Minor	26			
Carana Weir TM	5.82	03/04/2017 1:00pm	3.3	5	5.7	Major	9	13	6.18	Jul 1998
Dalcouth ALERT	1.6	31/03/2017 3:52am	1.4	2	2.5	Minor	2nd=7	7	3.17	1974
Glenarbon Weir	3.44	01/04/2017 3:15pm	3	4	5	Minor	**1**	20	None	
Goondiwindi Weir TM	7.42	03/04/2017 12:00am	4	6	8.5	Moderate	12	17	10.43	Jul 1998
Inglewood Weir	5.27	01/04/2017 7:00am	4	8	9	Minor	5	54	11.75	Jan 1956

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Stanthorpe ALERT	2.3	31/03/2017 8:21am	2.2	3.5	4.5	Minor	8	7	5.18	Feb 1976
Stanthorpe TM	2.31	31/03/2017 9:00am	2.2	3.5	4.5	Minor	4	12	3.47	May 2009
Storm King Dam HW ALERT	0.1	30/03/2017 10:37pm	0.1	0.25	0.5	Minor	3	8	0.9	Jan 2011
Terraine ALERT	3.4	30/03/2017 11:44pm	2	3.5	4.5	Minor	2	4	4.12	Jan 2015
Terraine TM	3.38	31/03/2017 12:00am	2	3.5	4.5	Minor	19	65	6.11	Feb 1976
Terrewah	6.69	07/04/2017 9:30am	5	6	7	Moderate	=25	33	7.46	Jan 1996
Woodspring ALERT	5.81	31/03/2017 8:05pm	3.5	5.5	7	Moderate	**1**	4	*4.66**	*Jan 2015*
Yetman Bridge	5.94	01/04/2017 2:00pm	5	7.6	9.1	Minor	=12	20	10.97	Nov 2000

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Weir River peak heights

Data is from 31 March to 12 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Talwood	No data available							n/a	4.85	Apr 1988

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
O'Connor TM	8.75	31/03/2017 1:00pm	4	6	9	Moderate	16	13	14.58	Dec 2010
Retreat Bridge	8	31/03/2017 1:49pm	6	8	10	Moderate	17	13	14.95	1956
Gunn Bridge	5.94	02/04/2017 11:00pm	5	6	7	Minor	19	6	7.64	Dec 2010
Kilbronae	3.7	01/04/2017 3:58am	1	2	2.5	Major	3	17	4.18	Jan 2013
Hartmann Bridge	4.41	05/04/2017 5:00pm	4	5	5.7	Minor	18	32	5.78	Aug 1998
Surrey	4.5	06/04/2017 7:32pm	3.5	4.5	5.5	Moderate	24	13	6.04	May 1996
Jericho	2.38	12/04/2017 12:00pm	2.2	2.8	3	Minor	10	11	3.85	Feb 2014

* New record set with this event
Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Moonie River peak heights

Data is from 31 March to 13 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Flinton	4.4	01/04/2017 10:00am	3	4	5	Moderate	17	46	5.06	Aug 1998
	3.9	05/04/2017 2:50pm				Minor	27			
Nindigully	3.1	05/04/2017 3:05pm	2.2	3	4	Moderate	3rd=22	19	4.65	Mar 2010
	2.95	09/04/2017 7:30pm				Minor	>50			
Thallon Bridge	4.4	07/04/2017 9:00pm	4	4.5	5	Minor	7	6	5.4	Feb 2012
	4.15	11/04/2017 7:00am				Minor	8			

Information location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
The Deep Crossing	3.3	31/03/2017 6:45am	2.5	3	4.2	Moderate	4=12th	13	5.65	Dec 2010
	3.3	31/03/2017 4:00pm				Moderate	5=12th			
Southwood	5.65	02/04/2014 7:10am	3.5	4.5	5.5	Major	11	16	6.9	Dec 2010
Warrie Station	4.65	04/04/2017 9:00am	3	4	5	Moderate	2	18	6.5	2010
	4.20	08/04/2017 9:00am				Moderate	3			
Nindigully TM	5.08	06/04/2017 8:00am	2.2	5.1	5.8	Minor	28	48	6.23	Mar 2010
	4.88	09/04/2017 11:00pm				Minor	34			
Fenton TM	4.01	10/04/2017 8:00am	3.5	4.5	5	Minor	30	46	5.9	Jan 1974
	3.94	13/04/2017 4:00am				Minor	34			

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Tweed River peak heights

Data is from 31 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Murwillumbah	~6.1 to 6.2	31/03/2014 ~1:00am	3.0	4.0	4.8	Major	**1**		*6.07**	*Feb 1954*
Chinderah	2.25	31/03/2017 12:58pm	1.3	1.7	2.0	Major	3		3.1	Fe 1954

* New record set with this event

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Brunswick River peak heights

Data is from 31 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Billinudgel	4.47	31/03/2014 2:30am	2.5	3.5	4.5	Major	2		4.51	Jun 2005
Mullumbimby	4.36	31/03/2017 5:59am	2.5	3.0	3.5	Moderate	4		4.62	Mar 1978

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Wilsons River peak heights

Data from 31 March 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Lismore	11.59	31/03/2017 11:12am	4.2	7.2	9.7	Major	3		12.27	Feb 1954 & 1880

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Richmond River peak heights

Data is from 31 March to 2 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Wiangaree	15.55	31/03/2017 3:00am	11	15.5	n/a	Moderate	3		16.67	Jan 2008
Kyogle	17.39	31/03/2017 11:15am	12	14.4	16	Major	5		18.9	Feb 1954
Casino	~10.5	01/04/2017 ~2:00am	9.2	12.2	15	Minor	>10		15.39	Feb 1954
Coraki	6.79	01/04/2017 7:15am	3.4	5	5.7	Major	>10		7.01	Mar 1974
Bungawalbin	5.48	01/04/2017 4:15am	3	4.5	5	Major	>10		6.1	Feb 1954
Woodburn	4.04	02/04/2017 3:00am	3.2	3.7	4.2	Moderate	>10		5.42	Feb 1954

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Clarence River peak heights

Data is from 31 March to 2 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Grafton	2.75	01/04/2017 12:00pm	2.1	3.6	5.4	Minor	>75th/106		8.09	Jan 2013
Ulmarra	2.11	01/04/2017 04:15pm	2.1	3.4	4.9	Minor	>50th/63		16.29	Jan 2013

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

Macintyre River peak heights

Data is from 31 March to 1 April 2017, with historical comparisons included.

Forecast location	Height of Peak (m)	Date and Time of Recorded Peak	Flood Classification (m)			Flood class reached	Rank	Years of Record	Highest on record	
			Minor	Mod	Major				Ht (m)	Date
Ashford	4.41	31/03/2017 4:15pm	2.2	4	6	Moderate	>25th/192		9.56	Feb 1976
Yetman Bridge	5.95	01/04/2017 3:45pm	5	7.6	9.1	Minor	>15th/65		10.99	Nov 2000
Boggabilla	9.38	01/04/2017 9:30pm	5	11.5	12	Minor	>85th/560		12.83	Feb 1979

Note – Some river level stations have a 'Highest on Record' flood peak that precedes the 'Years of Record'. In this situation, the 'Highest on Record' relates to an historic flood level that has been surveyed (most likely using a known flood mark) and then related to the gauge boards at these locations.

4.4 Wind gusts

Peak 3-second wind gusts recorded at Bureau Automatic Weather Stations[15]

Location	Peak 3-second wind gust	Time (AEST) and date	Historical context
Figure1: Hamilton Island Airport	263km/h	10:25am on 28 March	Highest recorded wind gust in Queensland
Figure 2: Proserpine Airport	165km/h	12:57pm on 28 March	Highest recorded wind gust at the station (31 years of data)
Figure 3: Bowen Airport	148km/h	1:35pm on 28 March	
Figure 4: Double Island Point	131km/h	4:35pm on 30 March	Highest recorded wind gust in March at this station (29 years of data)
Figure 5: Hay Point	124km/h	5:33am on 29 March	
Figure 6: Lihou Reef Lighthouse	120km/h	3:01am on 26 March	
Figure 7: Yeppoon Esplanade	117km/h	5:39am on 30 March	Highest recorded wind gust in March at this station (15 years of data)
Figure 8: Cape Moreton	115km/h	6:26pm on 30 March	
Figure 9: Rundle Island	115km/h	9:32am on 30 March	Highest recorded wind gust at the station (15 years of data)
Figure 10: Redcliffe	115km/h	6:40pm on 30 March	Highest recorded wind gust at the station (14 years of data)
Figure 11: Spitfire Channel Beacon	109km/h	6:26am on 30 March	
Figure 12: Sunshine Coast Airport	107km/h	5:20pm on 30 March	Highest recorded wind gust in March at this station (12 years of data)
Figure 13: Cape Byron	104km/h	3:36am on 31 March	
Figure 14: Rosslyn Bay	102km/h	5:43am on 30 March	
Figure 15: Moranbah Airport	100km/h	7:25pm on 28 March	
Figure 16: Blackwater Airport	100km/h	4:03pm on 29 March	
Figure 17: Mackay Airport	98km/h	2:08am on 29 March	
Figure 18: Middle Percy Island	98km/h	10:30am on 30 March	
Figure 19: Tewantin RSL Park	98km/h	5:08pm on 30 March	
Figure 20: Mackay Meteorological Office	96km/h	10:50am on 28 March	
Figure 21: Mackay Turf Club	96km/h	1:27am on 29 March	
Figure 22: Inner Reciprocal Marker	96km/h	7:17pm on 30 March	
Figure 23: Williamson	94km/h	11:35pm on 29 March	Highest recorded wind gust in March at this station (13 years of data)
Figure 24: Brisbane Airport	93 km/h	7:23pm on 30 March	Highest recorded wind gust in March at this station (18 years of data)

[15] Maximum 3 second wind gust data reported from Bureau automatic weather stations reporting every 1 minute, unless otherwise indicated

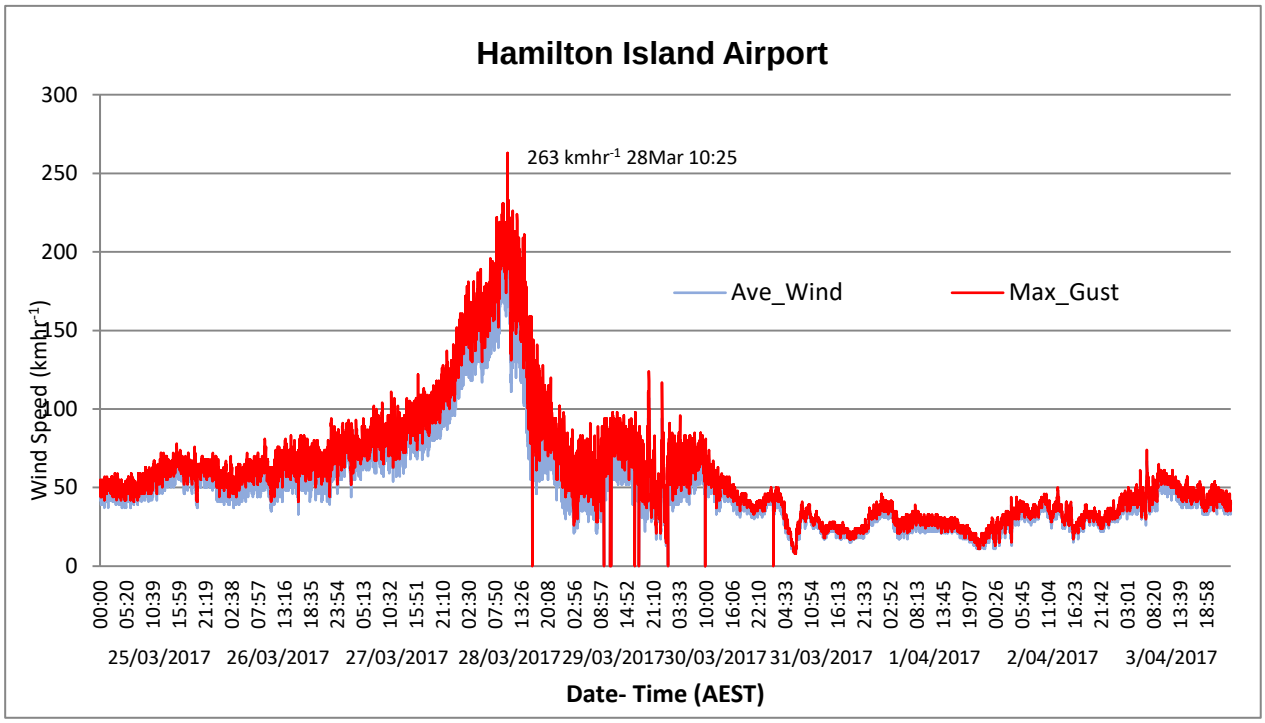


Figure 1: Hamilton Island Airport (033106) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

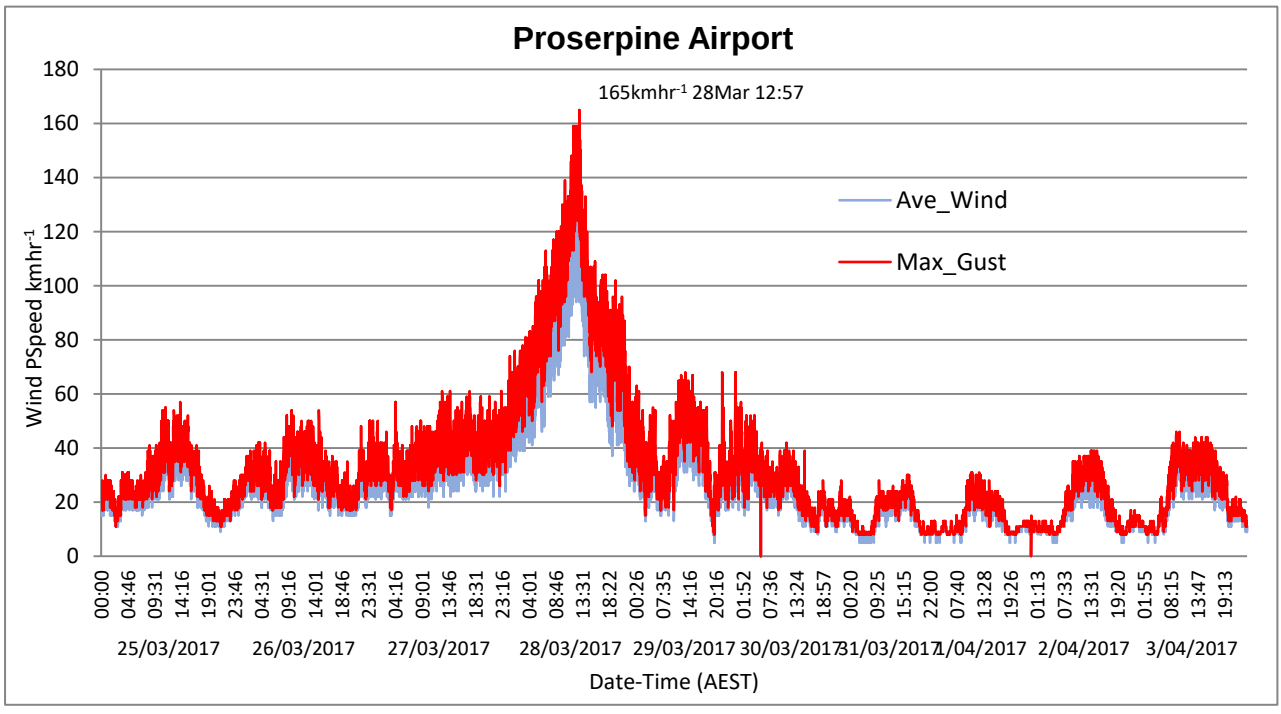


Figure 2: Proserpine Airport (033329) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

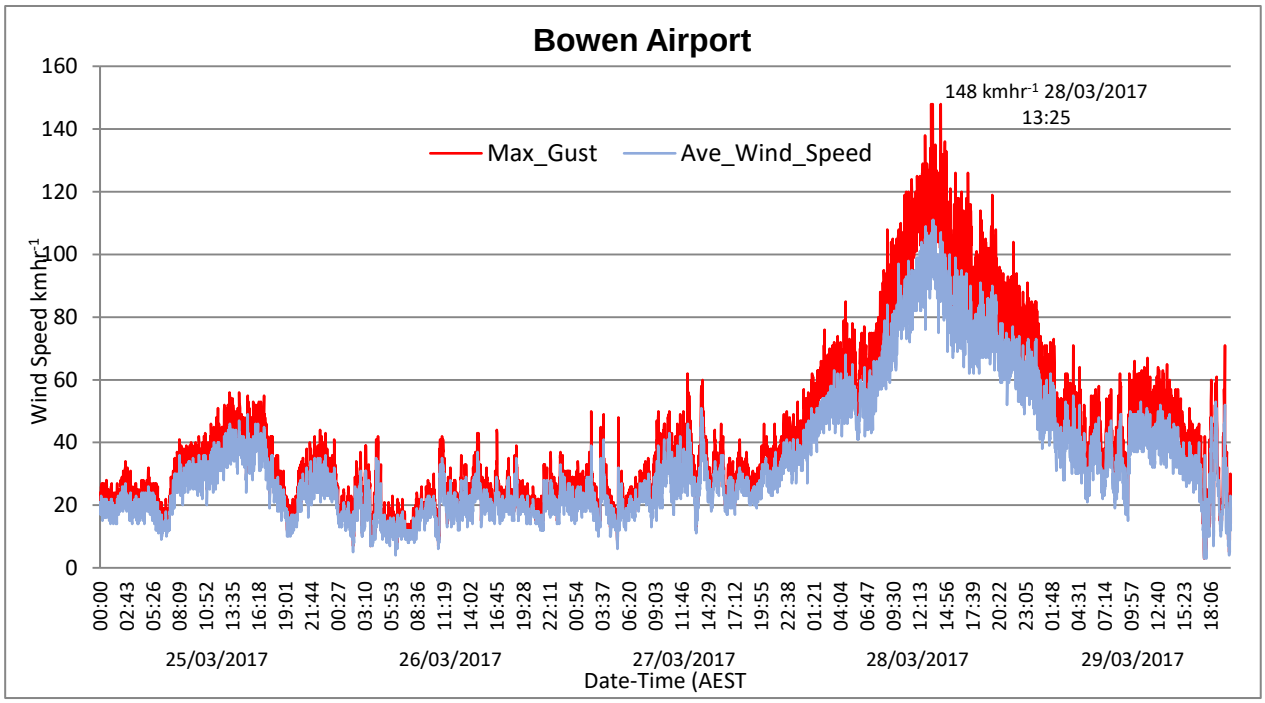


Figure 3: Bowen Airport (033329) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

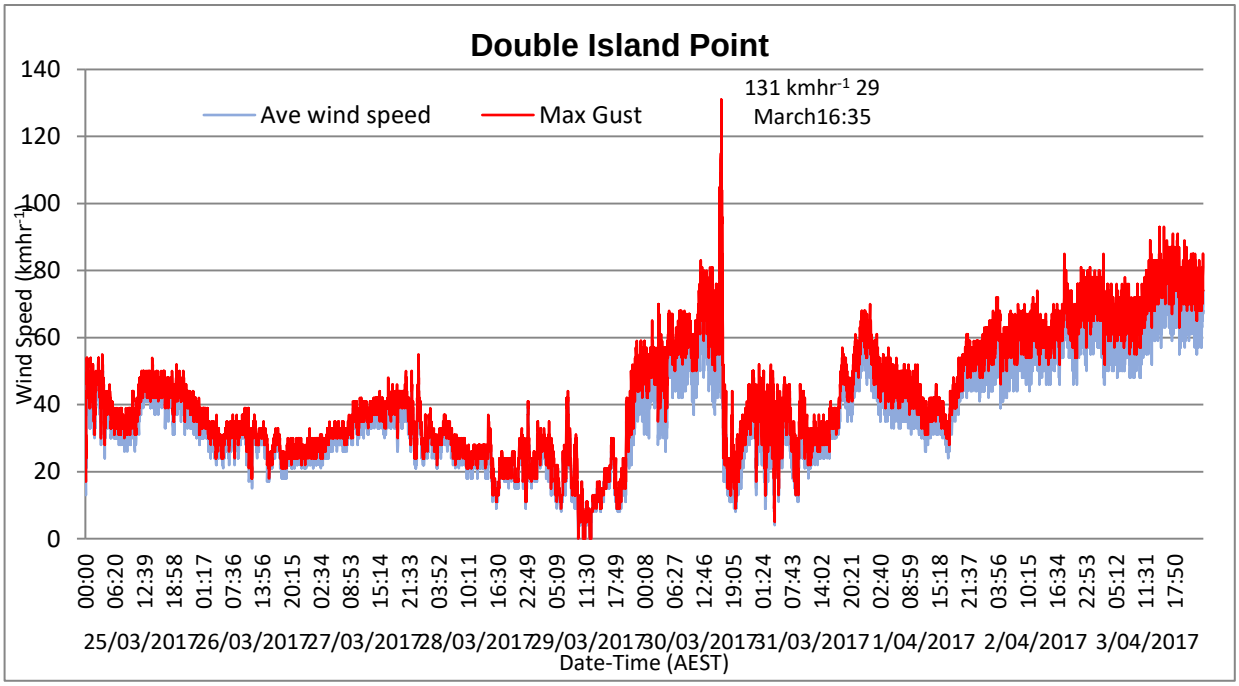


Figure 4: Double Island Point (040068) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

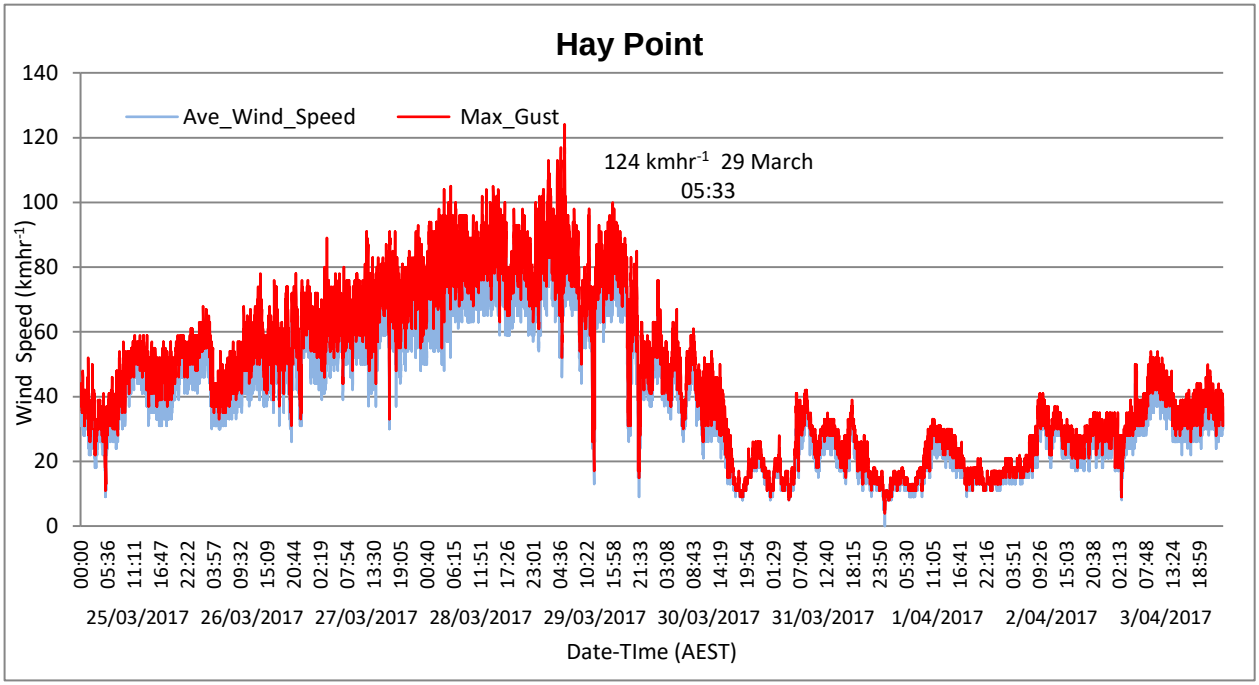


Figure 5: Hay Point (033317) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

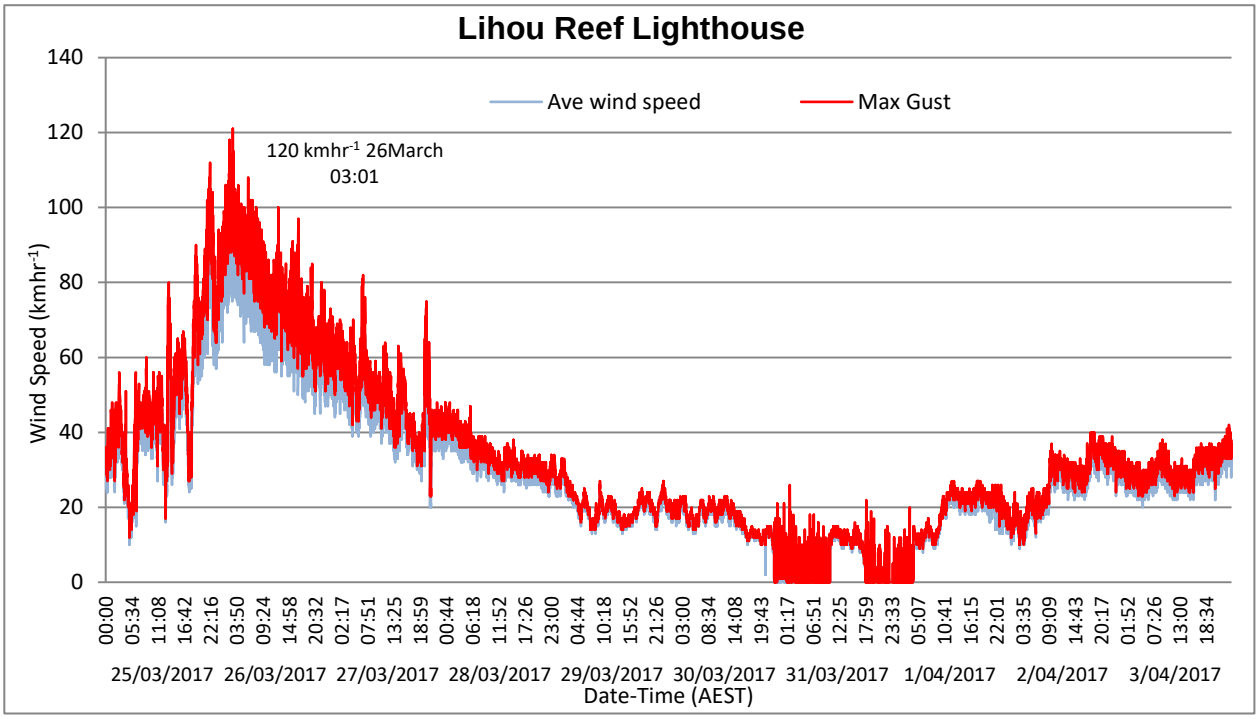


Figure 6: Lihou Reef Lighthouse (200880) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

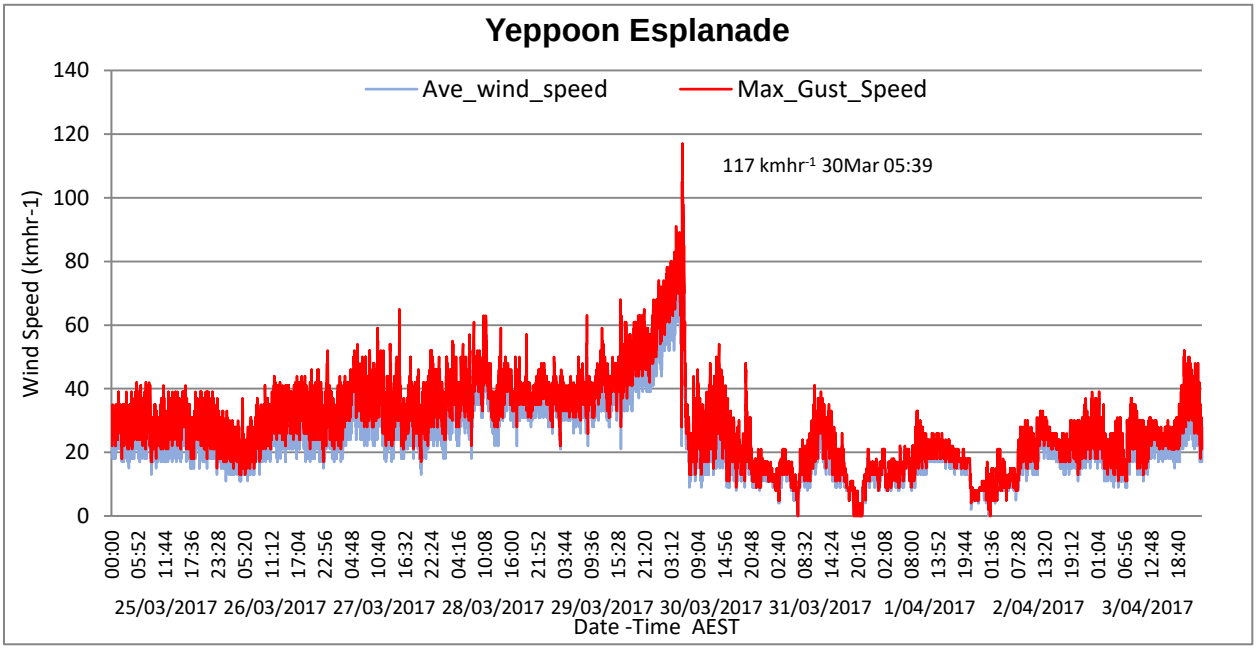


Figure 7: Yeppoon Esplanade (033294) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

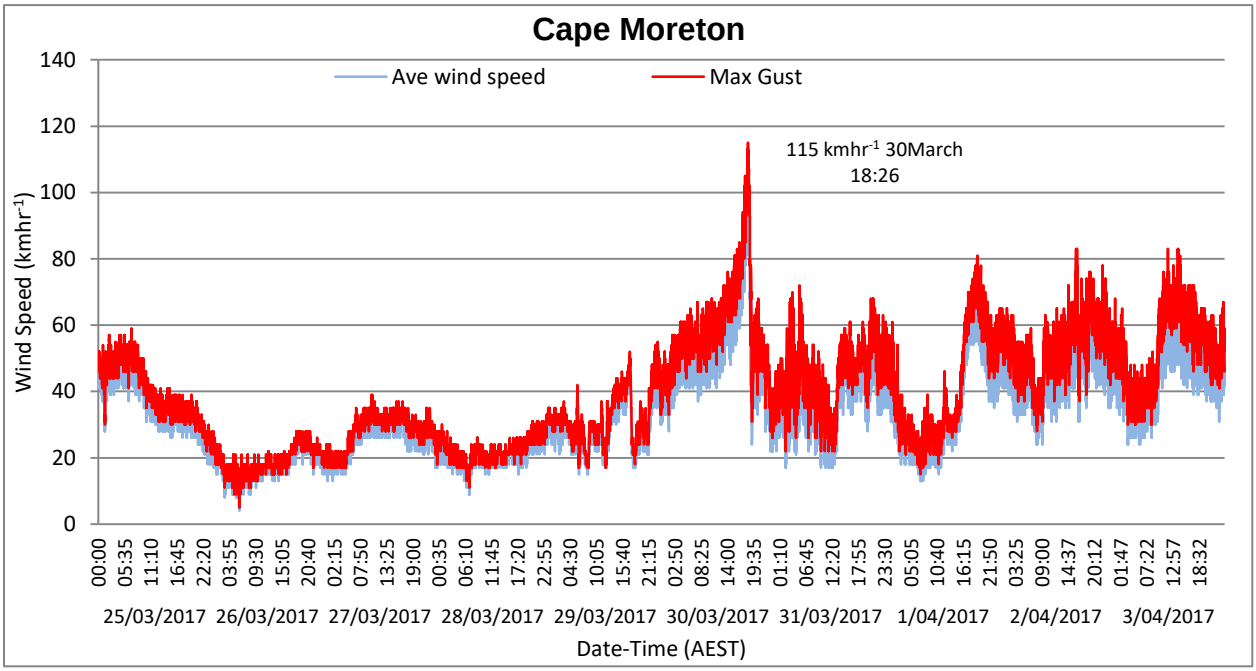


Figure 8: Cape Moreton (040043) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

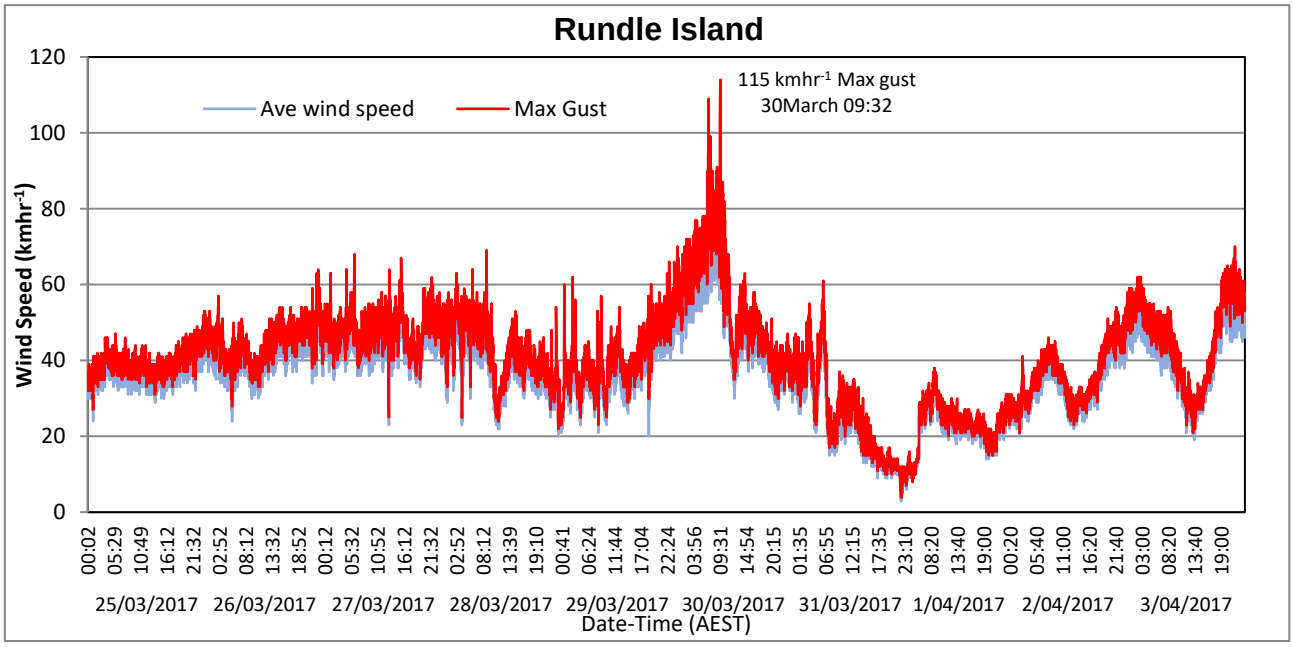


Figure 9: Rundle Island (039322) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

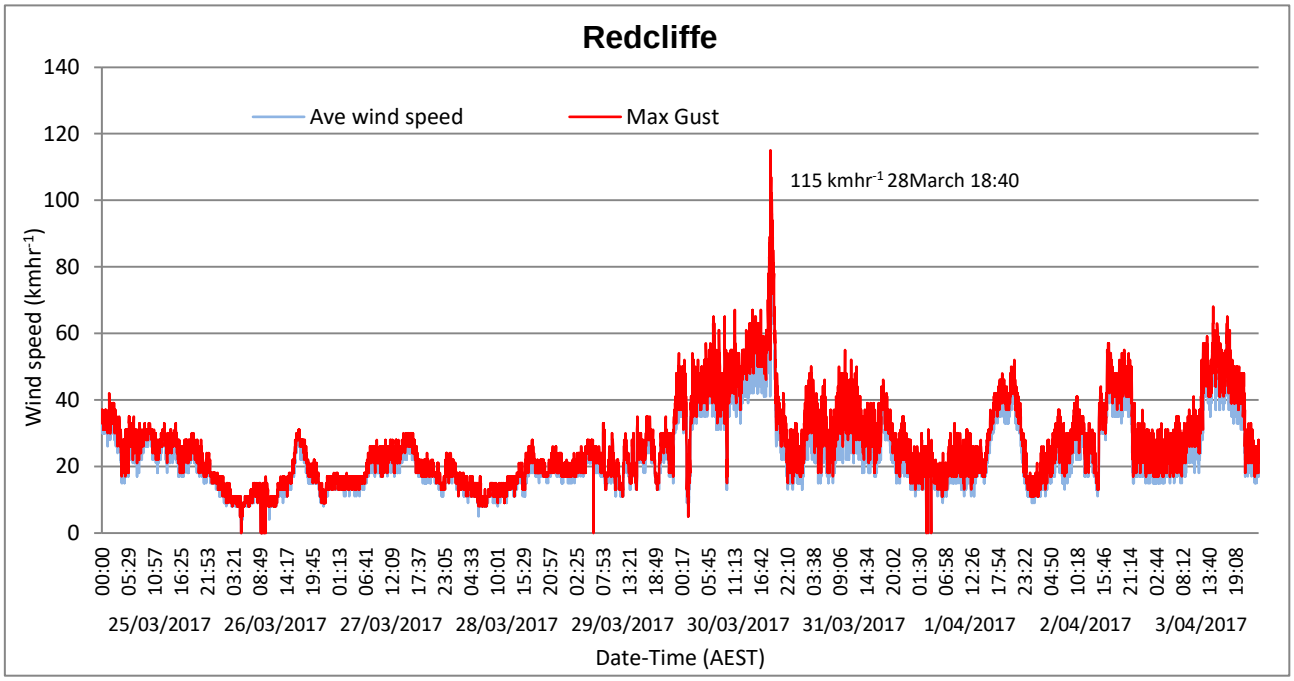


Figure 10: Redcliffe (040958) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

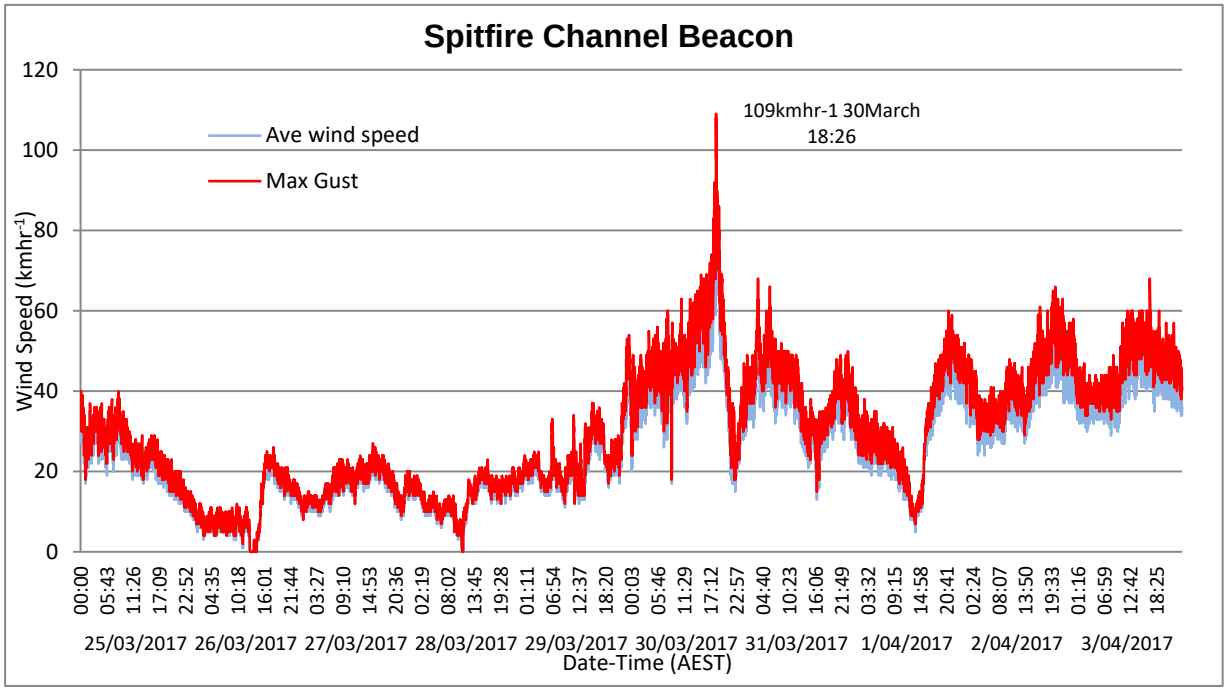


Figure 11: Spitfire Channel (040927) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

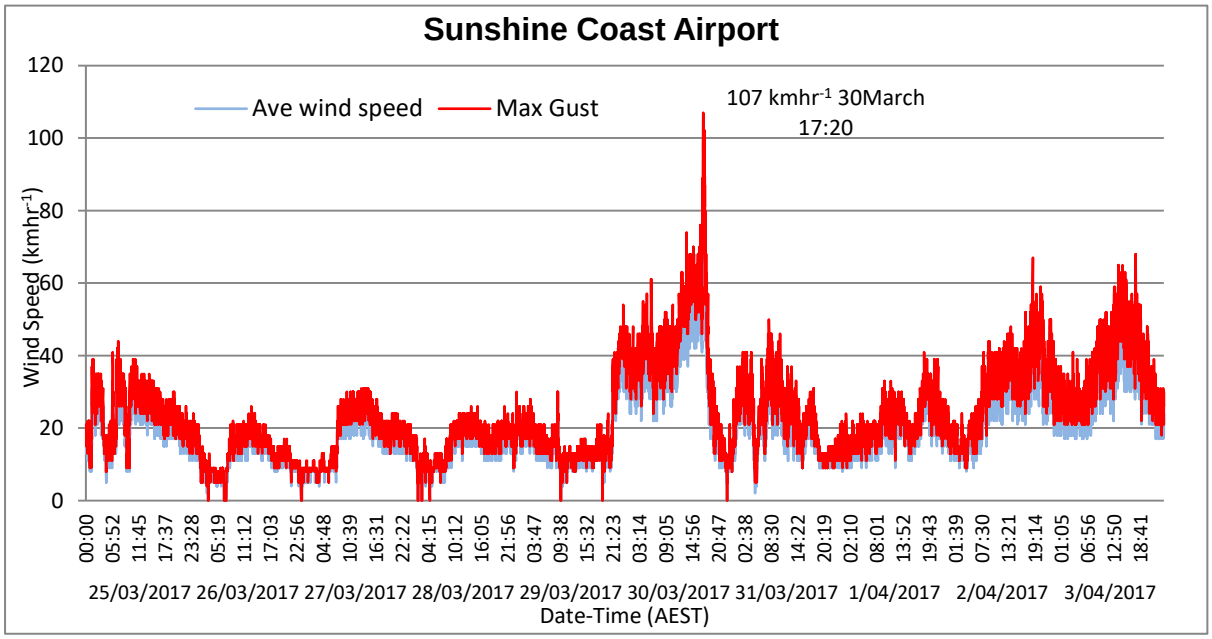


Figure 12: Sunshine Coast Airport (040861) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

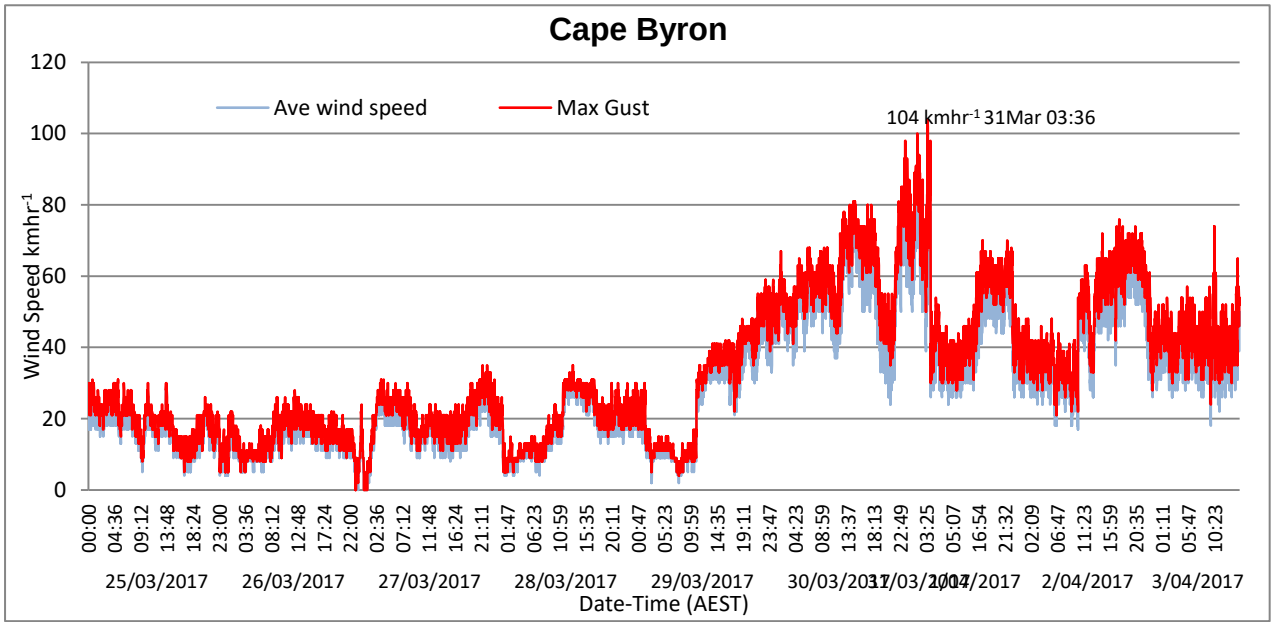


Figure 13: Cape Bryon (058216) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

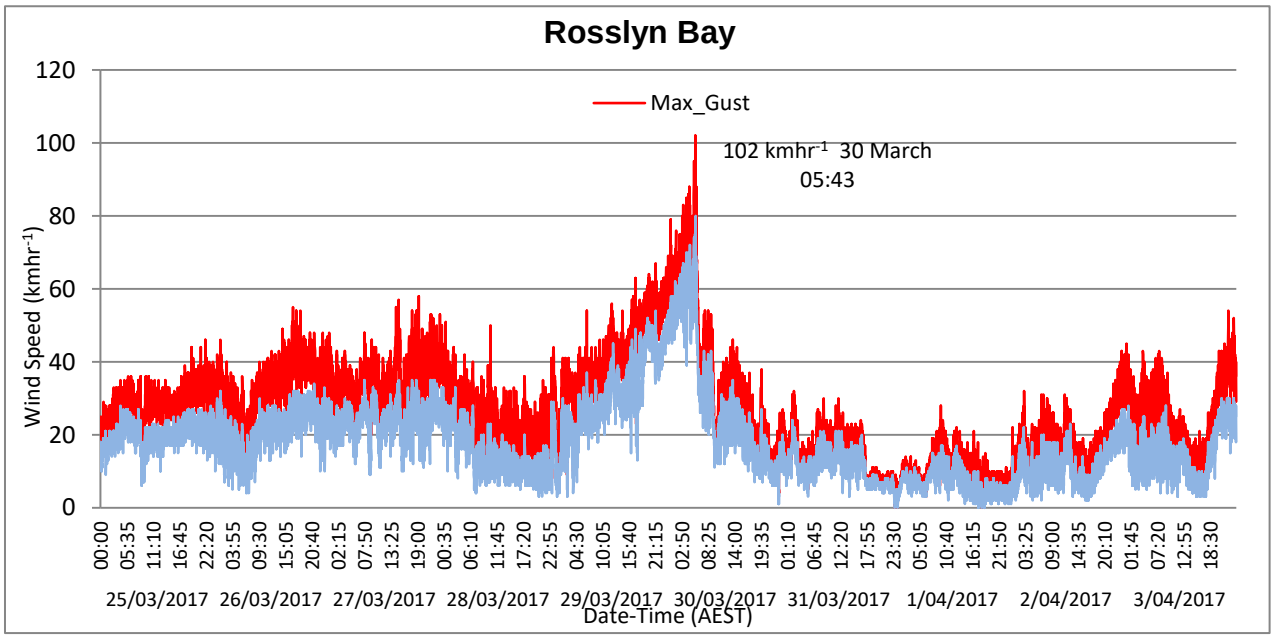


Figure 14: Rosslyn Bay (033208) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

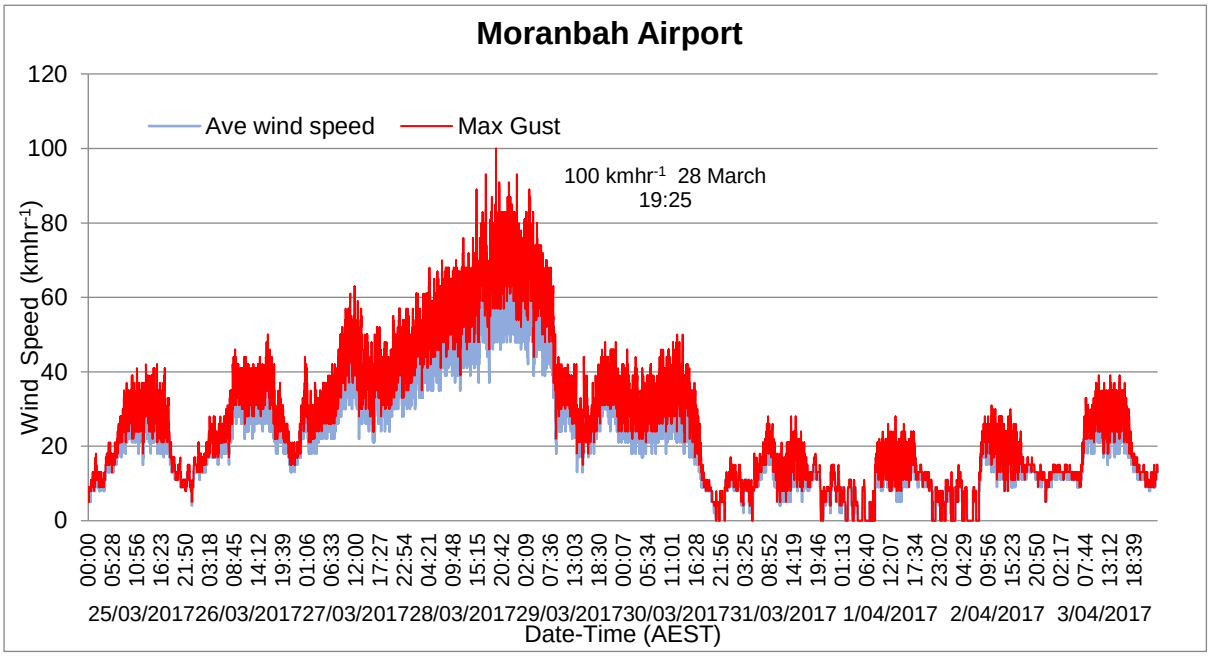


Figure 15: Moranbah Airport (034035) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

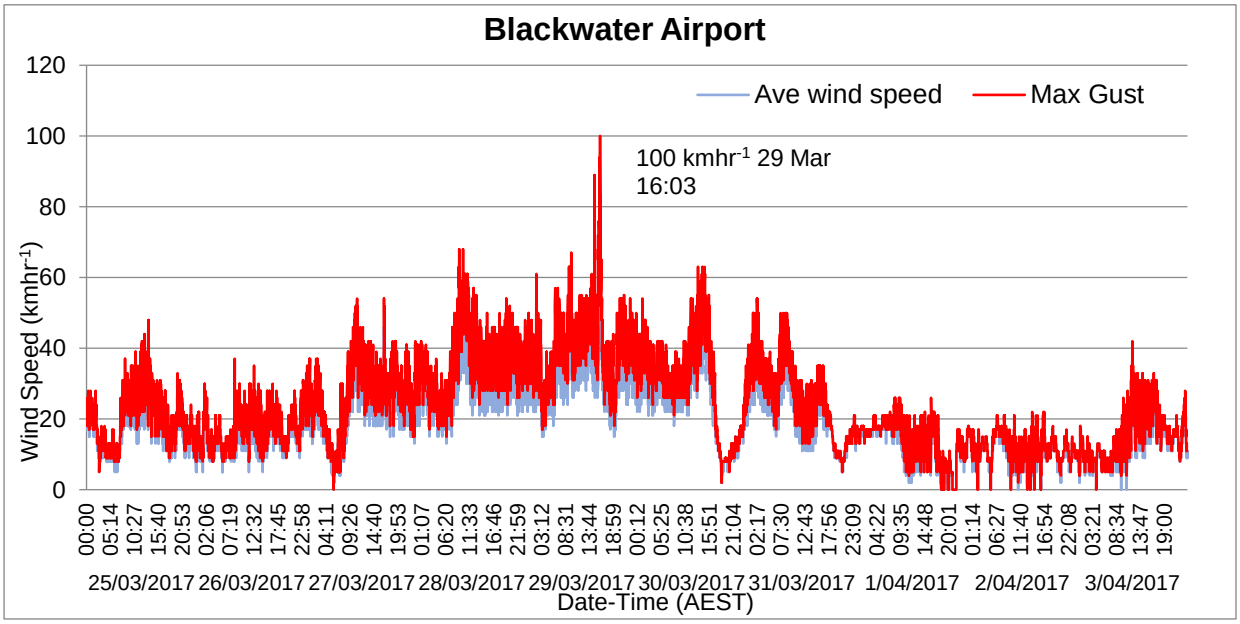


Figure 16: Blackwater Airport (035134) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

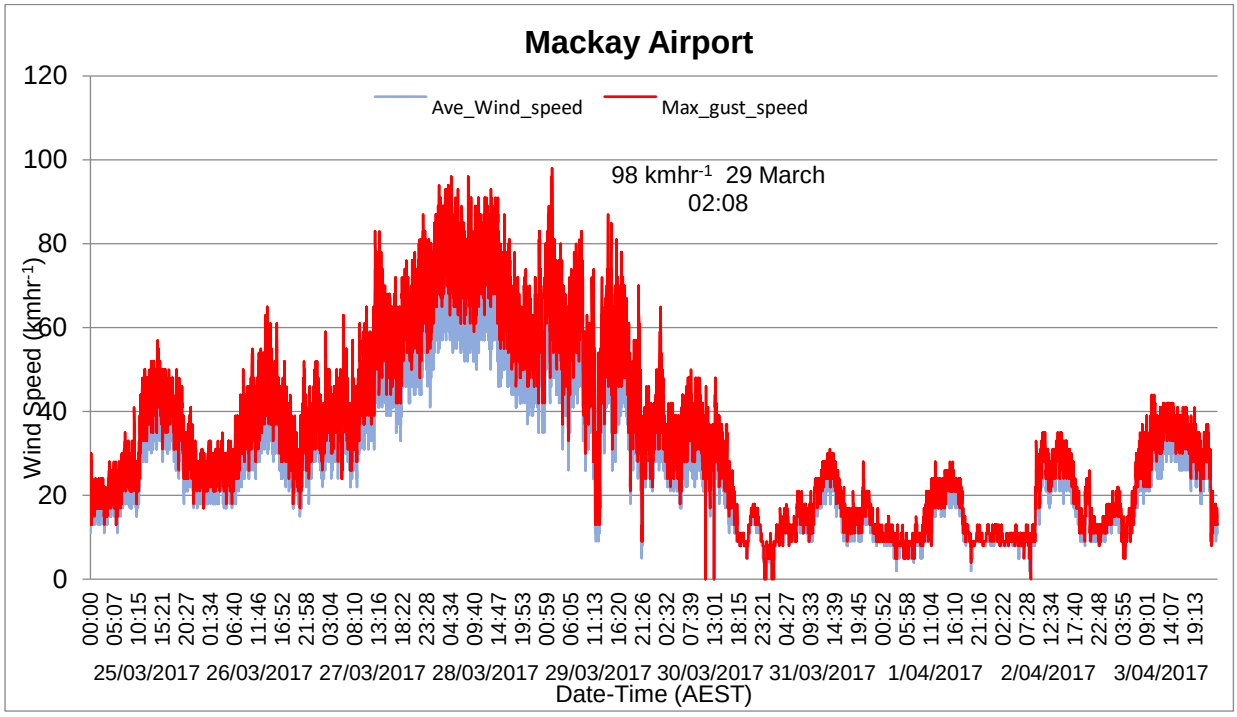


Figure 17: Mackay Airport (033045) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

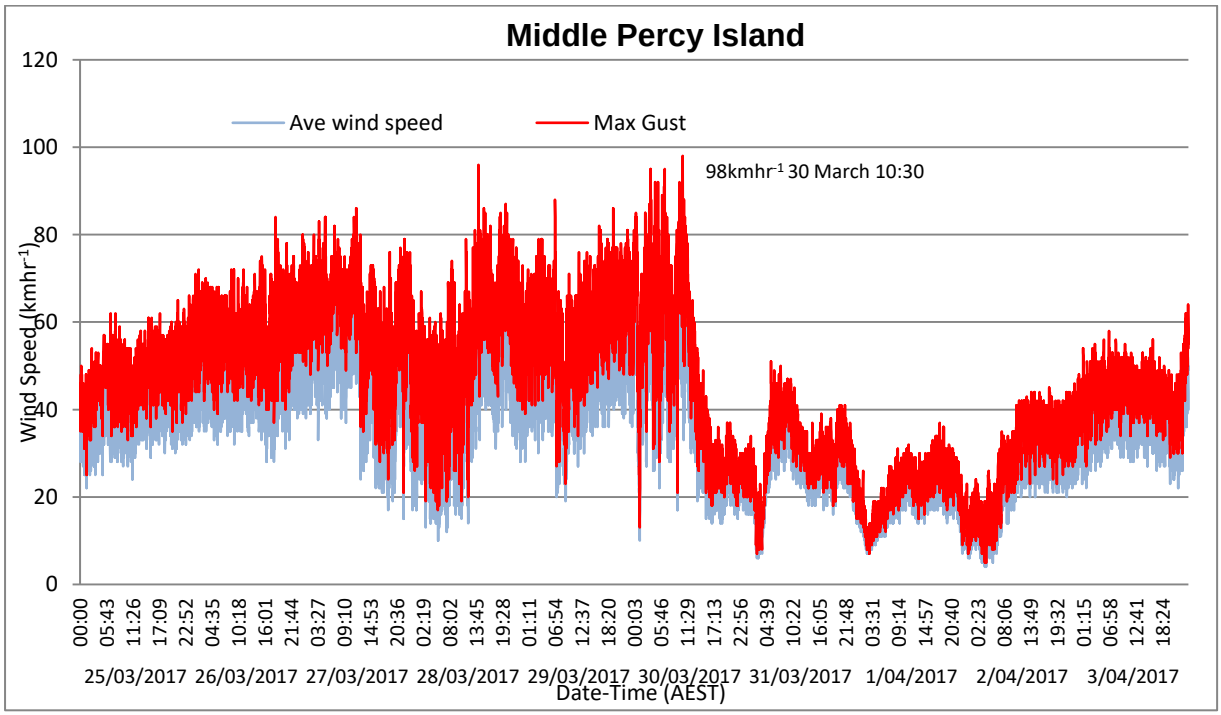


Figure 18: Middle Percy Island (200001) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

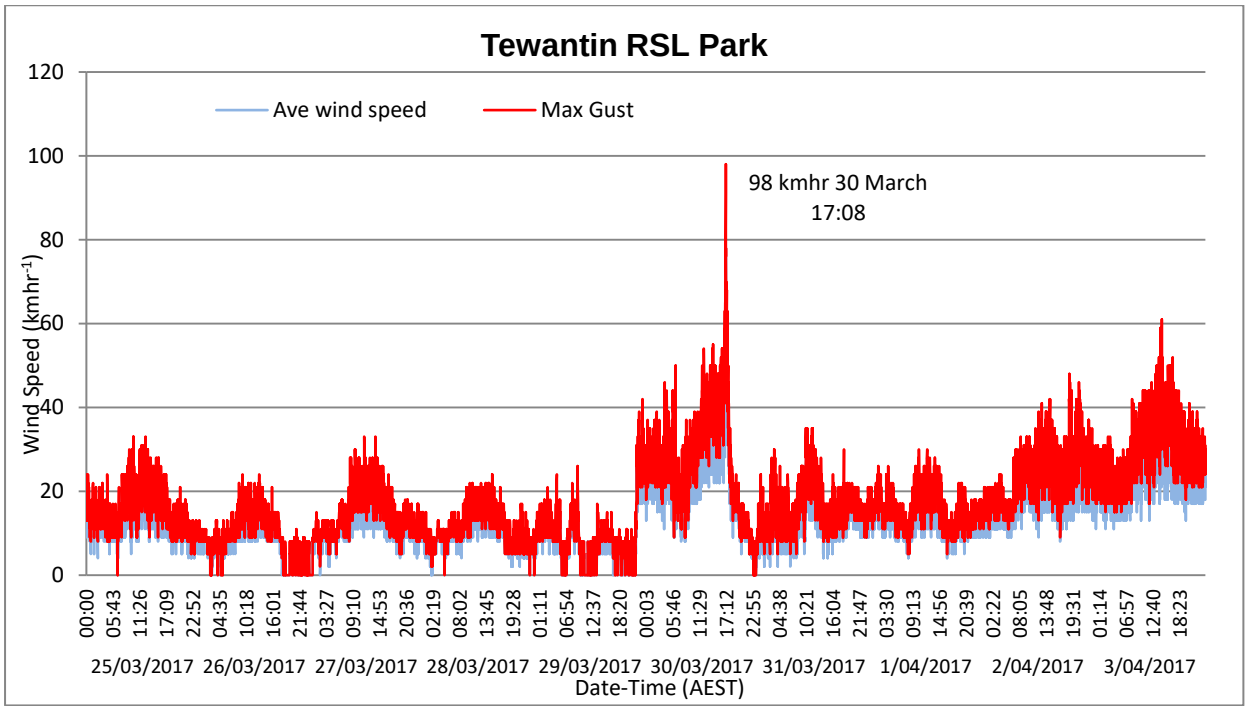


Figure 19: Tewantin RSL Park (040908) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

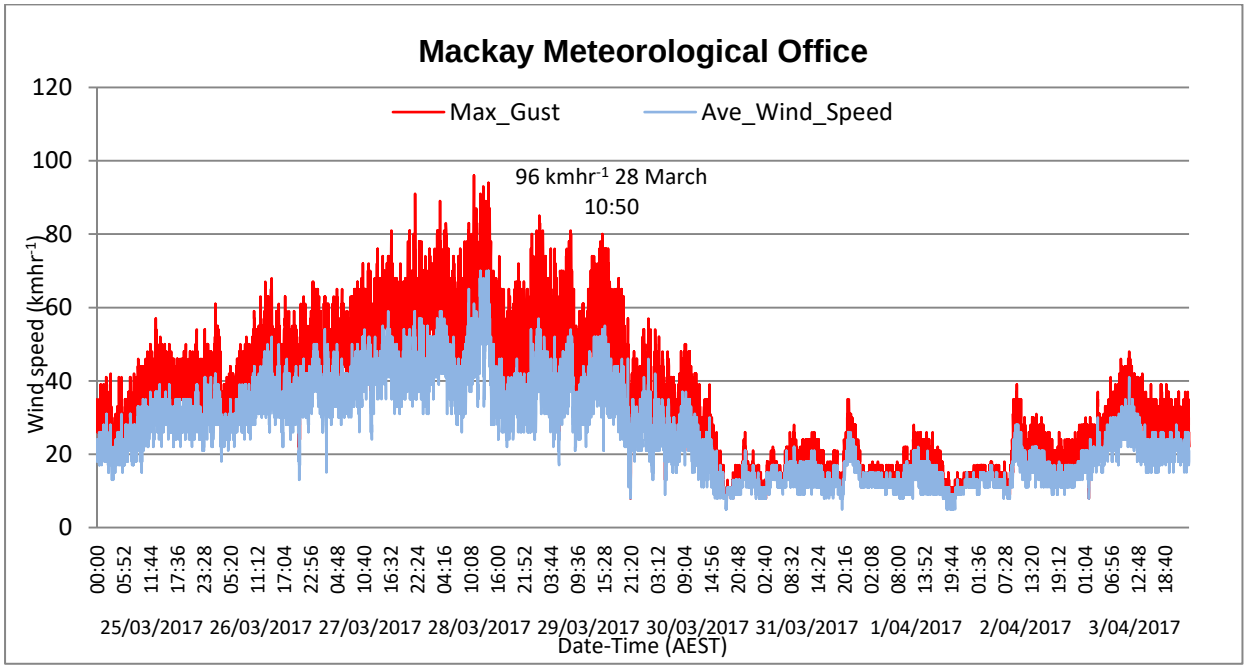


Figure 20: Mackay Meteorological Office (033119) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

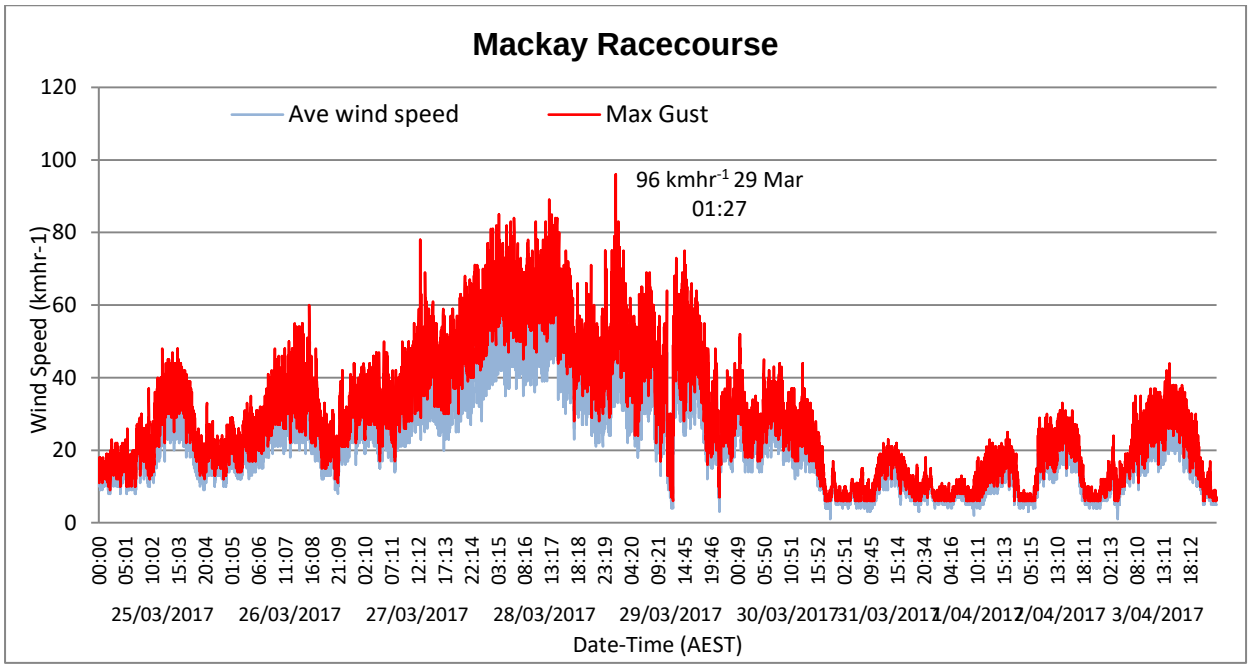


Figure 21: Mackay Racecourse (033329) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

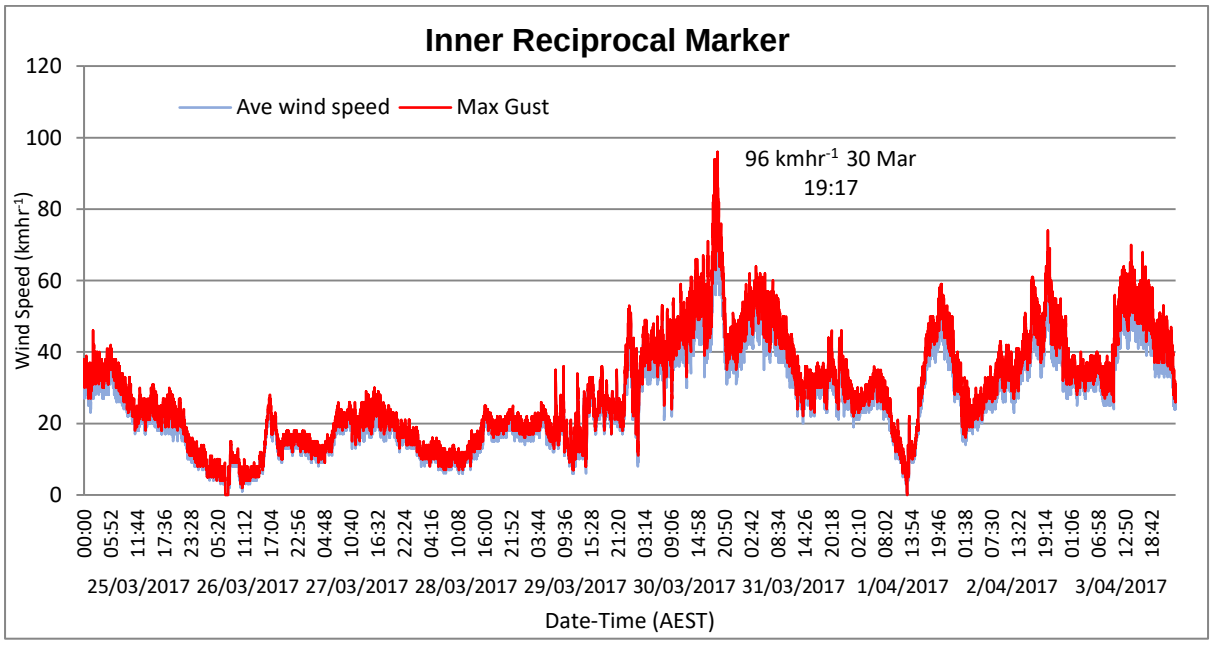


Figure 22: Inner Reciprocal Marker (040926) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

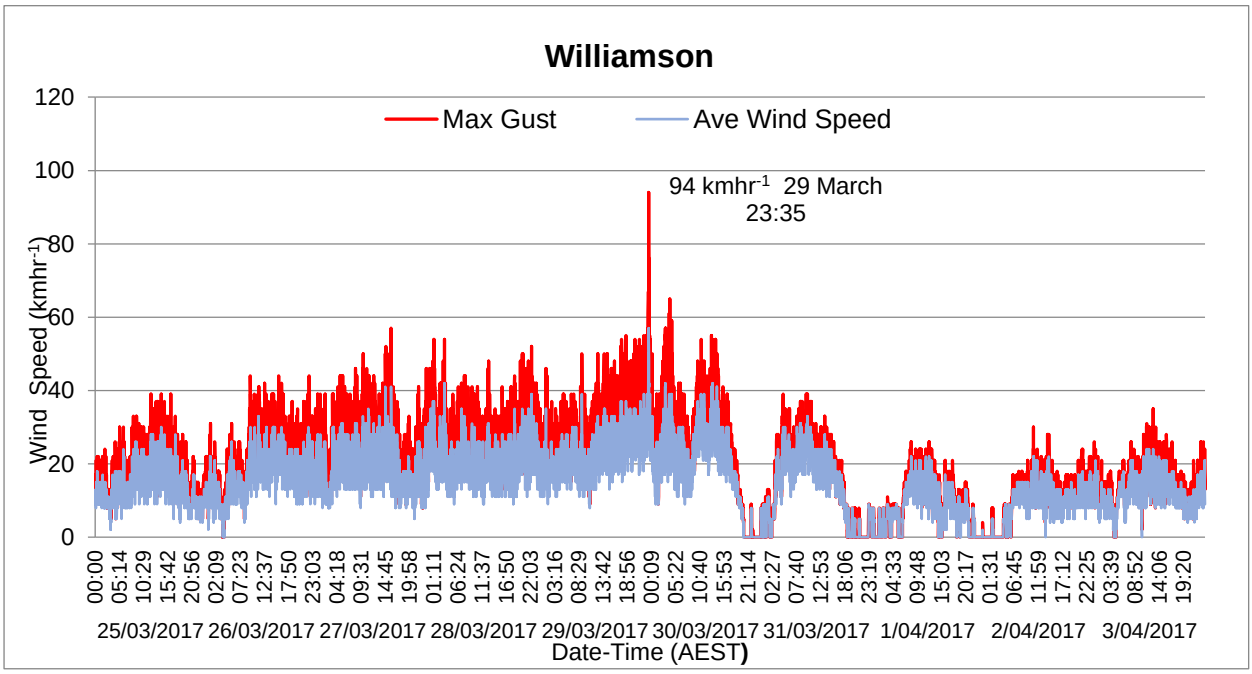


Figure 23: Williamson (033195) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

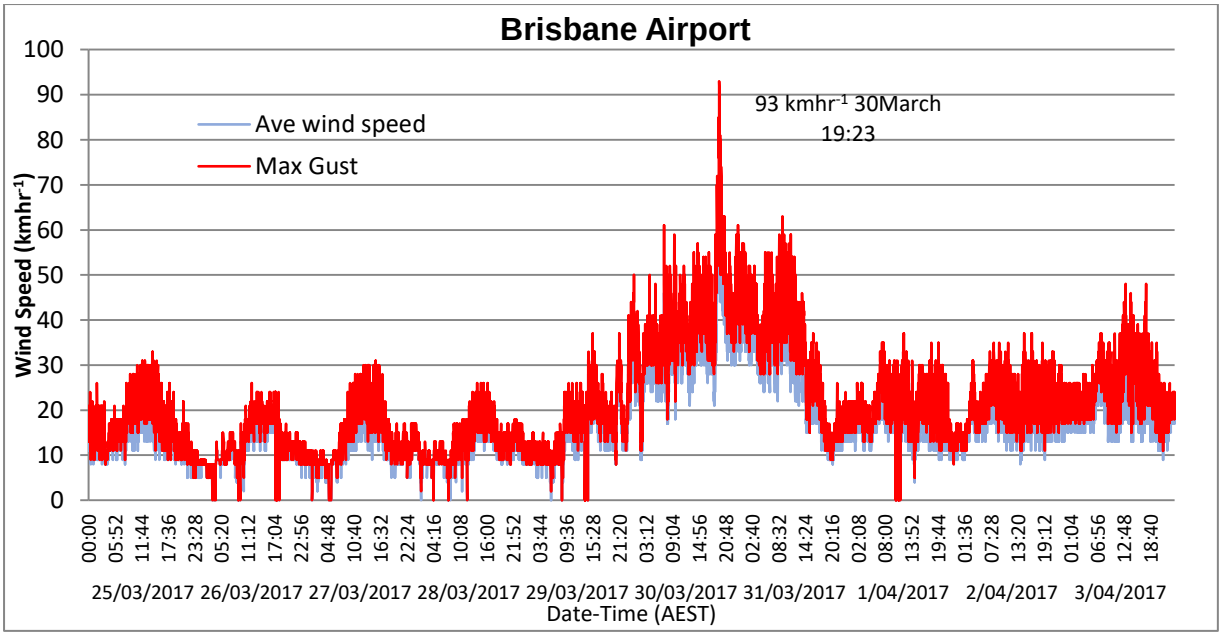


Figure 24: Brisbane Airport (040842) One-minute wind data plot of average wind speed and maximum 3 second wind gust (km/h)

4.5 Pressure charts

Lowest Mean Sea Level Pressures at Bureau of Meteorology Automatic Weather Stations during the event.

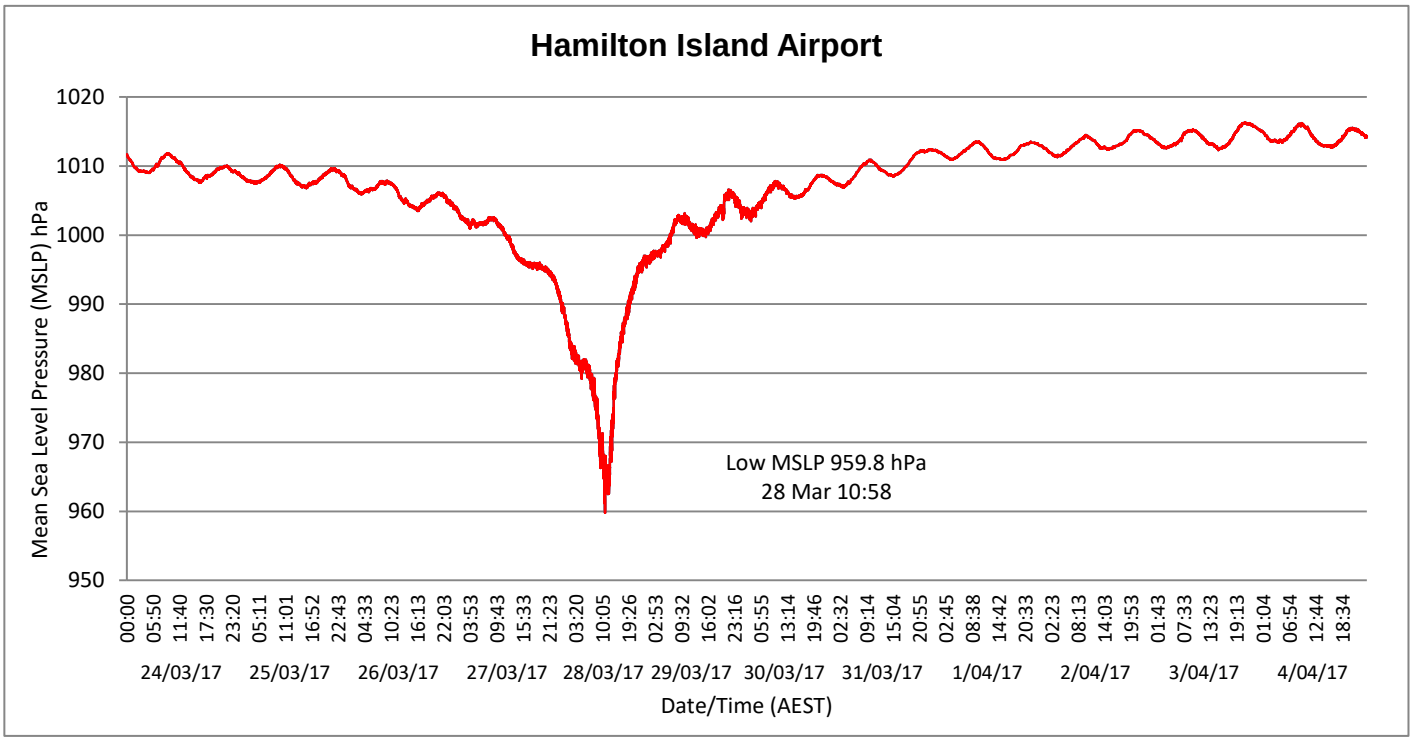


Figure 1: Hamilton Island Airport (033106) Mean Sea Level Pressure 959.8hPa (10:58am AEST on 28 March 2017)

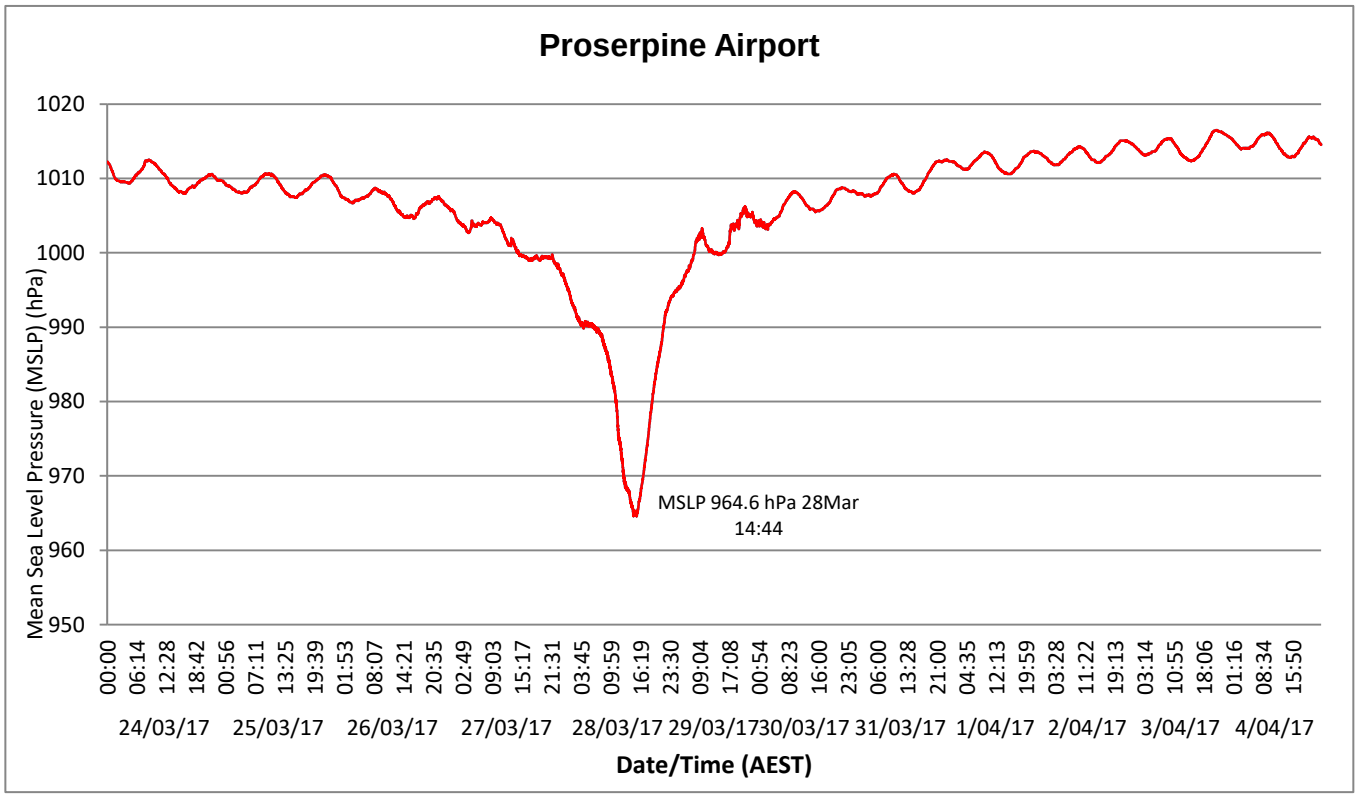


Figure 2: Proserpine Airport (033247) Mean Sea Level Pressure 964.6hPa (2:44pm AEST on 28 March 2017)

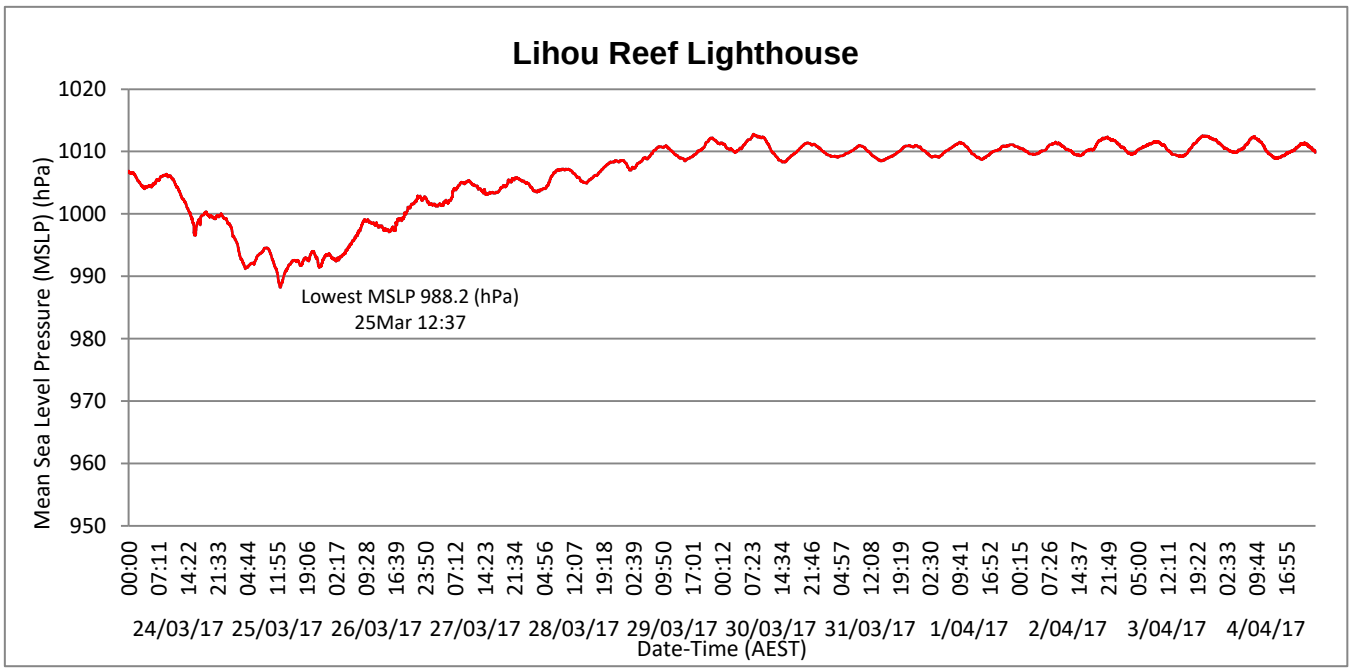


Figure 3: Lihou Reef Lighthouse (200880) Mean Sea Level Pressure 988.2 hPa (12:37pm AEST on 25 March 2017)

4.6 Tides

Positive tidal anomalies were recorded along most of the Queensland east coast, south of about Bowen, during the event. The maximum storm surge values were observed around the point of landfall with the largest storm surge recorded at Laguna Quays. However, it is important to note that storm surge values of up to 0.9 of a metre were still observed in southeast Queensland as *Debbie* underwent extra-tropical transition.

The table below shows some of the storm surge values observed along the Queensland coast during the event.

Maximum storm surge and storm tide levels (relative to HAT) during the event (source: DSITI[16]).

Location	Max surge (m)	Max storm tide (m above HAT)
Bowen	0.52	-0.16
Laguna Quays	2.66	0.91
Shute Harbour	1.23	0.21
Mackay	1.11	0.06
Urangan	0.90	-0.25
Mooloolaba	0.31	-0.19
Golden Beach	0.28	-0.20
Scarborough	0.77	-0.01
Shorncliffe	0.88	-0.07
Gold Coast Seaway	0.44	-0.09
Russell Island	0.75	-0.61

[16] Department of Science, Information Technology and Innovation (DSITI) fact sheet at: publications.qld.gov.au/dataset/19c20822-f29e-494c-880a-113ccd13a04b/resource/c0167030-3256-4e90-8c84-b949cb67be39/download/tc-debbie-factsheet.pdf

4.7 Waves

Large waves were recorded along the Queensland east coast, south of about Townsville, during the event. The largest wave height was recorded at Brisbane (offshore of North Stradbroke Island) with a maximum wave height of 9.55 metres. It is possible that larger wave heights may have occurred at Mackay, but were not recorded as the buoy sustained damage during the event.

The table below shows some of the maximum wave heights and significant wave heights observed along the Queensland coast during the event.

Further details about wave monitoring data during *Debbie* can be found on the Department of Science, Information Technology and Innovation (DSITI) fact sheet[17].

Maximum wave height and significant wave heights during the event (source: DSITI)

Location	Maximum wave height (m)	Significant wave height (m)
Townsville	3.67	1.97
Mackay	8.69	3.57
Hay Point	6.63	3.63
Abbot Point	5.85	2.92
Mooloolaba	6.15	3.46
Brisbane	9.55	5.37
Gold Coast	5.72	3.17

[17] Department of Science, Information Technology and Innovation (DSITI) fact sheet at: publications.qld.gov.au/dataset/19c20822-f29e-494c-880a-113ccd13a04b/resource/c0167030-3256-4e90-8c84-b949cb67be39/download/tc-debbie-factsheet.pdf